

HOUSEHOLD CONSUMPTION IN ANCIENT ECONOMIES:
POMPEII AND THE WIDER ROMAN WORLD

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Nicholas Martin Ray

Abstract

This thesis draws upon modern consumption theory to provide an interpretive research framework for examining material culture and consumer behaviour in the Roman world. This approach is applied to data from twelve Pompeian households to identify patterns of consumption, materiality, and motivations for the acquisition of commodities.

Analysis of the assemblage data is performed at multiple levels comprising weighted ranking of goods and the application of Correspondence Analysis, with investigation performed on both functional categories and artefact types. Setting the results against theories of consumption and rationality, consumer choice in the ancient world is examined.

From this detailed examination of twelve Pompeian houses, ‘core’ and ‘fringe’ commodities and recurring suites of goods are identified. Non-luxury goods are given particular attention as they provide information concerning the consumption of everyday utility objects. This approach also allows the evaluation of statements about the state of occupation of houses in sites such as Pompeii. The results validate this form of analysis as an important tool for assessing the role of the consumer in economies of the ancient world, moving beyond concepts of conspicuous consumption and group values.

This research provides a structured interpretive framework upon which varied archaeological data can be superimposed to interrogate the motivations behind commodity acquisition. This research also raises the potential for future consumption modelling using multivariate statistics. Through the application of consumer theory to Roman data, discussion of ancient economies is shifted away from a focus on production to one of demand, choice, and sites of consumption.

Keywords:

Consumption, material culture, household, Pompeii, materialism, correspondence analysis.

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PART I:

Theoretical Framework

CHAPTER ONE:
INTRODUCTION AND THEORETICAL FRAMEWORK

1.1: Introduction

Consumption is a concept that is seldom acknowledged as a feasible investigative tool for the ancient world, primarily due to its strong associations with economic studies. More specifically, as acknowledged by Fincham (2002), the conceptions of ‘consumers’ and ‘consumption’ have modernist connotations and have become synonymous with the idea of capitalism and the modern economic atmosphere. Thus, they are perceived as anachronistic in the realm of archaeological studies. Despite an ever increasing presence in the literature across the social sciences (Fine 2000, 1), and permeation into more mainstream, popular publications (for example, Douglas 2004), this view largely remains.

This thesis argues that these perceptions are misplaced and moreover, if correctly applied, consumption can be a useful lens through which the ancient world can be viewed. This will be achieved through dispelling the misinterpretation that the concept is solely capitalistic in reach, and subsequently by creating a working definition that also considers social and cognitive factors.

The aim and objectives of this thesis are as follows:

Aim:

To develop a framework within which aspects of consumption and consumer behaviour can be investigated.

Objectives :

- To assess the validity of the concept of the consumption of material goods (consumer durables) in the ancient world.
- To investigate and examine if consumption profiles can be established and consumer motivations and orientations identified, using household assemblage data from Pompeii.
- To investigate how a ‘life-event’ such as the 79 CE eruption of Mount Vesuvius impacted upon consumer behaviour and patterns of consumption.
- To establish a way to model patterns of the consumption of material goods in a Roman household using consumer theory.

This thesis comprises two parts: the first dealing in depth with theoretical frameworks and methodological issues; the second, an extended analysis of consumption patterns in a judgement sample of Pompeian houses. The theoretical framework will be constructed through looking at numerous aspects of consumption theory, including consumer perceptions, information processing, and materialism. This will be superimposed onto previous historical and archaeological studies that incorporate elements of consumption theory, and will be briefly summarised. Chapter Two examine ancient textual evidence to investigate the applicability of consumer theory to interpretations of socio-cultural context and consumerism in the Roman world. Subsequently, Chapter Three continues the discourse on documentary sources, introducing material such as historical probate inventories and ancient papyri, to address methodology and data concerns. This is followed by an examination of

previous case studies incorporating ceramic evidence into consumer theory, both in Roman archaeology and other branches of archaeological research (Chapter Four).

Part Two of the thesis concerns the Pompeian household assemblages, with Chapter Five introducing the data and describing the methodology that has been applied (Correspondence Analysis and weighted ranking of the objects). Chapters Six to Eight comprise data analysis and are structured so as to give diametrically opposed approaches: Chapter Six takes a bottom-up approach to produce a general analysis of the data, examining artefact functional categories by incorporating consumption profiles and statistical analysis of variables such as house size and state of occupation at the time of the eruption of Vesuvius in 79 CE. Chapter Seven continues this approach but focusing on the vessel data, divided by material and subdivided by artefact type and form. Analysis is completed by examining all of the vessels as a single assemblage component, irrespective of material divisions. Chapter Eight then takes a top-down approach and applies theoretical constructs from Chapter One to frame an investigation into materialism, analysing the data categorised according to the theoretical model. It comprises an overall discussion of the data in terms of consumer behaviour and orientations; the assemblage data is interrogated at the household level but also considers broader socio-economic implications. Finally, Chapter Nine summarises the main arguments in this thesis, identifies the limitations of the current study and discusses future implications and potential.

By structuring the examination of the concept of consumption into two parts, this thesis comprehensively addresses the subject of consumer behaviour from both theoretical and practical perspectives to assess the applicability of the constructs to archaeological data. This involves an assessment of the use of consumption theory in modern, historical, and archaeological contexts to investigate methods and practical

limitations. Building upon the discussion from Part I, the second half of this thesis applies the established theoretical framework to household artefact assemblages from Pompeii. Attempts are not made to intensively investigate every element of the data due to the impracticality of the endeavour; therefore, specific components are identified and targeted to maximise interpretational value. As such, ceramic, glass, and metal vessels are subjected to the most intensive analysis, after an overview of the entire data set. A more theoretically integrated approach will complete the analytical component by testing the limitations of modern theoretical constructs.

1.2 ‘Consumption’ and ‘the Consumer’

1.2.1: What is ‘Consumption’?

In the fourteenth and sixteenth centuries respectively, the words ‘consume’ and ‘consumer’ were already in use, albeit with pejorative connotations; to use up, devour, exhaust. The economic sense of the words was developed by the mid-19th century with regard to the bourgeois, with ‘consumption’ becoming a contrast to production (Aldridge 2003, 2; Williams 1988, 78-79), as witnessed by Adam Smith who wrote in *The Wealth of Nations* that “Consumption is the sole end and purpose of all production” (Smith 1976 [1776], 660). Prior to this, ‘consumption’ was used in reference to any wasting disease, frequently referring specifically to tuberculosis (Aldridge 2003, 2; Brewer and Porter 1993, 4).

Today, the act of consumption occurs in various forms and is not merely an economic behaviour (Bocock 1993, 2-3). It has numerous socio-cultural contributing factors, cumulatively representing a human activity that is frequently taken for

granted (de Grazia 1996). As such, consumption is not limited to advanced capitalist societies, but also occurs in societies that are predominantly rural and agriculturally based. Once determining social or cultural influences have been experienced, the *desire* for goods or behaviour can transcend the economic factors, irrespective of the individual's capability to acquire them (Bocock 1993, 3). Furthermore, consumption is not restricted to material goods, as it can encompass political or social activity. For example, education has been included by some as an act of consumerism, although Douglas and Isherwood (1996, 109) argue that this is not the case, but is instead an investment in human capital. Gibb (1996) extends the list for consumer behaviour to include farm animals, as well as how people bury the dead. Holt (1995) uses baseball spectators as an example of consumers, through their consumption of the sport; what he calls 'consuming as play'. A positive consequence of widening the concept of 'consumption' in such social science studies has been that it is less often approached through a supply and demand theoretical framework, reducing its ahistorical character and serving to remove the focus from a primarily material-content view of acquired commodities (Fine 2000).

Fine (2000, 9) describes consumption as a conduit for cultural influences, reinforcing the necessity for creating distance from traditional supply-demand frameworks and producer-consumer oppositions. Anthropologists have applied this symbiotic material-social double-role perspective to consumption extensively, resulting in it being practically axiomatic (Douglas and Isherwood 1996, 39). By widening the context within which consumption is studied, especially incorporating the concept of identity, the scope for its application becomes 'unlimited' (Fine 2000, 11). Regarding the ancient world, Smith (1999, 116) and Vaughn (2004, 63) state that the study of consumption is a logical step, as the archaeological record is composed of

innumerable physical traces of consumption activities; “archaeological evidence for consumption is ubiquitous” (Smith 1999, 116).

In the same way as consumption itself, the *study* of consumption is not restricted to the field of economics; it is multidisciplinary. Fundamental concepts from the disciplines of psychology, sociology, social psychology, and anthropology are all influential in the study of consumption and consumer behaviour (see *table 1.1*). However, the study of the subject is largely separated into two polarised groups: formal, rational behaviour studied through economics; and other irrational cultural contexts studied through branches of the social sciences (Aldridge 2003, 7-8; Slater 1997, 51).

Irrespective of the perspective from which researchers approach the subject of consumption, the emphasis is upon understanding and explaining why, and how, people acquire what they do (Bagozzi, *et al.* 2002, 1). Recent pleas for more integrated recognition of both functionalism and symbolism (for example, Miles, Meethan, *et al.* 2002; Smith 1999; Warde 2002) have helped broaden the concept of consumption. Subsequently, there has been a shift in attitude away from the mechanics of capitalist production and its resultant impact on consumption behaviour, towards cultural and communicative systems balanced with utilitarian use.

Table 1.1: Concepts used within the Social Sciences to Explain Consumption (and Consumer Behaviour)

Discipline	Definition	Influential Concepts	References
Psychology	The study of individual behaviour	Motivation Personality Perception Memory Learning Cognition Attitudes Emotion Processes of communication	Bagozzi, <i>et al.</i> (2002); Henry (1991); Robertson (1970); Schiffman and Kanuk (1987).
Sociology	The study of group behaviour	Group dynamics The role of symbols Group membership Family structure Social class	Bagozzi, <i>et al.</i> (2002); Henry (1991); Robertson (1970); Schiffman and Kanuk(1987).
Social psychology	The study of individual behaviour in a group context	Interpersonal behaviour Influence (persuasive communication) from: Peers Reference groups Other respected individuals/groups Attitudes Emotion	Bagozzi, <i>et al.</i> (2002); Henry (1991); Robertson (1970); Schiffman and Kanuk(1987).
Anthropology	The study of groups of human beings and their behaviour and productions	Culture Acculturation Assimilation Innovation Diffusion Adaptation Geographical and temporal change	Douglas and Isherwood (1996); Henry (1991).

1.2.2: Defining 'Consumption'

Within anthropological studies on consumption, the term has been defined by Douglas and Isherwood (1996, 37) as the use of material possessions beyond commerce and free within the law, enabling the concept to be used for non-state societies that lack not only capitalism, but also commerce. Similarly, the broad definition of consumption involving the selection, purchase, use, maintenance, repair, and disposal of any product or service (Campbell 1995, 102) has been applied in archaeological studies (for example Smith 1999, and Vaughn 2004). Therefore, for the purposes of Roman archaeology, the term 'consumer' can be stripped down to its fundamental meaning allowing for significant application to economic studies: someone who consumes a certain thing, regardless of how, or why (Fincham 2002, 34). In addition to the acquisition of objects/'products', Schiffman and Kanuk (1987, 6) define consumer behaviour as "the behaviour that consumers display in searching for, using, evaluating, and disposing of products, services, [practices,] and ideas which they expect will satisfy their needs" (also see Bagozzi, *et al.* 2002, 1 and 171; de Grazia 1996, 3-4). Further to this, consumption is more often than not interpreted as individual rather than collective behaviour, with the impact of ruling institutions and the state neglected (de Grazia 1996, 9). This is an important point when applying consumption studies to the ancient economy and the Roman world.

Additionally, consumption provides an alternative perspective from which to investigate the ancient economy, compared to the much-used approach of production (for example, Mattingly 1988a; Wilson 2001, 2002a, 2002b). This is not to say that the two are entirely separate entities within the same economic continuum, parasitical consumers versus functional producers. Instead, they exist through complex reciprocal relationships (Courtney 1997, 98). For example, the mode of production

sets the parameters within which other activities (such as consumption) can occur, but it does not determine such activities (Bocock 1993, 6). As with production, consumption – and thus consumer behaviour – is embedded in social structure (Foxall, *et al.* 1998, 213) and relates to issues of trade, transport, marketing, and sale, as well as the larger issue of the ‘ancient economy’. Therefore, to examine the dual concepts of production and consumption separately is to consider only half of an interrelated nexus (Belk and Ger 1994; de Grazia 1996; Leach 1993, 149), and they should consequently be seen as ‘imbricated’ (i.e. overlapping) in order to reach a full understanding (Aldridge 2003, 31). It could be argued that the connection is more entwined than this, with the act of production only being possible through the consumption of raw materials and labour (Smith 1999, 116).

1.2.3: Consumption as Symbolism

Just as consumption is not solely an economic process, it also represents more than the utilitarian, material object, encompassing cultural signs and symbols. It is a system, or process, communicating social meaning through which people convey symbolic messages to themselves as well as to others on matters such as class, social status, and identity (Aldridge 2003, 10-24; Belk 1985; Bocock 1993, 2-3; Corrigan 1997; Douglas and Isherwood 1996; Hodder 1982; Howard 2000; Lee 1993; McCracken 1986; Rook 1985; Schor 1998, 25-63; Shankar *et al.* 2009). As an extension of this, Holt (1995, 2) argues that consumption consists not only of actions in which consumers directly engage objects (object actions) but also interactions with other people in which consumption objects serve as focal resources (interpersonal

actions). Similarly, consumer actions can be ends in themselves (autotelic actions), as well as a means to further ends (instrumental actions). This contrasts with other views that essentially see production as being about means, and consumption being about ends (refer to Persky 1993, 187).

Furthermore, diverse aspects of culture, including political, social, religious, military, and technological fields (MacKinnon 2004, 11-12) are pervaded by consumption, with numerous factors impacting upon the behaviour of consumers and affecting their subsequent actions. For example, identity is a powerful, fluid, context-dependent perception that influences consumption through the desire to belong to a group, or a social/cultural unit. This, in turn, is thought to be centrally influenced by gender, amongst other factors (Aldridge 2003, 10-24; Fine 2000, 10; Miles *et al.* 2002a; Roberts 1998; Schroeder 2003).

The use of the term 'reference group' has been used in consumer studies to describe an individual, or collection of people, whom the individual uses as a source of behaviour, values, or beliefs. Therefore, they form a frame of reference for a person's actions, and may represent a group to which the individual belongs or one they aspire to join, although complete conformity is rare (Foxall, *et al.* 1998, 214-17). Conversely, negative reference groups can exist, inasmuch as the actions or behaviour of an individual or collection of people are repugnant to a consumer, causing dissuasion and active evasion of those actions. Consequently, consumers appear to select collectives that are compatible with their self-concepts; the family often forms one of the most important social influences (Foxall, *et al.* 1998, 218-19). Reference groups influence consumer behaviour through three primary interpersonal mechanisms, referred to by their effects (Foxall, *et al.* 1998, 213-18):

- Compliance - the power groups have to reward or punish group members, or aspiring members.
- Identification - the group gains 'power' and influence over the actions of the individual consumer because of that person's liking for the group; the individual adjusts to match what is observed.
- Internalisation - the process whereby consumers adopt the beliefs and behaviours of the group, making them their own, thus internalising them.

These mechanisms are important to note when considering actions influencing consumer behaviour and underlie most analyses incorporating artefactual components. For example, the permeation of 'Roman' material culture can be reflected through the mechanism of internalisation, in which individuals manipulate the use of 'Roman' objects as an expression of indigenous culture (for example, Cooper 1996).

Identity is not a new concept to Roman archaeology, with the relative paradigm of 'Romanisation' having been the focus of numerous studies (for example, Freeman 1993; Keay and Terrenato 2001; Mattingly 2002; Millett 1990a, 1990b). However, it is important to realise that not only is this term generally inadequate, but it is often misapplied as archaeological evidence is misinterpreted. This predominantly occurs when archaeologists have interpreted the adoption of Roman-style material culture, such as ceramics, by indigenous populations as being representative of emulation, or an attempted association of identity with the Romans. Such approaches do not consider the possibility of an adapted use of 'Roman' objects as an expression of the indigenous culture, rather than a process of emulation (Cooper

1996). Therefore, the term ‘creolisation’ is seen by some to be a more appropriate substitute for ‘Romanisation’, as it acknowledges a cultural hybridisation resulting from a two-way process (for example, Cooper 2000; Webster 2001).

It is necessary to use such elements from consumer theory to expand interpretation of commodity acquisition beyond objects that are ‘needed’ or those that are ‘available’. Relevant conceptual areas include: product involvement, perceived risk, and information processing, all of which relate to consumer perception. These will be discussed in greater detail later in this chapter.

Having identified and defined consumption as a concept, several significant facets of consumption theory will be addressed in more detail: (i) consumer perception and information processing will be discussed to permit a semi-psychological perspective into examining consumer motivations; (ii) materialism will be approached as a construct that can be investigated through archaeological evidence and is an adjunct of consumer perception that can potentially be measured through material culture; (iii) globalisation places the argument within a broader context, with demand and acquisition of consumer goods being an important mechanism within this frame; (iv) the concept of satisficing behaviour will also be addressed as this combines the facets of consumer motivation with rationality and accessibility to consumer durables. Considering these components creates a stable framework within which archaeological evidence can be examined. This will initially be done through an investigation of historical and ancient documentary evidence, and of pottery as a tool for investigating consumption and consumer behaviour. Attention will be paid to methodology, and to the applicability of these techniques for the ancient world. Prior to this, however, wider theoretical issues regarding establishing models for the ancient

economy will be addressed in relation to this study and the wider issues surrounding consumption.

1.3: Beyond Generic Models for Ancient Economies: The Role of Consumption

In this section, emphasis will be placed upon the theoretical basis of studies of the ‘ancient economy’. By briefly outlining past models and perspectives on the subject, the potential for consumption studies within a broader framework will be identified with parameters redefined where necessary.

One fundamental issue for ancient historians, archaeologists, and economic historians is whether economic concepts, terms, and theories are social universals. Some (for example, Davies 1998) argue that they can be applied to investigations of the ancient world, whereas others (such as Finley 1965; 1985) argue against this.

Through modernising perspectives Rostovtzeff (1957) referred to the Roman Empire as a single economic unit and saw the main source of large fortunes as resulting from commerce and commercial activity. Within this model, large agricultural estates reached levels of production that extended beyond self-sufficiency and consumption within the estate, producing for market sales (1957, 170-75). Furthermore, purchasing power was seen by Rostovtzeff as significantly influential on industry, with the ‘*Bourgeoisie*’ having large purchasing power, but being small in number (1957, 352). The lower classes and the country population, however, were large in number, but their purchasing power was small – the aggregate power of which was not discussed (1957, 177). Relating to this, he saw competition rise

through an increase in consumer presence impacting upon the economy through industrial advance, such as mass production for an indefinite market (1957, 351-52).

Finley did not just avoid the terminology and conceptualisation of modern economics, but argued that such notions did not exist in antiquity. He saw the application of concepts such as efficiency, productivity, rationalism, and growth as misguided because the ancient world was not one concerned with exchange value or market economy, but use-value (Finley 1965; 1985; Scheidel and von Reden 2002).

For Finley the consumer existed in terms of his 'consumer city' model; the crux of which is that in antiquity agriculture was the dominant mode of production, while industry was minimal, with towns fulfilling the parasitical position of net consumers (Finley 1985; Frederiksen 1975; Grahame 1996, 151; Greene 1986; 2000; Jones 1974; Mattingly and Salmon 2001, 3; Parkins 1998, 4-5; Scheidel and von Reden 2002). Furthermore, he argued that towns paid for goods and amenities through the consumption of products from their hinterlands, with only small contributions from trade and manufacture, although he did allow for some limited economic progress (Finley 1965, 194; Millett 2001).

Finley was influenced by Karl Polanyi's substantivist perspective, which viewed exchange transactions as embedded in social relationships, and not part of a free-market environment with a price-demand mechanism (Davies 1998, 234; Polanyi 1975, 1977). Consequently, Finley saw trade and manufacture as peripheral to the main socio-political fabric and above economic rationality; status and civic ideology, rather than supply and demand, governed economic decision making (Frederiksen 1975, 165-66; Mattingly and Salmon 2001, 3; Scheidel and von Reden 2002).

The Finley and Rostovtzeff frameworks are related to the formalist and substantivist positions. Davies (1998, 233) explains that the formalist perspective

holds that the ancient economy was recognisably similar to modern economies, but was 'less-developed'; it was a functionally segregated sphere with its own profit-maximising, want-satisfying logic and rationality. The substantivist position, however, views the ancient economy as having been not just 'less-developed', but socially embedded and politically overdetermined; it was *irrational*.

The current dominant perspective for studying ancient economies is encapsulated in a statement by Meikle, who argues that ancient activity can be explained in terms of economic concepts, even though these concepts were formed later: "economics merely makes explicit what has always been implicit in economic activity" (2002 [1995] , 237). Similarly, Temin (2001) argues that modern theories are applicable but the nature of archaeological data means that it is necessary to adapt methods so that they satisfy the context of the research questions. Therefore, the issue becomes one of establishing a method for *approaching* the subject, let alone establishing the 'answer' itself, for there is no singular model for an 'ancient economy'.

It is only through detailed consideration of the archaeological record that attempts can be made to test the validity of a proposed model (Mattingly, *et al.* 2001, 67) or enable a progression towards more carefully directed research questions. Mattingly and Salmon (2001, 4) stated that most studies are qualitative as opposed to quantitative with regard to the ancient economy, with few exceptions (such as Duncan-Jones (1982; 1990)). However, the application of archaeological evidence is resulting in a greater availability of exploitable quantifiable data suitable for numerous kinds of enquiry into ancient economies.

The focus of the significant body of work regarding theoretical frameworks and models for the ancient economy rests upon production. Within this, questions of

scale continue to be the central issue. Consumption as a concept and an investigative tool has remained marginal to discussions, gaining little more than casual comment. I would argue, however, that consumption studies deserve a more central role in the debate, offering a valuable alternative from which to view the subject.

Within the confines of consumer behaviour and the identification of consumption patterns, the debate is shifted away from the usual 'scale of production' arguments to one of access and market availability, in addition to the numerous other cultural issues that can be addressed. As such, it creates an opportunity to tackle the topic of market economies from the other side: that of the consumer, the destination of goods.

In order to establish a working method for the application of this conceptual tool it is necessary to examine how it has been previously applied in archaeological and historical contexts. By doing this, a more secure methodology can be determined, which acknowledges problematic issues encountered elsewhere and recognises the potential of the data.

1.4: The Concept of 'Consumption' in Historical and Archaeological Studies

Roll (1961, 12-14) and Said (1993) both argue that a person's perspective upon the world is influenced by their position within it and the experiences they encounter: theories are related to economic practice. This concept has been referred to as 'discrepant experience' (Said, 1993) and can be encountered in archaeological scholarship in numerous contexts, such as those addressed by Mattingly (1997; 2002) and Hingley (2005) in terms of Roman imperialism, and Greene's perspective to

approaching ancient economic interactions (1986; 2005). In relation to this thesis the concept can also be found in studies relating to economic actions, with our current views of consumption and consumerism affecting our perceptions of acquisitive behaviour and exchange. This section will concentrate on presenting the varying perspectives and approaches taken to apply the archaeological record to address consumptive behaviour.

In the nineteenth century many studies, especially those by Weber and Marx, were characterised by interest in the rise of capitalism and the question of power in society (Whittaker 1995). Greene (1986, 11-12) is in agreement with Roll's assessment and argues that Rostovtzeff (1957) arrived at his opinions in interpreting social, political and economic interactions as a result of influences received from direct experience of the Russian Revolution and American capitalism.

Fincham (2002) argues that the concept of discrepant experience can be extended into the study of consumption through 'discrepant consumerism': a process by which objects have social lives (Appadurai 1986; Gosden and Marshall 1999; Kopytoff 1986) and the meaning of an object changes between social, cultural, political, or personal circumstances. These circumstances, or locations, within the object's life thus represent discrepant consumerism. One example of such a process is highlighted by Werbner (1990) through gift economies that become embedded in capitalistic, market-commodity economies, and in plural societies. Commodities can be converted into gifts (becoming customary, ranked, personalised) depending of the social context of the transaction, although they can still be responsive to changes in the market (inflation, fashions etc.), and can also subsequently be reconverted into commodity-level objects (see Gregory 1982). This is a valuable facet in the study of the consumption of goods but is difficult to identify and access in the majority of

artefact assemblages in the archaeological record. Therefore, it is information that will only be assessed at a peripheral level for the Pompeian data (as it concerns transitions in object status and utility).

Douglas and Isherwood (1996, 131) state that for less developed countries it is not difficult to recognise different consumption patterns as they usually correspond to different levels of income, and to a very obvious social stratification. Such consumption patterns might also be evident in Roman archaeology as status was of paramount importance in Roman society. Recognising consumer behaviour in archaeological contexts generally means a focus on rich, high status people. This is primarily because the surviving evidence is material culture, which is more conspicuous and 'available' in elite houses. This does not mean that the poorer classes are ignored, rather that elite consumption creates a relative scale with which comparisons can be drawn permitting a further understanding of poverty and consumption patterns (Douglas and Isherwood 1996, 108). An example of the application of this is purchasing power through coinage – but this is only *one* aspect of the acquisition process.

This provokes the question of just how visible are the poorest classes in the archaeological record? Barclay, *et al.* (1990, 69) state that urban domestic sites from Medieval Winchester “did not compare unfavourably” in terms of their consumption of goods compared to the greater houses. Although when the status of the residents from these houses is considered, it becomes evident that they were not 'poor', rather, an impression of an occasionally wealthy inhabitant is presented (Hinton 1990, 34).

Status at an individual level in the Roman world is difficult to identify through material culture assemblages. Within Roman houses there was a range of social standing, from the 'owners' at the top of the hierarchy to the servants at the bottom

(cf. George 1997; Gallivan and Wilkins 1997). Separating who owned what is an unattainable target and therefore individual status levels are not possible to identify with a high degree of confidence. Subsequently, this impacts on issues of cultural value, as occupants of the house will have ascribed values differently.

Regardless of the context of the data, several important questions regarding consumption patterns can be identified. For example, below are two outlined by Douglas and Isherwood (1996, 134), and a third by Fine, *et al.* that echoes these (1992b, 2):

1. Do consumption patterns exist at all in a distinguishable way?
2. Are consumption patterns determined by different positions on the scale of income distribution?
3. Are there particular consumption patterns that can be regularly observed across the population or subgroups of the population?

One often-used method of consumption analysis consists of defining social classes in terms of spending habits, which are then linked to occupation and income groupings to create categorised guidelines. However, although goods could define social class, Douglas and Isherwood argue that they could not then be used to explain consumption behaviour, as occupation categories are not a safe guide (1996, 131-32).

Brewer and Porter (1993, 3) stated that one of the primary problems of the concept of consumption, when applied to economic history and material culture, was that it was “historiographically immature”. When this statement was made, the focus of the application of the concept had been placed upon the 18th and 19th centuries; for example, Branstner and Martin (1987), Church (1999), Johnson (1988), LeeDecker, *et*

al. (1987), McKendrick, *et al.* (1982), Shammas (1993), Spencer-Wood and Heberling (1987), Weatherill (1988; 1993). Nevertheless, ‘consumption’ has been applied more recently to other branches of archaeological study, such as archaeology of the 20th century (Hudson 1983), Native America (Bayman 1996), Latin America (Vaughn 2004), Medieval (Courtney 1997), and Bronze Age (Webb 1998). It has also received thematic emphasis in some areas, such as architecture as conspicuous consumption (Russell 1998; Schoep 2004; Steinberg 1998; Trigger 1990), and archaeological sites have even been seen as objects of consumption, such as Stonehenge (Hetherington 1992). Despite this, consumption received a tentative introduction to Roman archaeology, in studies such as Laurence (1994) – although more integrated in his second edition (2007) – and Paterson (1997), although sometimes the Finleyan associations with ‘consumption’ remain (such as Horden and Purcell 2000). However, its practical application has slowly been permeating further into Roman studies, some of the more significant of which will be discussed below. *Table 1.2* summarises numerous studies that have applied the concepts of consumer theory, although ‘consumption’ *per se* is not always conceptually acknowledged, particularly in relation to identity.

Table 1.2: Summary of archaeological studies of consumption

Studies	Region/Era	Evidence/Data	Focus
Bayman (1996)	Classic Hohokam platform mound site of Marana, Arizona	Finished shell ornaments from domestic refuse middens	Through geographical sourcing, the implications for political and economic integration of consumption were examined: there was a geographic concentration of ‘consumed’ shells in a marginal environment for food production, which would have been exchanged for food within networks that helped to maintain social inequality.
Vaughn (2004)	Latin America - Early Nasca society (c.1450)	Ceramic assemblages	Demonstrated how polychrome pottery was consumed by individuals of varying social status, thereby negating a simple prestige-utilitarian dichotomy. Differential consumption was represented by vessels associated with ritual behaviour.
Burke (1993)	Contrasts consumption in early modern Europe (1500-1800) with China (under the late Ming and early Qing dynasties) and Japan (under the Tokugawa).	Interior decoration and furnishings, limited to elite individuals and households	Focus was placed upon conspicuous consumption, especially aspects of symbolism and significance.
Johnson (1988)	Dynamic nature of social relationships among urban working-class families (1870 – the end of World War One)	Records of how people spent their money, reflecting consumption patterns.	Demonstrated that conspicuous consumption occurred in many forms (such as clothes and housing), and had cultural implications for establishing social position. However, the evidence used was qualitative, not quantitative
MacKinnon (2004)	Roman Italy	Textual and zooarchaeological data	Studied of the production and consumption of animals, assessing the role of meat and other animal products in the Roman diet; involving the acquisition of food resources (including trade, transport, marketing, sale, and distribution), diet, preparation and eating of consumables, as well as disposing of the waste. The subject of ‘the ancient economy’ was avoided, however.
Blyth (1999)	Roman world	Epigraphic and literary evidence	Took an alternative approach to consumption and examined fuel and water consumption in Roman baths in order to deduce the running costs of such establishments.

Studies	Region/Era	Evidence/Data	Focus	
Hawkes (2001)	Roman Britain	Integrates ceramic evidence with faunal and botanical remains	Identity	Examination of the construction of identities through the preparation and consumption of food. The overall conclusions were limited: food was important in constructing identity and Roman presence had little impact on native eating habits.
Cooper (1996)		Pottery		Examines the transference of ‘Roman’ material into indigenous material culture. The ceramic evidence demonstrated that it is not possible to attribute the consumption of ‘Roman-style’ pottery to processes of emulation and ‘Romanisation’; rather indigenous expression through material culture needs consideration.
Eckardt (2000) (see also Eckardt 2002)		Ceramic lamps		Examined the construction and negotiation of identity in Roman Britain through the cultural use of artificial light. Concludes that lamp use is not explained by a single factor and that context is significant. We also need to consider regional differences, status, and the military-civilian and urban-rural divides.
Carr (2001)		‘Body-related’ artefacts (brooches, hairpins, toilet instruments, cosmetic grinders)		Considered the use of these objects to investigate the adoption, adaptation, and/or rejection of ‘Roman’ items and practices; with typological and chronological information available for these forms of artefacts, the diachronic aspects of these facets could be examined. However, the assumption is made that ‘identity’ equates, and is limited to, appearance.
Spradley (2001)		‘Small finds’		Expanded discussion from specific artefact types, such as brooches, to a more integrated examination of the potential of ‘small finds’ to investigate consumption and identity. Consisting of relatively shallow quantitative analysis, it took the perspective that people express their identity through the manipulation of their environment, including objects.
Cool (2006)		Eating and drinking apparatus		Challenged the idea that being ‘Roman’ or ‘native’ can be explained in a single way. A variety of forms of evidence were considered, including pottery, metalwork, documentary, faunal, and floral. The strengths and weaknesses of the different forms are examined.

Studies	Region/Era	Evidence/Data	Focus
van der Veen (1998; 2008). See also, 2003 volume of World Archaeology edited by van der Veen.	Mons Claudianus; Roman Britain	Archaeobotanical remains	Investigation of the trade and consumption of luxury foodstuffs, addressing factors such as accessibility of commodities, broadening of diets, and the expression of identity.
Martins (2003; 2005)	Roman Britain	Villas	Consumer theory was applied to examine social aspects of individuals' behaviour. Conspicuous consumption was evaluated and consideration was given to components psychological factors that may have influenced villa variability, such as landscape aesthetics and proximity to connective routes. The detailed engagement of data with consumer theory in this study has been valuable in expanding the use of modern consumer studies to include socio-psychological elements hitherto not acknowledged in archaeology.
Jongman (2007)	Roman Empire	Osteoarchaeological and zooarchaeological remains	Meat consumption as a proxy indicator for human stature and relative prosperity within the Roman Empire. Application of the data is unconvincing, however, as there is no allowance made for stature variation across the empire as a result of factors such as geography, climate, or even ethnic group.
Greene (2008)	Roman Empire	Examines previous studies of applied art, bead necklaces, pottery, and lamps.	Argues that some forms of Roman consumption can fall under the label of consumerism, and highlights the importance of the communication of knowledge, especially in regard to technical innovation (see also Greene 1992; 1994; 2000). Suggests that a sufficient rapidity of change in fashions and tastes is indicative of consumerism. Furthermore, argues that such behaviour can be exhibited through disposal as opposed to production and acquisition. Greene's perspective is consistent with some studies of modern consumption that argue consumerism is about excess and not necessity (for example, Chua 2009); however, although excess is a condition of consumerism, not all excess consumption is assumed to equate to consumerist behaviour.

1.5: Consumer Perception and Information Processing

The desire for goods or behaviour is far more than an economic-driven phenomenon and, as such, encompasses the constructs of rationality as well as consumer perception and information processing. The act of consumption relates to expectations to satisfy a person's – a consumer's – needs. One of the underlying themes in the evaluation of consumer behaviour is the concept of 'needs' versus 'wants'. This has taken many forms in the evolution of its discourse, most commonly through the needs-wants division, otherwise stated as necessities-luxuries. This strict division is oversimplified, however, as the concept of luxury – 'items of desire' – is situational and individual, or at best collective. Different people have different concepts of what is needed and what is desired, relating to consumer preference (see Belk *et al.* 1997, 24; Berry 1994; Bloch and Richins 1983; Bourdieu 1984; Foxhall 1998; Gilbraith 1987; Greene *et al.* 2008). 'Non-urgent' or 'created' wants are seen to be stimulated by the process of emulation described by Veblen (1994[1899]; Gilbraith 1987; also see Campbell 1998) and correlate with the assertion that "our desires are not simply person-thing relationships they inevitably involved other people" (Belk *et al.* 1997, 26).

Kleine and Kernan argue that through perception consumers engage and respond to their interpretation of an object and "not the literal 'objective' object". Through this, an 'aggregate perception' of a consumption object is constructed by the individual through two dimensions: (i) an interpretation of the object's attributes (*attribute dimension*) and (ii) its action potential (*performance dimension*) (Kleine and Kernan 1991, 312).

When it comes to consumer information processing there are two types: *rational* and *experiential* (Novak and Hoffman 2009, 312), which contribute to social cognition, or how we store and process information (Fiske and Taylor 1991; Howard 2000, 368; see also Jacoby *et al.* 1998). The measurement of commodity attributes links into satisficing behaviour or ‘rule following’ (Mellers *et al.* 1998, 447) as a consumer will balance gathering information to make a choice with any necessary expenditure to gain this information. Quite often this process is performed through proxy measurement of commodity attributes (Barzel 1982, 42-46). This is especially pertinent to the ancient world, with glass vessels being an example. As discussed in chapter six, in the third century¹ such goods were sold according to their weight, a unit of measurement that was not the desired attribute (Stern 1999, 461-2). Greene *et al.* report that “the capacities of the jars would have been of most interest to merchants and consumers” (2008, 695) but this could have also included liquid retention, or even colour. The inherent problems of the measurement of attributes pervade all economic transactions (Barzel 1982, 48) and are not limited to the modern world. For example, documentary evidence relates that the value of bread was often measured by quality of flour, with lower quality bread being purchased for slaves (cf. Matthews 2006; Scheidel n.d., 4; Pliny *NH* 18.90).

The fact that people cannot possibly possess all of the information about goods and their sale/exchange is a key part of social cognition, with the suppression of obtainable information necessary to pre-empt “excessive measurement” (Barzel 1982, 48). There are, however, steps that can be taken to reduce expenditure on attribute measurements. For example, if an individual is presented with a product choice and attribute information is incomplete, inferences about missing attributes can be made to

¹ It is uncertain whether this practice was in place in the first century.

avoid choice deferral, based on perceived knowledge and relationships (Gunasti and Ross 2009, 823-4).

Moreover, repeat purchases and the subsequent development of a bond of trust can also be significant; in the modern world this also includes reliance and acceptance of 'brand name' (Barzel 1982, *esp.* 48). There is potential evidence for such behaviour in the archaeological record, such as the following example presented by Greene *et al.* (2008, 405-6): in their discussion of artefacts from a sixth century BCE shipwreck in Turkey, they suggest the presence of *mortaria* and pitchers can be explained by their use in exchanges to provide accurate measurements for smaller quantities of amphorae products. This process could also have involved taste-testing some products before purchase to ensure quality and product confidence. Such building of trust would have probably made the measurement of commodity attributes superfluous for future exchanges as a social connection (and trust) had been established between the consumer and the distributors. This falls within the scope of consumer memory and experiential information processing (*cf.* Jacoby *et al.* 1998; Novak and Hoffman 2009). In modern contexts this behaviour of building customer relationships would be considered 'loyalty marketing' (Ferguson 2009, 214). The use of this term for the ancient world, however, is, perhaps, inadequate because the context is too embedded in capitalist connotations. Adaptation to a concept of 'loyalty purchases' would, perhaps, provide a more suitable alternative. *Figure 1.1* depicts a conceptual model of the interrelationships on this basis between a consumer and a merchant, where trust is transformed into loyalty to a product and/or trader.

If the purchaser was a merchant himself, the creation of social bonds such as these would "facilitate the sale of bulk goods in unmarked and nonstandardized containers" (Greene *et al.* 2008, 706). Such cases can be encountered in modern

business exchanges, such as a small family-owned business favouring supply purchases on trust relationships ahead of value and competition (Monat 2009, 23). This example would not be called economically ‘irrational’ as the agents involved would have evaluated the available information and perceived less risk by maintaining experiential exchange links. In the ancient world, perhaps itinerant traders fulfilled this role as ‘middlemen’ in the circulation of goods to the consumers outside of the urban core of the Pompeii service area (Peña and McCallum 2009b).

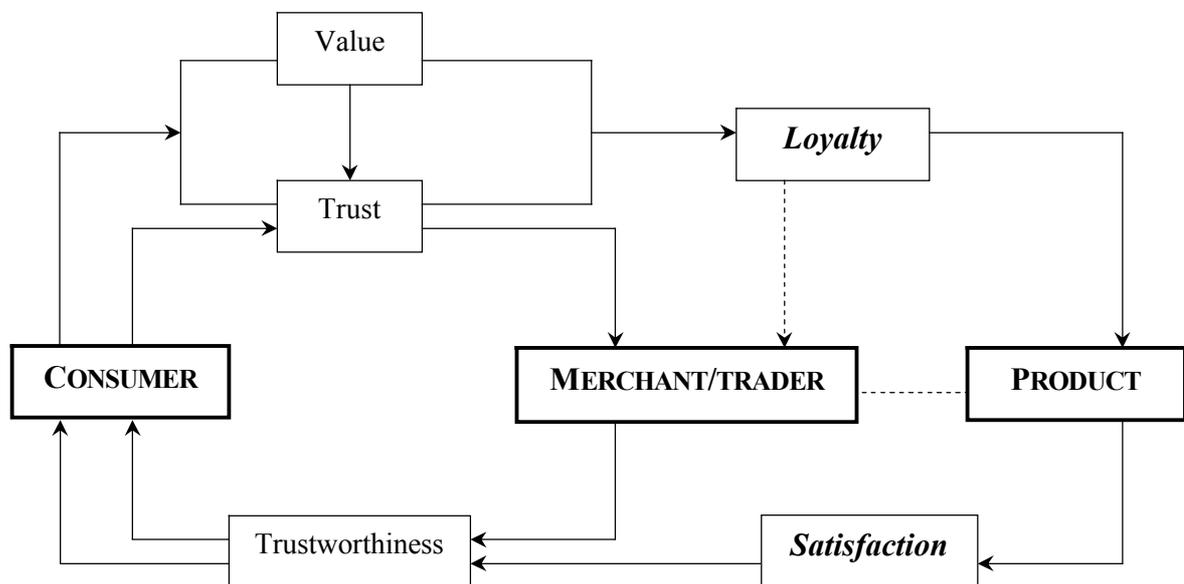


Figure 1.1: Conceptual model of consumer–merchant trust relationships (after Alhabeeb 2007, 611, figure 1)

The repeated act of consumption over time inevitably incorporates the application of memories, a form of asset called ‘experiential capital’, which helps an individual navigate through daily life and strengthen self-definition (Zauberman *et al.* 2009, 715-16). This use of knowledge can be divided into objective and subjective forms, which reflect ‘what a person knows’ and ‘what a person thinks they know’. The correlation

between these can consequently affect consumer decision-making, such as between luxuries and necessities, where subjective knowledge becomes inflated through social influence and can result in ‘irrational’ choices (Carlson *et al.* 2009, 864-7; Guo and Meng 2008).

Exposure to reference groups has an added effect on consumer behaviour, through re-active attitudes influencing informational function, and thus alters subsequent consumptive actions (Ferraro *et al.* 2009, 729-30). For example, if a person has an incidental encounter with a reference group member interacting with an object, this may lead to the processing of information about the item as well as the person themselves. The relative ease with which people can identify an object (a ‘stimulus’) is referred to as perceptual fluency, which is another form of experiential information processing (Ferraro *et al.* 2009, 730). An object that possesses high perceptual fluency is one that rapidly projects automatic information to the observer. In the context of the Pompeian households, this would include items that were conspicuously displayed, such as personal ornamentation or even aspects of the house itself, be they architectural or decorative. Roman streets were performance areas where religious, civic, and social identities could be asserted and reinforced. Appearance was judged first and foremost on their appearance, constructed through clothing, jewellery, and attendants (described in the first century BCE by Horace in *Sat.* 1.6.78–80; Potts 2009, 68-9; see also Christopher and Schlenker 2000).

In the Roman provinces, perceptual fluency would extend to assertions of identity, whether as a statement of adoption of ‘Roman’ material culture or, conversely, as a statement of ‘resistance’ to incoming cultural modes (*cf.* Sandlin and Callahan 2009). In other words, social resistance can be represented as negative reference groups – individuals or collectives that cause active evasion of actions.

1.6: Materialism

A further element of consumption that is relevant to this study is ‘materialism’, which has been defined as “the importance a consumer attaches to worldly possessions” (Belk 1985a; Ger and Belk 1996, 56); a concept that differs to ‘possessiveness’, or the “inclination and tendency to retain control over ownership of one’s possessions” (Belk 1983, 515). The two predominant perspectives of materialism will be considered below, both of which are anchored in value systems: (i) the individual level, or (ii) an over-riding socio-cultural level (Hunt *et al.* 1996; Richins and Dawson 1990; 1992). Relating to this, Martins (2005, 60) states that “greater materialism may suggest a transition from collectivist to individualistic values”, although such a diachronic perspective will not be visible in the data population analysed in this current study.

Belk (1985, 265) argues that acquisitive desires can be traced back to ancient civilisations and can be found at different levels, not just within the frame of a positive-negative dichotomy. The interplay between materialism and consumption has important ramifications in terms of social influence potential: “materialism should facilitate the efficacy of social influence” (Hunt *et al.* 1996, 77). Reference groups are one of the affective motivators for behaviour because individuals that make greater use of possessions to define themselves and reinforce identity (i.e. they have higher materialistic values) are frequently more susceptible to such behaviour when in the presence of others.

I shall argue that the relevance this holds for the ancient world is to be found in the realm of cognition and communication of social values. This in turn is anchored in fields of experience and social constructions of shared values; a

commodity cannot function as a symbol unless the consumer's reference group shares the same beliefs, or cognitive structure (Dittmar and Pepper 1992). To express this differently, relative wealth evidenced by the context of material goods is a socially symbolic communicator. This can operate at one of three levels that have been put forward in the sociological literature (for example, Dittmar and Pepper (1992; 1994); also see Hunt *et al.* 1996). These are summarised below with their application potential for studies of the ancient world, based on the discussions in this thesis:

Biological: an underlying human 'acquisitive instinct'.

The value of level of interpretation has been questioned in modern consumer studies, and cannot be accepted here for obvious reasons of historical and socio-cultural diversity (cf. Dittmar and Pepper (1992; 1994)). As stated above, 'common human nature' is a fallacy and, apart from the immediate necessities in life such as food, the needs of first-century Pompeians were different to ours today. Therefore they do not stand comparison.

Individual-centred: an internal locus of object function; significance for the consumer themselves.

This relates to Furby's model of the psychology of possession ownership, in which objects provide their owners with 'quasi-physical control' over their material and social environment (Dittmar and Pepper 1992; Furby 1980; 1991). This relates to Belk's argument for objects being an 'extension of self' (Belk 1985b), and although personal psychologies of perceived control are hard to access in the ancient world, they are theoretically approachable

through the concept of a scale of materialism in adapted form (cf. Richins and Dawson 1992).

Social constructionist: an external locus of object function; symbols of identity

This facet has the most potential for studies of material consumption in antiquity, being most accessible through conspicuous consumption and emulation. This in itself has implications via reference groups and value ascription. The archaeologist can be assisted in approaching such subjects through the consultation of documentary records.

The last two components of this triad will be discussed further in Chapter Eight to demonstrate that the construct of materialism, as defined above, can be successfully applied to the interpretation of Roman material culture. This is achieved through the analysis of the Pompeian household data using various models of materialism, from a simple high-low scale through to multi-faceted frameworks that address consumption orientations.

The following section incorporates elements from the discussion so far, such as consumer perception and materialism, to argue that the use of marble for decorative purposes in Roman houses provides an example of materialistic consumptive behaviour that can be classed as ‘consumerism’. Specific examples from Pompeii are provided and the evidence is considered in terms of emulation and trickle-down theory.

1.6.1 Marble Decoration

An interesting facet of Roman consumption that incorporates aspects discussed in this study is the use and display of marble goods. Prior to the early Augustan period the availability of Luna marble was limited (Fant 2007; 2008) but by the late Neronian and early Flavian periods it was ‘relatively cheap’ and readily available thereby becoming “depreciated currency” (Fant *et al.* 2002, 309). This trend is visible in public buildings at Pompeii, such as at the Sanctuary of Venus which demonstrates phases of construction in changing materials: Temple 1 had no marble or coloured stone, Temple 2 was decorated with white marble, while Temple 3 in the first century CE also made use of coloured limestone (Bruno *et al.* 2002; Carroll *et al.* 2008)

This increased availability and use meant that items such as *impluvium* surrounds, *puteals*, and garden furniture that had previously been of tufa and travertine were being replaced by marble, especially Lunese (Fant 2007, 339-40), evidenced by the House of the Vetti (Fant *et al.* 2002), as well as numerous household assemblages in this study. This is evidence for the ‘trickle-down’ of a material good that has previously only been available to a minority of people and subsequently became available to many, consequently reducing the strength of the social statement it provided. This would have been an exaggerated phenomenon after the earthquake(s) of 62 CE, whether or not the marble from the ‘clean-up’ was sold or left for salvage.

Not only are there examples of emulation in the use of ‘in-fashion’ varieties of marble, such as the polychrome marbles used in Rome, but households would use painted imitation marble in wall paintings to help monumentalise domestic interiors (George 1997, 310) thus evidencing “aspirations [that] were not restricted by cost or

availability” (Fant 2007, 336). Ling refers to this as a translation of medium to suit social requirements (1991, 95). This is a description that can also be applied to a situation such as that discussed by Curchin (2007, 13), in which terracotta sculpture was used in Celtiberia (central Spain) by the ‘less affluent’ who could not afford stone alternatives to express adopted Roman motifs. Numerous sites in this region also demonstrate the use of imitation marble in Third and Fourth Style wall painting from the second century CE (Curchin 2007, 11). Furthermore, the adoption of mosaics in regions such as Celtiberia would project high levels of perception fluency, especially if associated with ‘Roman’ cultural symbols in preference to traditional ones.

Beyond conspicuous consumption, it could be argued that another variant of symbolic consumption is also relevant for the use of marble in flooring. In Chapter Three the example of pearls on footwear is presented as an example of luxury and sumptuous behaviour. A similar situation could be argued for here, with marble flooring only present in the wealthiest of houses and representative of a luxury material that could be set underfoot and walked upon. Some houses whose occupants could not acquire such decorative displays were limited to using small marble inserts or panels in their floors, which would have been available in the form of off-cuts from marble workshops (Fant 2007; 2009).

Emulation is evidently a motivating force behind the selection of marble types because of perceived social associations and connotations. Fant suggests that the popularity of Nero in Pompeii caused the fashion for porphyry to have a rapid diffusion in the city (2007, 342). For example, there are several occurrences of the luxurious and expensive porphyry being used in the Casa del Fabbro (Ling and Ling 2005, 138). Such extravagance was an important symbolic component in the Roman

Table 1.3: Occurrences of marble pavements and imitation marble wall decoration in (a) Casa del Menandro and (b) Casa del Fabbro

(a)

Casa del Menandro (I.10.4)	
Room 11	Imitation stone reliefs (Ling and Ling 2005, 65-7)
Under Room 18: Room C wall decoration:	Veins of yellow and pale green to imitate variegated marble (Ling and Ling 2005, 229).
Painted <i>lararium</i> , in <i>atrium</i> complex	Painted podium faces, and back walls within the shrine: imitate marble veneer Imitation porphyry: entablature; detail on south face of podium; shaft of the corner column (Ling and Ling 2005, 188-9).
Decorated altar, <i>exedra</i> 25	Imitated marble veneer, Fourth Style (Ling and Ling 2005, 240)

(b)

Casa del Fabbro (I.10.7)	
Room 5 wall-decoration	Dado of purple-red, with yellow marbled effect. Fourth Style. (Ling and Ling 2005, 138, 258-9, figures 103-6)
Room 2 wall-decoration	Dado of purple-red with white, yellow, and green to give a marbled effect. Fourth Style (Ling and Ling 2005, 138, 256, figures 94-7)
Room 4, pavement	The majority of Fourth Style pavements in this house were of plain undecorated mortar (mostly <i>cocciopesto</i> or <i>lavapesta</i>), apart from room 4 (and room 9, see below), which has insert pieces of white and coloured marble. Third Style (Ling and Ling 2005, 138, 257-8, figure 93D)
Room 9 pavement	Inset pieces of white and coloured marbles - including porphyry and a centrepiece panel of Carrara marble (Ling and Ling 2005, 145, figure 93D)
Upper floor, rear room pavement	'Probably' a luxurious dining room paved, at least in part, with coloured marbles (Ling and Ling 2005, 145)

world, with Ling and Ling stating that the “residents of the Casa del Fabbro still retained a certain pride in their environment; whatever the basis of their income, they were ready to aspire to a respectable level of pretention in the embellishment of their living space.” Imitation porphyry is encountered at the House of the Menander (House 7 in the data analysis of this study), such as on the *lararium* in the atrium (see *table 1.3*), as well as examples of imitation stone reliefs. Ling and Ling state that the latter were probably intended to emulate and evoke the Neo-Attic examples set within the walls of wealthy villas, such as Cicero’s at Tusculum” (2005, 65-7).

The implication, therefore, is that there was consumer demand for up-to-date trends, especially from Rome and the emperor, which meant that wall painting workshops needed to maintain awareness of fashions (Fant 2007; Strocka 2007). Curchin suggests that in Roman provinces either itinerant painters from Italy facilitated this, or there were portable ‘pattern books’ made from papyrus that provided designs that could be imitated (2007, 11; see also Allison 1991; 1995).

As Fant succinctly summarises, “the important thing was not necessarily the physical object, but taste itself” (2007, 343), a point echoed by Ling (1991, 71). Thus, the consumption was of the prevailing trends and if the rarer desired types of marble could not be acquired, more common white marbles or painted imitations would have to be sufficient; the consumers were displaying satisficing behaviour based on an evaluation of processed information with reverence to reference group ideology. Greene (2008, 72) argues convincingly that if “the rate of replacement appears sufficiently rapid” such behaviour can be classed as consumerism. I believe that such a term can be applied to the ancient world, and the example presented here of marble consumption proves a good illustration in the domestic sphere, as would an aspect closely related to architectural components: the garden (cf. Hales 2003, 153ff.;

Jashemski 1979; 1993). Greene (2008) states that diachronic studies into the following areas can also indicate consumerist behaviour through stylistic changes and developments:

- **Artistic:** for example, wall paintings, such as those in Pompeii providing the ‘Four Styles’. For further discussion of this aspect see Allison (1997), Allison and Sear (2002), Hales (2003, Ch. 5), Ling (1991), Ling and Ling (2005), and Strocka (2007). Marble and imitation-marble decorative elements would also fall into this category.
- **Ceramic vessels and glassware:** for example, stylistic changes for drinking and eating vessels (Greene 2007; 2008, 74; Roberts 1997).

1.7: Rationality, Globalisation, and Satisficing in the Frame of Consumption

“the terms in which trade, markets, and
‘globalization’ are discussed have been changing”
(Morley, 2007, xi).

Recent years have seen an increase in a more tolerant attitude towards the use of what were once seen as modernising terms in discourses on subjects such as trade and ancient economies. This section will discuss the use of globalisation as a concept inherently linked to consumption theory and commodity flow. Brief consideration will be given to examples of its application to the Roman world, predominantly under the guise of identity. Ultimately I will argue that the use of the concept is valid in

both social and economic terms, providing the idea of the ‘local’ or ‘regional’ is not removed from the discourse. Subsequently, the concept of glocalisation will be introduced. Finally, the concepts of consumer perceptions and information processing will be interwoven with ideas of (economic) rationality to address the concepts of *bounded* rationality and satisficing behaviour to challenge assumptions regarding consumers’ maximising expected utility.

1.7.1: Globalisation

An emergent term in archaeology is that of ‘globalisation’, or the growth to a global or worldwide scale, in relative terms. It is, however, one that carries certain pre-judgements as to how it should, or indeed whether it can at all, be applied to historical situations. It is often taken as being synonymous with modernity, implying Westernisation through capitalist-driven processes, and it is assumed to be related to situations where cultures are homogenous – sometimes even becoming a site of disembedded activity (cf. Giddens 1990; 1991). I will argue in this chapter that it would be wrong to sustain such preconceptions as there are varying interpretations of the concept of globalisation.

One of the first questions that requires addressing is the extent to which ‘globalisation’ has a viable historical applicability. The argument can be encapsulated through the divide between scholars as to whether or not globalisation is a long-term process. Osterhammel and Petersson (2003) and Giddens (1990) view it as a modern

phenomenon, whereas Robertson and White (2005) argue that it can be traced back over millennia².

The view that perceives modernity as a corollary to globalisation is historically shallow and often overlooks the role of power in the equation, especially in respect to imperialism (Nederveen Pieterse 1995). Or it takes globalisation to be a homogenising and disembedding phenomenon whilst simultaneously neglecting to comprehend the significance of culture within social relations (Giddens 1990; 1991). It is important, however, to note that ‘globalisation’ can be viewed as a valuable part of the dialogue of imperial history and yet refer to the modern connotations of globality. That is because globality is seen as a consequence, or condition, of modernity (Robertson 1995; Robertson and White 2005). Similarly, ‘globalism’ is seen as the policy, or process, of managing globalisation (Nederveen Pieterse 1995).

Globalisation is a term that has increasingly infiltrated Roman studies, perhaps in some areas as a reaction to the inadequacy of ‘Romanisation’ as an explanatory process. Does globalisation imply similar processes without explicitly stating so? I would argue not, as long as there is avoidance of the assumption of homogenising unity with comprehensive diminished territoriality through an increased erasure of borders (boundary erasure is different to boundary crossing (Nederveen Pieterse 1995), the latter carrying implications of fluidity). To follow Cochrane and Pain’s emphasis, globalisation is the *interpenetration* of practices, through networks that are political, cultural, and economic in nature, extending social relations (2000, 15-16). This does not create presupposition of a unidirectional cultural flow by an overarching dominant presence. Instead, it is incorporating the multi-directionality of

² It should be noted, however, that in his earlier work Robertson considered globalization to be a “relatively recent phenomenon” (1990, 20) in which the ‘Germinal Phase’ was in Europe between the fifteenth and eighteenth centuries, with the post-1880 period being one of accelerated globalization.

interactions and networks across the Roman Empire following social-exchange theories, which centre on the idea that when an interaction takes place each agent involved can expect to benefit from the process (Simon 1982e, 446). I would argue that another example of the viability of the use of the concept of globalisation is the implication of cultural impact (however slight) beyond the imperial frontiers, in that provinces may adapt their behaviour, or strengthen their symbolic representation of identity, in reaction to the shadow of the Empire and potentially this may be evidenced through the consumption of goods.

Cultural change through globalisation is frequently interpreted as ‘hybridity’ (Bhabha 1994; Nederveen Pieterse 1995; Young 1995), which although rejecting a single direction of cultural flow, is an overly simplistic way to view interaction, as it implies only two agents are involved and leaves little room for further cultural expansion. Within this are similarities to and overlaps with other processes that also attempt to demonstrate multi-dimensional facets to cultural interpenetration, including those of syncretism – a merging of two or more systems – and creolisation – the enrichment, or “multicultural adjustment”, of a system via borrowing and creation (see Ram 2004; Webster 2001).

Within the overriding broad context of globalisation, one of the most important mechanisms is the demand for certain consumer goods (Osterhammel and Petersson 2003, 7). Since an assumption of demand-driven systems in ancient economies is a precarious path to follow, especially as a generalising statement of aggregate behaviour (there may be exceptions for local (urban) market demand for utility goods), it may be more appropriate to talk of consumer *requirements*. These may surpass the basic necessities of an individual (or household) depending on the socio-economic position held by those concerned and include certain items that are

‘wanted’ goods. A separate level of acquisition concerns what may be termed luxury goods; a topic that is considered in Chapter Two through the interrogation of documentary evidence.

Ultimately, globalisation is a construct of connectivity reflected through a four-filtered lens (those filters being cultural, social, economical, and political – some would also include military in this list, (cf. Robertson and White 2005, 349). Such structures or practices are sometimes recognisable through one of the dominant subsidiary mechanisms, consumption of material goods – consumer behaviour *per se* being an intangible action. Patterns of consumption can potentially be identified as similarity can be sustained by difference. It is not, however, as straightforward as that with both practical and conceptual obstacles being present. The former incorporates the processes of object discard, survival, and recovery in the archaeological record (see Chapter Four), not to mention subsequent interpretation. This thus overlaps into conceptual obstacles, which primarily concern limitations to the term ‘globalisation’, even in the modern world: “Globalization must have some limits – unless one thinks in terms of its leading inexorably to a highly standardized, claustrophobically compressed and entropic world...” (Robertson and White, 2005, 355). We can thus conceive globalisation in terms such as that of “the development, concentration, and increasing importance of worldwide integration [so that] the concept loses its static character and its aspects of totality” (Osterhammel and Petersson, 2003, 26). The fact that there are acknowledged limitations in the application of the concept to the modern world is significant to us in the appropriation of the concept to antiquity, and is also addressed by Morley (2007, 90ff). The use of the term therefore necessitates caution: -isation terms encourage generalisation as though the term related to a single

standardised process, rather than something experienced in different ways (cf. similar comments by Mattingly (1997, 9) on Romanisation).

There have been several attempts to bring the concept of globalisation into a workable frame within the Roman world. For example, Geraghty (2007) examined the impact of the process of globalisation through the application of economic modelling. Consideration was given to commodity flow, integrated markets, and economic rationality in order to construct a narrative of economic development. Overall, however, as accepted by Geraghty, the predictions yielded by the applied method “overstate observed phenomena” (2007, 1052). Therefore, although the attempt to integrate theory and data to model socio-economic constructs is valid and exhibits potential, the conclusions are somewhat overly broad in character continuing the falsehood of a single ‘economy’ – albeit one situated within a well-integrated market system.

Sweetman (2007) applies globalisation theory to Roman Knossos in order to create an alternative perspective in the understanding of the city’s cultural development under the expansion of the Roman Empire. Significantly, the study circumvented the application of ‘Romanisation’ to address cultural change and considered Knossos as a city that underwent a gradual development. Pitts (2008) reached similar interpretational conclusions in his study of ceramic vessels in Roman Britain, stating that the evidence of consumptive patterns reflected “part of a globalizing process involving the active integration of parts of southern and eastern Britain into a larger system of connectivity” (2008, 497) driven by state-driven supply networks (2008, 504).

1.7.2: *Glocalisation*

Hingley (2003; 2005) and Witcher (2000) both acknowledge globalisation as a concept that offers more constructive analysis and interpretation of imperial mechanisms than that offered by Romanisation, as it incorporates macro-regional synthesis as well as localised perspectives. I agree with the perspective that both the global and the local require acknowledgement, and would argue that the use of the term ‘globalisation’ is not overly problematic once parameters are defined with critical awareness. The need for caution comes from the implication created through an unstated removal of the idea of the local. For such reasons, should the term ‘*glocalisation*’ be used (Robertson 1995)³? In doing so, it brings local conditions into the overlying basis of ‘globalisation’; regional diversity and differentiated consumption become part of the interpretation. This is not to polarise local from global (or near-global); they are intertwined in activity, but carry different socio-cultural implications. Globalisation, through processes of communicative interaction, does not mean that the local becomes ‘de-pluralised’ through cultural homogenisation, an argument that has received increasing attention. For example, emphasis has been placed on global-local processes, such as by Eade (1997), Friedman (1990), Pitts (2008), and Robertson (1990; 1992; 1995); the latter of which argues that the significance is multidirectional, in that the global affects the local but the local also affects the global: the very definition of Cochrane and Pain’s (2000) interpenetration of practices (see above). Further to this, Robertson also forwards the concept of “sequences of ‘miniglobalization’” for the development of historic empires in

³ Andrews and Ritzer (2007) use the term ‘grobal’ for a similar process

reference to the “unification of previously sequestered territories and social entities” (1990, 21).

Although this is a useful concept to apply to Roman studies, global-local interaction is made more explicit by reference to glocalisation, which takes into account locality and the increasing interconnectedness of culture on a greater scale, thereby incorporating spatiality to the discourse (see Featherstone and Lash 1995; Robertson 1995). This approach at least addresses more directly the concern some have regarding “the way local lives are shaped by global flows” (Seidman 2000, 339). This is pertinent to the Roman Empire as “what is often called local resistance against globalization is a reflexive form of glocalization”, otherwise referred to by the authors as *normative* glocalisation (Robertson and White 2005, 355). Furthermore, by communicating the global through terms of local there is scope for the individual to be recognised, as the individual is the final locus in the process (Appadurai 1990, 298) – represented archaeologically, more often than not, through the *collective* (especially in terms of identity narratives) or, at the highest level of resolution, the household. As previously stated, the household thus becomes a significant indicator for social life at the local level in relation to the wider level of the empire.

Consumption is an intrinsic part of the dialogue regarding globalisation/glocalisation, as recognised by scholars such as Bauman (1998) and Morley (2007), and covers a spectrum of actions ranging from consumption of the mundane through to consumerist acquisition (such as that argued for by Greene (2008)). Discussion of the global/glocal within this thesis will be restricted to Part I, as the construct of globalisation is imperceptible unless sites less geographically central to the Roman Empire are examined. At urban centres within the core of the Empire, such as Pompeii, evidence of exotics or long-distance trade links is not

indicative of globalisation; it is more likely to reflect a top-down structure, in which commodities are brought to the core, rather than a redistributive system representative of multi-layered glocal interaction. The analysis of the Pompeian data in this thesis is unlikely to reveal evidence of global-local interactions; however, as already stated, consumption is an integral component of glocalisation and it is essential to consider this theoretical component of the argument.

1.7.3: Bounded Rationality and Satisficing

The unrestricted (unbounded) rationality that represents the mentality of *homo oeconomicus* in formal economics is specialised and unrealistic as it assumes unlimited choice and unlimited knowledge of decision-results insomuch as to create the view of a rational consumer that consistently maximises expected utility (Simon 1982d, 405; 1997, 291-92; Wang 2001). It cannot, therefore, be applied to many aspects of the modern world, let alone the ancient world. Removing oneself from the realms of capitalism can create opportunity for the addition of cultural aspects to enable access to the complex pluralised accounts of consumer behaviour and choice. Some economists, however, have realised the restrictive impositions of such isolating explanations. Robertson, for example, has made use of cognitive psychology to pluralise explanations of ‘rational’ choice. It is through adapting these interpretational frameworks, partially through simplifying – and removing – certain assumptions of modernity that the applicability of such arguments becomes more viable for Roman studies. Simplification of such matters, however, is not to remove the inherent diversity and ambiguity of human behaviour (refer to Gero 2007).

In an attempt to reach a viable medium between the rationality of formal economics and the ‘procedural rationality’ of psychology, the concept of *bounded rationality* has been used by Simon to introduce cognitive limitations and reflect the behavioural nature of decision-making *processes* that inherently involve social and environmental factors (for example: Simon 1982c; 1982e; 1982f; 1997). Thus, bounded rationality refers to behaviour that is appropriate to achieving goals within certain conditions and constraints (Simon 1982d, 405; 1982e, 408). A perspective of goal attainment, such as that described here is known as a *deliberative system* and can be intertwined with the emotionally-driven motive for decision-making, otherwise termed an *affective system* (Loewenstein and O'Donoghue 2004). As can be gauged from this definition, economic explanations alone for such behaviour are insufficient, and require complementing facets such as notions of social situation, which include identity and environment (the term ‘environment’ is a little vague and could therefore be replaced by the more restrictive concept of ‘life-space’ (as referred to by Simon 1982c, 260)).

Within this framework, there are two interwoven components: i) the human mind and the limits thereof; ii) the task environment that (i) is fundamentally a part of. Therefore, by definition, (ii) incorporates what Dudey and Todd (2001, 197) refer to as ecological rationality. If we were to consider some of the characteristic components of rationality in a broad sense we would encounter behavioural alternatives (perceived and real) in the pathway towards what economists term ‘pay-off function’ (Simon 1982a, 101), which translates to ‘value’ and/or ‘utility’. In addition to the introduction of ‘approximating mechanisms’ to the discourse of rationality, the dialogue is distanced from the *results* of choice. The process is

consequently recognised as being subjective and adaptive, as opposed to the objective nature of formal economic optimisation (Simon 1982a).

Obviously the evidence of material culture in archaeology is limited to the results of commodity choice and, in fact, is frequently restricted to the analysis of discarded material. This does not mean, however, that the *processes* involved in the acquirement and use of material culture cannot be studied as well. The need for consideration of the processes of the creation, use, and deposition of prehistoric material culture in terms of the associated architectural remains has also been argued for (McFadyen 2006). This is relevant for Roman consumer behaviour in the following terms: first, the concept of ‘task space’, introduced by Ingold (1993) and applied by McFadyen (2006), integrates spatial and temporal dimensions, as argued for above; second, the final location of a commodity is not representative of its ‘social life’ (see Appadurai 1986).

I propose that Herbert Simon’s concept of *satisficing* is one way in which to provide explanations for socioeconomic (and therefore behavioural) choice and patterns of consumption in archaeology. The definition of this term is in itself relatively straightforward but the resultant implication of its use is a theorem that permits psychological components and maintains necessary ambiguity and potential complexity: to ‘satisfice’ means not to choose an optimal outcome (or for our interests, commodity), rather, “an alternative that meets or exceeds specified criteria, but that is not guaranteed to be either unique or in any sense the best” (Simon 1997, 295). Goods are evaluated until one is encountered “that exceeds the acceptability threshold” (Schwartz *et al.* 2002, 1178). This term is, therefore, intertwined with the concept of rationality but not in terms of formal economic theory that assumes optimisation or “maximization of utility subject to budget constraints” (Simon, 1997,

295). There are peripheral uses of the concept of ‘satisficing’ in Roman archaeology, such as Greene (1994) and Wilson (2002) who discuss mechanical technology in terms of ‘profit-satisficing’ and risk (Greene 1994, 52), and in relation to investment and economic return (Wilson 2002).

As with the adoption of glocalisation, the recognition of satisficing actions enables a more culturally cognitive aspect to material choice. Satisficing is concerned with explaining behavioural actions appropriate to choice bounded by limits or constraints, often within terms of functionality or adaptiveness. This approach is taking rationality and describing it in psychological theories of perception and cognition. Therefore, phrased in the language of psychologists, the decision-maker has a “fixed aspiration level, and its successes or failures do not change its aspirations” (Simon 1982a, 260-61). In a broad sense, the term could be seen as being synonymous with ‘reasoning’, which is devoid of neo-capitalist connotations. Rationality through satisficing actions thus becomes part of the behavioural process in attaining goals within given conditions, whether or not knowledge of the choice alternatives remains ambiguous to the decision-maker (the consumer). If the individual exhibits actions that can be deemed behaviourally consistent (a phrase used by Karni and Safra 1990) patterns may be determined, even within archaeology. Such consistency has been termed by some as being *sequentially rational* (Guerdjikova and Zimper 2006, 5).

In connection to this, Basu (2004) argues consumer behaviour that appears ‘irrational’ may actually be related to more fundamental rationality, mainly in terms of components of an affective system. This is because humans have limits in information accumulation, as well as inseparable emotional influences, which therefore impacts upon the decision-making process. It comes down to an assessment

of time-energy expenditure in the gathering of information related to decision computation. This has a two-fold significance for us: i) it counters traditional economic assumptions of economic rationality; ii) it assimilates itself into the conceptual use of satisficing in contexts of the consumer, including that of the decision-maker in the ancient world. Engaging with these theoretical standpoints enables the study of consumer choice and behaviour to move away from the oversimplified ‘rational’ market-purchased action versus the primitivised system of social-emphasis acquisition. In their place come attempts to understand the (ancient) consumer in terms of behaviour *not* relating to a *single* set of *well-defined* goals (for example, see Loewenstein and O'Donoghue 2004).

This composite conceptual stance is suggested as part of prevailing behaviour, although is not arguing for a straightforward maximising-satisficing dichotomy; it is a paradigm in which different domains of choice are averaged to a position on a spectrum (Featherstone 1990, 6). As a result, an individual may predominantly display behaviour that is clearly satisficing in nature in the majority of choicedomains, although could act in a manner bearing closer resemblance to a maximising strategy in certain scenarios. An example of this is that of consumption for purposes of identity display. For a maximiser the actual result of the commodity selection is not the sole desired outcome: they are also concerned with the commodity conveying information about the self (Schwartz *et al.* 2002, 1195). As such, they can consequently be described as identity-conscious as well as assuming some part of Michalos’ “multiple discrepancies theory” (MDT) in which people evaluate objects in relation to past and future goods, expectations, needs, as well as conducting evaluations in relation to other people and their possessions (Michalos 1980, 1985, 1986; Schwartz *et al.* 2002, 1195). It should also be highlighted, however, that in

discussing consumer behaviour with regard to ‘identity’ we should not be deceived into accepting simplistic explanations, as ‘hidden transcripts’ may be in operation (refer to Mattingly 1997; Scott 1990). In which case, is the consumption of an object the goal of an individual or a representation of the object of the social system within which the individual is situated (Simon 1982, 405)?

In case there is a temptation to view some of the aforementioned concepts as products of a solely economically-centred argument, it should be noted that the use of models of satisficing actions are used outside the field of economics in scenarios that are distant from market structures. For example, they are used in work on forager behaviour, (such as the study by Carmel and Ben-Haim 2005) in which optimisation as a foraging strategy is tested against a satisficing one under the basis of limitations presented by bounded rationality. A strategy that is ‘good-enough’ still enables an animal to survive, without the need to search for optimal solutions. Additionally, there were earlier studies that incorporated this concept into prehistoric contexts, such as Conrad (1978) and Keegan (1995). The former analysed data from Peruvian settlement patterns to investigate sub-optimal behaviour in making locational compromises. Keegan applied the paradigm of satisficing behaviour to explain models of prehistoric population dispersal, stating that habitats were occupied on the basis of *suitable* access to resources, rather than optimal. From these select examples, it can be seen that it is possible to use the concept with non-capitalist intonations, thus demonstrating that the term can be appropriated for archaeological concepts that are more widespread than Roman household consumption of material goods.

Taking this a stage further, work from neuroscience can be useful to expand on the accountability of choice systems. Daw *et al.* (2005) discuss choice in terms of cognitive control related to flexibility and revaluation; cognitive control being goal-

directed selection, referred to as a ‘deliberative system’ by Loewenstein and O'Donoghue (2004). An example of such a control in action is the balancing of time taken in computing a decision versus acceptable levels of deviation from the necessary/desired attributes. The cognitive evaluation of the cost of a commodity in relation to the desired selection can also be taken as a further example. Behavioural actions such as these contrast inflexible ‘cached actions’, which are impulsive or habit-driven. Although cognitive computation of alternatives is a part of the process, utility maximisation is once again not implied. For that the discussion would be directed towards “computational theories of learned optimal action control” (see Daw *et al.* 2005, 1704). Choice through deliberative processes can also be influenced through impulsive or ‘passion’ factors (McClure *et al.* 2004) or even habitual control (Daw *et al.* 2005; Dickinson 1985).

Short- and long-term preference (an inherent factor of ‘rational’ selection), is another consideration, although it is important to acknowledge that this is not always merely a market-oriented balance of cost-benefit recognition. Environmental stimuli can also play their part, as well as the proximity of a stimulus (Loewenstein and O'Donoghue 2004). For the effect of proximity, consider Roman culture as a stimulus for a consumer to buy a particular type or style of commodity. In this you would expect the significance of identity symbolism and cultural adoption to hold more emphasis and influence (even if not consciously acknowledged) in urban centres geographically closer to the Imperial core. Consumers in the rural landscape of peripheral provinces, such as Britain, would almost certainly experience a more diluted effect from such a stimulus.

Two further disciplines that can be drawn on to add to this dialogue of explanations for consumer behaviour are those of evolutionary biology and

evolutionary psychology. The mechanism of concern is behavioural rationality through evolutionary environments of adaptation, albeit in a cultural sense (Wang 2001, 85). Fitting within this mould is Lumsden and Wilson's concept of 'culturgens'(1981): cultural traits (or 'genes') that can be transmitted socially via artefacts, behaviours, or mental constructs termed 'mentifacts' (Lumsden and Wilson 1981). These three components are far from discrete: artefacts, including architectural constructs, cross generational boundaries and impact upon behaviour that includes speech and the use of artefacts; and mentifacts, the creations of the mind, are inherently inseparable from behaviour (see Lumsden and Wilson 1981, 19-30 & 316-318). The term 'culturgen' has generally been replaced by that of 'meme', originally coined by Dawkins (1976) and subsequently widely adopted (for recent discussions of the subject see Shennan (2002)).

When memes become increasingly transmitted through interpenetration of cultural contact, dilution occurs and therefore complexity increases. Such a process, referred to as 'culturgen assimilation' by Lumsden and Wilson (1981, especially 21-30), is similar to the argument of hybridity but without the simplified dual-agent foundation. This process permits greater flexibility through adaptation and can also be reconciled with the construction of identity narratives. This is achieved through the process of species 'programmability', where the species is the social group (of indiscriminate size), and an ability to adapt cultural elements is expressed by programmability. An important component of this thus becomes the social environment. In particular, "susceptibility to accepting programs under social influence or pressure" (Simon 1983, 55), which relates to the impact that an imperial 'shadow' might confer. This is consequently reflective of an adaptation to social living through *docility*: "the propensity to behave in socially approved ways and to

refrain from behaving in ways that are disapproved” (Simon 1983, 65). As a result, if positive outcomes are perceived from such actions by the less dominant agent, the prevalence of docility as a socially responsive mechanism will be seen to increase. For the dominant agent, socially approved behaviour will be induced, potentially reinforced through societal rewards, such as land allocation. To follow the theme of models of evolutionary psychology, flexibility through an ability to culturally adapt (which could be referred to as ‘survival tasks’ (Wang 2001)) defines a social group’s ‘fitness’. A form of rational behaviour thus ‘evolves’ under these terms and is dictated not by directives to behave in specific ways but in ways that are defined as appropriate by the wider society or pressure groups. The globalising power thus becomes the ‘deme’ and the local populations the ‘trait groups’ (Simon 1983, 59-66).

Without the passing of memes there is no development or shift in cultural representation, and therefore no identity narratives. So it is only through the introduction of a new social environment that the transmission of cultural components develops. This is not to mean that culture becomes static and stagnant in an isolated society, rather it argues for reduced visibility of fluidity as cultural shifts are more gradual in nature and not in response to external environmental factors. In other words, the members of the society feel stable, even across generations, with the existing memes at their disposal.

So how can memes and societal response be measured in the ancient world? The answer is through material culture in the archaeological record, as the unit of the artefact can be regarded as a type of meme (Lumsden and Wilson 1981, 6, 27) and diversity can be represented through the frequency and variance of memes present (Lumsden and Wilson 1981, 314-15).

To summarise, if an individual (the consumer) requires an item, the decision-making process (however conscious or ‘complete’) may result in the acquisition (not necessarily the market purchase) of a ‘default good’ – one which could represent a reflexive action of selection, a lack of available choice, or a statement of identity. In other words, the action is a rational choice within a field of limitations that may appear as an economically irrational action. The use-value of the object may become of prime significance, wherein the implications of cultural identity are disregarded as provincial use could contrast ‘Roman’ use patterns. This predominantly occurs when the Roman-style material culture, such as ceramics, adopted by indigenous populations are interpreted by archaeologists as being representative of emulation, trickle-down, or an attempted association of identity with the Romans. Such approaches do not consider the possibility of an adapted use of ‘Roman’ objects as an expression of the indigenous culture, rather than a process of emulation (Cooper 1996; Mattingly 1997; Pitts 2007). Therefore, a pot becomes a pot with severance of cultural associations for the over-lying need of a utility vessel. The individual has thus performed a complex set of actions in constructing a narrative of identity through certain commodity domains (Ahuvia 2005; Belk 1985; Berger and Heath 2007), wherein satisficing may be recognisable in an economic sense based upon sub-optimal selection of goods, but (near)maximising is reflected in social behaviour (within which emotion-driven affective systems cannot be negated). Furthermore, it has been argued that a distinction can be made between irrationality and ignorance (refer to Stigler 1961). In this, ignorance is seen as an economic phenomenon in which risk and uncertainty are taken into account, where the former can be combated through risk spreading (Vriend 1996, 266-67). This is not an unknown phenomenon for the ancient world, where merchants are known to have distributed commodities among

several sea-faring vessels so as to not lose an entire cargo if a ship is lost to misfortune. In other words, if a consumer makes a cognitive decision based on incomplete information the process is not necessarily irrational, rather it is a form of ‘ignorance’. Consequently, it can be established that a lack of apparent economic rationality, especially that according to formal economics, does not necessarily mean that the action is a representation of irrational behaviour.

1.8: Concluding Remarks on Theoretical Frameworks

The concept of consumption has been discussed and demonstrated to provide a flexible framework through which social, cultural, and economic facets can be examined in the ancient world.

Why are the concepts discussed here of use to studies of the ancient economy in the Roman world? Firstly, they are helpful because they provide a series of investigatory avenues within which psychological factors of choice complement economic theory and introduce significant factors into the equation such as the environment/living space. In other words, they provide a contextual framework within which consumer preferences, and the factors that led to the shaping of these preferences, can be studied (see Wang 2001). Secondly this debate is extending the discussion of economic rationality into a firm social setting, albeit one that is relying heavily on theoretical concerns, especially as we lack definitive knowledge of decisional processes in the Roman world. It has been demonstrated that there is sizeable potential for these theoretical frameworks to be incorporated into studies of goods and commodities in the Roman world. Without the use of which “we cannot

hope to expose the complexity of the vast body of material culture” (Mattingly 1997, 15). If taken out of a capitalist atmosphere and conflated with socio-cultural considerations, the concepts and terminology discussed here become more suitable to attend to theories of ancient economic interactions.

The social economy is more of a local phenomenon, whereas the extent of the Roman world and its inter- and intra-Empire trade connections makes for more of a market-oriented economy with commercial impetus. Overall, a glocalising effect can be seen that draws upon consumer behaviour, be it on a socio-cultural identity-based level, or on a acquisition for simple utilisation. The signalling of identity through the use of consumption can be seen to be part of the ‘objects consumed for further means’ sphere of interaction, whereas the utilitarian component is a reflection for consumption as an end target.

In order to establish a valid method for investigating consumption in the Roman world, evaluation of methods that have previously been employed in historical and archaeological studies is necessary. Further, careful thought is essential when establishing the nature of the data to be used, as well as recognising the key questions for identifying consumption patterns and behaviour. The following chapters will examine the contribution and application of documentary evidence (Chapters Two and Three) and pottery (Chapter Four) to analyse consumption patterns, paying attention to the issues raised above.

CHAPTER TWO:

ROMAN CONSUMPTION AND CONSUMERISM - DOCUMENTARY EVIDENCE

Having examined consumer theory and how it can be applied to archaeological situations and, in particular, the Roman World, documentary evidence relating to the subject will now be assessed over the next two chapters. This is carried out in order to address methodological considerations that relate to the analysis of data in Part Two of this thesis, and to investigate consumptive behaviour that is seldom visible to us through the material archaeological record.

The current chapter will examine ancient literary sources for material to investigate the applicability of consumer theory to interpretations of socio-cultural contexts and consumerism in the Roman world. The discussion will address the nature of the evidence, its relationship to consumer theory, and attitudes (such as those of moralists) reflected as a result of acquisitive behaviour.

2.1: Ancient Documentary Source Evidence

What is a cynic?

A man who knows the price of everything
and the value of nothing.

Oscar Wilde,

Lady Windermere's Fan, 1892, Act III

Ancient literary sources have revealed a wealth of information about domestic lives and economic activities and can therefore cast a light on attitudes towards, and the

behaviour of, consumers in antiquity. This chapter investigates consumer behaviour as evidenced in the documentary evidence, with specific attention to measures that were imposed to restrict excessive consumption of goods. Due to the nature of this form of evidence, the predominant class of commodities that will be discussed is luxury goods. The textual material is a valuable source of evidence that needs to be considered in terms of context and intended audience, but enables the archaeologist and ancient historian to address indirectly items that rarely survive in the archaeological record, such as textiles, foodstuffs, and objects made from organic materials.

Attention is often directed toward agriculture in the ancient economy and its literary reference, such as through the works of Varro and Columella. Other than the discussion of self-maintenance and the necessary (consumption of) utensils and equipment in the sphere of agricultural production their value in this discussion is limited. Attention to sources such as these will, therefore, go no further in this thesis; the centrality of such production activities in antiquity is not being questioned, rather the urban consumer is the focus rather than an investigation into who was involved in production and on what scale it occurred. For commentary on land-holdings and estate management, see Rathbone (1991), Rostovtzeff (1967), and Lewis and Reinhold (1990). This is not to say that labourers did not consume but their archaeological visibility is less than the occupants of (urban) households.

The intention of the ensuing discussion of this material is to identify attitudes to wealth and 'consumerism' and how this could, or would, have impacted upon segments of the population. This is an important element because it is imperative to acknowledge that such evidence is not representative of everyone's actions, perhaps not even the majority. How many would have been able to acquire (legally!) silver

tableware, for example, as described by Celsus (33.10) and alluded to by Athenaeus (6.275b)? The documentary evidence relating to consumption habits, as well as the attitudes demonstrated towards them, will inevitably largely comprise references to wealth and luxury, as the everyday mundane items seldom get attention.

There are dangers in taking many texts at face value, particularly those of anecdotal or satirical nature as they inherently contain undercurrents of cultural associations, some of which will be lost to us over the course of time as they are not themselves recorded. For example, financial expenditure on material goods was not the only measure of opulence, for Seneca asserts that drinking prior to dinner is luxurious, as is keeping plants indoors (*Ep.* 122.6, 8; for further discussion on Seneca and food consumption metaphors see Richardson-Hay, 2009). So, as Edwards (1993, 8) asks, “What did *luxuria* mean for Roman writers?” This will be addressed below, particularly with reference to consumption and consumerism.

2.2: The ‘Rise’ of Luxury and Consumerism

“Yet those things which were then looked upon as remarkable
were hardly even the germs of the luxury to come.”

Livy, *History of Rome* 39.6.9

**I HAVE
BEEN AWOKEN
BY WANTING**

Advertising slogan from
Leicester Highcross shopping centre

2.2.1: *Luxury Values*

The value attached to luxury by a population or society is a significant component when investigating the consumption of material culture, both in ancient and modern situations. Whether consumption serves as a status marker, an indicator of moral decline, or even just a statement of needs and desires (see Berry 1994; de Botton 2005) the very act is an integral part of individual lifestyles. Extravagance and shifting patterns in social (and financial) values ascribed to such practices are not fully visible in the archaeological record and, therefore, ancient texts can be an invaluable investigative tool. They present us with an opportunity for glimpses at perceptions of and attitudes towards consumption in regard to wealth and luxury. A prime example is Petronius’ *Satyricon*, in which the excessive conspicuous displays of various forms

of food, goods, and lifestyle are satirised through the behaviour of the character of the freedman Trimalchio. This example will be returned to later. It is important to consider, however, that many of the references given to these topics of luxury are designed to use inflammatory language and exaggerate situations for satiric or comedic reasons, or indeed political prolongation.

A wealth of material is covered by the topic of ‘luxury’, ranging from the possession of art through to jewellery and clothing through to the extravagance of construction materials used in private houses as well as the number and age of slaves. As such, it would not be possible in the scope of this thesis to fully address all aspects in a suitable way; some of these facets, however, will be drawn out of the Pompeian household data in subsequent chapters (especially Chapter Eight). The discussion of documentary evidence here will primarily focus upon the aspect of portable material culture associated with luxury, as well as the inescapable matter of food. Additionally, the interrogation of documentary sources can provide glimpses into the cultural aspect of goods that are otherwise less tangible in the archaeological record, such as cultural ascriptions and practices. Of interest to this topic is the use of chests, which are not just concerned with the practicalities of storage but they also relate to concepts of the ‘unseen’; this duality will be further discussed in Chapter 3 through giving attention to household- and probate inventories from historical England. The ancient sources can similarly be illuminating on these and other related matters, such as dowries (for example Plautus, *Aulularia*).

Regarding terminology used in the ancient literature, the words *luxus* and *luxuria* translate to ‘luxury’ and were used to denote immoral behaviour and excess in the realm of private consumption. The public form of this was termed *magnificentia*, which translates to ‘splendour’ or ‘expenditure’, and did not have the pejorative

associations that *luxuria* (luxury), *avaritia* ('greed', 'avarice'), or *incontinentia* ('self-indulgence', 'lack of self-control') occupied in the mindsets of many ancient authors (Cancik, 2005, 905-06; Edwards, 1993, 5). Morals and consumption have been continued into more recent history, for instance in Dante's *Inferno* one of the circles of Hell corresponds to avarice; it is also a topic that permeates into modern consumption studies (for example: Hilton 2004; Horowitz 1984; Wilk 2001) and so cannot be shaken from its place in studies of consumer behaviour.

2.2.2: Consumer versus Moralistic Behaviour

In accepting Greene's (2008) argument for consumerism in the Roman world, I suggest that its inception potentially becomes visible to us in the second century BCE. It was this period that witnessed a marked development in the availability of *luxuria* and new opportunities for the acquisition of wealth and personal indulgence. Military campaigns facilitated greater access to more varied, luxurious, and exotic objects and commodities (Astin 1989, 181-83; Dalby 2002, ch.2). This inevitably created social friction through a perceived conflict with morality and social values, thereby catalysing reactionary consequences in attitudes. Livy (59 BCE – 17 CE) is quite clear in his position on the subject, lamenting that luxury had been unleashed, with riches bringing with them avarice, excessive pleasures, and wantonness, all to the point of ruin (1.pr.11-12):

“You have often heard me complaining of the extravagance of the women and often of the men, both private citizens and magistrates even, and lamenting that the state is suffering from those two opposing evils, avarice and luxury, which have been the

destruction of the great empire... the more I fear that these things will capture us rather than we them. Tokens of danger, believe me, were those statues which were brought to this city from Syracuse.”

(34.4.1-4).

Livy identified a particular moment that changed the nature of commodity consumption in Italy, placing it in the aftermath of the conquest of Asia in 132 BCE (Livy 33.10.134-135). Similarly, he blamed the increase in the desire for, and the accessibility of, luxury (*luxuria*) in Rome to the army's return after the defeat of Antiochus (29.6.7). In fact, there is seemingly unequivocal agreement amongst the ancient sources in reference to military campaigns in the East during the second century BCE as causing the advent and 'infection' of luxury and ostentatious display in the Roman world. Polybius (203-120 BCE) attributed it to the period after the defeat of Macedonia, during which the riches of that defeated kingdom were transported to Rome (31.25.7-8). In the same way, Sallust (86-34 BCE; *Cat.* 2.5-6; 2.11-13), Valerius Maximus (in the reign of Tiberius, *Memorable Deeds and Sayings* 9.1.3), and Velleius Paterculus (c.19 BCE – 31 CE, *Compendium of Roman History* 2.1.1-2) accredit the Second Punic War with the advent of conspicuous consumption. The following passage from Livy's *History of Rome* (39.6.3-9) expands on this sentiment and can be seen to relate to modern views of commodity culture (cf. Roberts 1998):

“Still worse things were being witnessed among his soldiers every day, for it was through the army serving in Asia that the beginnings of foreign luxury were introduced into the city. These men brought into Rome for the first time bronze couches, costly coverlets, bed curtains and other fabrics, and – what was at that time considered gorgeous furniture – one-legged tables and sideboards.”

Athenaeus (early second century to the beginning of the third century CE) goes as far as singling out L. Licinius Lucullus as the first person to introduce luxury and extravagance to the Romans through his abandonment of self-discipline upon returning from his victories over Mithridates and Tigranes (of Armenia). He is said to have exploited the wealth of the two defeated kingdoms and thus “wrecked his life on the reef of extravagance” (6.274e-f). Plutarch (46-120 CE) also bemoans the behaviour of Lucullus providing an example of his improper behaviour, calling his daily dinners “ostentatiously extravagant” and of “envy to the vulgar” (*Life of Lucullus* 39. 1-41. 2). This latter phrase is exemplar of the attitude promoted by the Roman moralists who hark back to traditional ancestral morals and denigrate luxury and excessive consumption, ardently arguing for voluntary simplicity, *frugalitas*, (for instance, Athenaeus 6.273d-e; see also Briscoe (1981) and Astin (1978)) and a “modest and limited use of... material possessions” (Athenaeus 6.274a); something that can be investigated through the vessels from Pompeian household assemblages (Chapters Six and Seven):

“we do not wear unusual clothing or otherwise adorn ourselves; and we make no unusual sacrifices. Instead, we wear inexpensive clothes and shoes; put rough sheepskin caps on our heads; and bring ceramic and bronze vessels that contain the simplest possible food and drink”.

Athenaeus, 6.274b

Pliny’s view of extravagant materialistic lifestyles is equally scathing, with the unnatural nature of *luxury* being a recurring theme: nature and natural resources reverberate simplicity, humbleness, and accessibility, not to mention low financial outlay. Conversely, luxury epitomises excess and waste. This is a view also reflected in a poem by Propertius (50/45-c.15 BCE), *Luxury is destroying Rome* (3.13.25-6):

“Lucky of old the country youth, living in peace,
Whose wealth was tree and harvest”

The conviction that the corruption of morals was caused by private wealth was not solely a Roman sentiment, as it was also a common theme in Hellenistic literature in which Persia constituted the epitome of wealth and luxury (Briscoe, 1981, 50-1). Similarly, for Roman authors commenting on luxury and associated morality, Asia is frequently seen to be an example of sumptuous lifestyles and overly-devoted to luxury. Tacitus, when talking about Asia remarks that it could be a corrupting influence on Romans and that “the province was rich and an easy prey to the unscrupulous” (*Agricola* 6.2). Evidence is lacking, however, that Cato himself associated the rise of luxury with the Greeks (Astin, 1978, 173-4; Briscoe, 1981, 51) unlike some others, such as Cornelius Nepos (*Pausanias* 4.3.1-3) and Valerius Maximus:

“Xerxes, out of the proud imitation of his vast wealth, grew to that height of luxury, that he propounded rewards to them that should invent any new pleasure. What a ruin befell a most wide Empire, too deeply plunged in leisure and voluptuousness!”

Valerius Maximus 9.1 ext. 3

This example also draws attention to another facet of conspicuous consumption that is alluded to in other texts, that of the consumption of time through leisure. This links strongly into Veblen’s work on the *Theory of the Leisure Class* (1994; see also Veblen 1970) as well as Bataille’s work in which waste is a central theme (see Bataille 1998). The ability to conspicuously expend time is something that

accompanies and supplements the consumption of commodities as a demonstration of status.

Cato's frugality was praised by Seneca (*Ep.* 87.9) and is something that is cited by several ancient authors as being exemplary of appropriate moral behaviour. He is said to have lived a life of simplicity without expense to the state: "in general, he thought nothing cheap that one could do without, but that what one did not need, even if it cost but a penny, was dear" (Plutarch, *Cato Maior* 4.4). This quote should not be taken as a literal declaration of lifestyle; rather, it is a statement of principle, an aphorism (Astin 1978, 94). It was not that Cato objected to wealth itself but to the consumption of luxury goods and the overt display of them, as well as the acquisition of wealth by improper actions. Scullard (1980, 364) rightly argues, however, that there is potential exaggeration on the part of Cato in terms of Roman morals regarding extravagance.

Coffee's recent excellent study (2006; 2009) of warfare as a reflection of wasteful expenditure approaches the subject of consumption from a novel perspective, one that further encapsulates ancient attitudes. He examines Statius' *Thebaid* to consider the subject, in which the use of vocabulary and language reflects examples of self-indulgence and wasteful expenditure, as well as demonstrations of the undervaluation of commodities. People themselves are included in the term 'commodity' as war is seen as mass consumption through an "expenditure of lives" (Coffee 2006, 446). Coffee makes a strong argument for his interpretation of the vocabulary and language in the text. In addition to addressing facets such as reciprocity and commodity exchange, he argues that Statius perceived a link between a desire for goods and a desire for violence (Coffee 2006, 425). One of the most notable examples provided is that of the city of Thebes, which was "laden once with

arms and wealth and lately thronged with citizens, [but] you have drunk it down” (Coffee 2006, 438; Statius (*Thebaid* 11.273.74)); ultimately, “Polynices consumes his friend Tydeus, and Eteocles the wealth and citizens of Thebes” (Coffee 2006, 450).

In the following sections the discussion will progress to investigate how these attitudes manifested themselves in the population, if at all, and the legislations introduced in an attempt to restrict the consumption and display of luxurians. Furthermore, how did these attitudes change by the end of the first century CE when the evidence from Pompeii becomes a key form of evidence? Were the moralising attitudes and legislations still evident at this time?

2.3: Sumptuary Laws:

Sumptuary laws (*leges sumptuariae*) are statutes concerning consumption and display that have been present in various forms throughout history, from classical civilisations to feudal Europe to sixteenth-century England (Hunt 1995, 1996). Cato referred to them as ‘rationing laws’ (Macrobius 3.17.13) as many sanctions related to foodstuffs and dining practices, such as those indicated by Pliny in his discussion of pigs as luxury meats: “[h]ence pages of sumptuary laws, and the prohibition of hog’s paunches, sweetbreads, testicles, matrix and cheeks for banquets” (*NH* 8.209). Earlier restrictive laws of this type are also recorded, such as legislation in the XII Tables against increasingly elaborate expenditure on tombs in Greece (Daube 1969, 124). This applied from the mid-fifth century BCE through to the end of the Republic (Dixon 1985, 147) and provided “for the limitation of the expense and the mourning

at funerals, which were borrowed for the most part from the laws of Solon” (Cicero *de Leg.* 2.59), described by Plutarch (*Solon* 21).

Livy (59/64 BCE – 17 CE) saw the acts of extravagance and desire for material goods as a vice of his own time, stating that the reason for there having been no need for his ancestors to pass any sumptuary laws was that there was no extravagance to be restrained (34.4.6-8). Also, he states that “it is not strange that no Oppian or any other law was needed to restrict female extravagance at the time when they spurned gifts or gold and purple voluntarily offered to them” (Livy 34.4.10-11), and this was echoed by Macrobius (3.17.10). Valerius Maximus saw men as also being prone to succumbing to the pull of luxury, rather than this just being a weakness of women (9.1.3). This suggests that dubious moral behaviour of the richer classes was a motivation to enact against such situations; an attitude that will be explored in greater detail below. Other explanations could include factors such as the desire to reinforce social hierarchies.

Macrobius states that the first of the sumptuary laws in Roman times was the *lex Orchia* of 181/182 BCE (2.17.2), which served to limit the number of guests at banquets. There were, however, two other laws of interest to this study that predate the Orchian law. One of these was the *lex Cincia* of 204 BCE. This was not so much a sumptuary legislation as a measure to forbid the provision of gifts beyond a given limit outside of certain blood relationships (Hornblower and Spawforth 1996, 850). The second, and more significant, legislation is the *lex Oppia* of 215 BCE, constituting the first occurrence in the ancient sources for such a statute. As it was an emergency measure initiated during the Second Punic War to limit the expenditure of women (Livy 34.1; Tacitus, *Annals* III.34; Valerius Maximus. 9.1.3), it is sometimes not classed as a sumptuary law *per se* (Fantham *et al.* (1995, 260) refer to it as an

“austerity law”). Dixon (1985, 149) refers to the *lex Oppia* as “limiting female access to luxury goods” but it was not so much the *access* that was being restricted, rather the acts of acquiring and displaying these goods. It is most fully described by Livy (34.1.3-4) who tells us that this law served to not only restrict a woman’s wealth but also her *display* of wealth. One of the reasons for the significance of this law was that in 195 BCE it was repealed (Livy 34.4.6-11) due to mass public outcry at the fact this wartime measure was still in place even though the war had ended.

Cato’s strong dislike of extravagance in lifestyle (Livy 39, 44, 1-3; cf. Plutarch *Cato* 18, 2) was demonstrated by his censorship in 184 BCE when he proceeded to attack private conspicuous consumption through heavily taxing luxuries (Livy 34.4.1, Briscoe 1981, 50; Frank 1940, 197ff.). This could be argued to represent the start of non-economically driven sumptuary procedures; in other words, the population of Rome became ‘guided’ by regulation and legislation that was dictated by social and moral statements rather than economic needs (Astin 1978, 26; Lewis and Reinhold 1990, 489ff.).

“...most of the people were already infected and corrupted by it [luxury], and so he took a roundabout way. He had all apparel, equipages, jewellery, furniture and plate, the value of which in any case exceeded fifteen hundred drachmas, assessed at ten times its worth, wishing by means of larger assessments to make the owners’ taxes also larger. Then he laid a tax of three on every thousand asses thus assessed, in order that such property holders, burdened by their charges, and seeing that people of equal wealth who led modest and simple lives paid less into the public treasury, might desist from their extravagance. As a result, both classes were incensed about him, both those who endured the taxes for the sake of their luxury, and those no less who put away their luxury because of the taxes. For most men think themselves robbed of their wealth if they are prevented from displaying it, and that display of it is made in the superfluities, not in the necessities of life.”

Plutarch, *Cato* 18.1-3

The *Lex Voconia* (169/168 BCE) was the next sumptuary law that was passed and concerned the regulation of property passing through wills. Specifically, it restricted the inheritance rights women had in being named as heir to property valued in excess of 100,000 *asses* (Aulus Gellius 2.17.6). Next came the *lex Fannia* in 161 BCE, which was intended to restrict the ostentatious display of personal wealth at large dinner parties.

“The law stipulated that no one was to entertain more than three people from outside his household, or five on market days, which occurred three times a month. It prohibited buying fish that cost more than two-and-a-half drachmas, but allowed individuals to consume 15 talents of smoked meat per year, as well as whatever vegetables and dried legumes their land produced”

Athenaeus, 6.274

Many people of Italy regarded the Fannian law to only apply to the citizens of Rome, which resulted in the *lex Didia* being implemented in 143 BCE as an extension of the former. This statute also had a secondary function in that it extended the restrictions on dinner parties in that the attending guests also became liable, in addition to the hosts, if the legislation was violated (Macrobius, 3.17.6). After this, the *lex Licinia* was implemented, which was essentially the same as the *lex Fannia* apart from a few minor changes, related by Aulus Gellius (2.24.7-8). Two dates have been provided for this statute: the translators’ commentaries for Macrobius and Aulus Gellius put it at 103 BCE, whereas the *Oxford Classical Dictionary* (Hornblower and Spawforth 1996, 851) states that, as with the *lex Didia*, it dates to 143 BCE. The essential point of this law was that it was established because respect for the old law was “beginning to lapse” (Macrobius 3.17.7-8).

After the Licinian Law, the details for subsequent sumptuary laws are somewhat fragmentary. Part of the reason for this being the selectivity employed by Macrobius, in particular, for including relevant information. The *lex Cornelia* was imposed by Sulla in 81 BCE and, although it apparently only served to reduce the prices on foodstuffs rather than limit extravagant feasting, was classed as a sumptuary law. The resultant effect of this law was to cause greater accessibility of luxury foodstuffs to a broader component of the population, thereby providing the opportunity for a “lavish abundance of dishes” (Macrobius, 3.17.11). This evidence actually creates an impression that large sumptuous meals were not as widespread as might be assumed “since most of the delicacies included in the Sullan law as being generally well-known, are known to none of us even by name” (Macrobius, 3.17.12).

There are two separate *leges Aemilia*, one passed in 115 BCE and the other in 78 BCE (see translators’ notes for Macrobius, p243 n.9, and Aulus Gellius, p207 n.1). Details for the earlier one are lacking but the latter consisted of limits upon the kind and quality of food, not the expense (Aulus Gellius, 2.24.11; Macrobius, 3.17.13). Two subsequent legislations, which remain nameless to us, are briefly mentioned by Macrobius. All that is known regarding the first, passed by Antius Resto, is that it was never repealed. It was, however, “nullified by a stubborn extravagance and the strength of the general addiction to such vices” (3.17.13). The second was a statute proposed by Mark Antony that Macrobius provides very little detail for because he resented including it in his list of sumptuary laws. The reason for this was that he did not count Antony as “among those who sought to check such expenditure, since what Antony habitually spent on dining was surpassed only by... his wife Cleopatra” (3.17.14-18).

The remaining two *leges sumptariae* on which we have information, albeit fragmentary, appear in Aulus Gellius' work and primarily concern the alteration of expenditure during festivals. During the principate of Augustus (27 BCE - 14 CE) a legislation was brought in that increased the limit for festival expenditure to 300 *sesterces*, weddings to 1000 *sesterces*, and other days to 200 *sesterces* (2.24.14; Suetonius, *Augustus* 34.1). Subsequent to this, a further law was passed, according to Gellius, during either the principate of Augustus or that of Tiberius (therefore sometime between 27 BCE and 37 CE). This served to loosen further the existing restrictions on festival dining, increasing the limit from 300 to 2000 *sesterces* (2.24.15).

Considering the *lex Fannia* of 161 BCE permitted an expenditure of just 120 *asses*, these later statutes demonstrate the dramatic increase in sanctioned spending by the time of Tiberius. The indication is of an increase in tolerance of the consumption of luxury goods, as such changes in legislation cannot solely be a result of inflation. Furthermore, Frank points out that the limit of a hundred pounds in weight of silver tableware in the *lex Fannia* was incongruous with the stricter limit on food expenditure (1959, 199). His suggested explanation for the phenomenon is that the silver plate taken as booty during military campaigns had been auctioned off to private individuals and therefore, to use a modern economic expression, the market was relatively saturated with such commodities. This hundred pounds limit is a stark contrast to the situation just over a century prior to the Fannian law, when Cornelius Rufinus was in 275 BCE allegedly expelled from the Senate for possessing ten pounds in weight of silver tableware (Astin 1989, 185).

Table 3.1: Summary of *leges sumptuariae*

Law	Date	Subject of Law	Imposed by	Source Reference
<i>Lex Oppia</i>	215 BCE (Repealed in 185 BCE)	Restriction of display of wealth by women (wartime measure).	Gaius Oppius	Livy (34.1.3-4; 34.4.6-11) Macrobius (3.17.1-3) Plautus (<i>Aulararia</i> 475ff.) Valerius Maximus (9.1.3) Tacitus (<i>Annals</i> 3.33-34) Rescission: Livy (34.1-8) Tacitus (<i>Annals</i> 3.34)
<i>Lex Cincia</i>	204 BCE	Restriction on gifts	M. Cincius Alimentus	Hornblower and Spawforth, (1996)
<i>Lex Orchia</i>	181 BCE	Limiting guests at dinner	Cato	Macrobius (3.17.2-3)
<i>Lex Voconia</i>	169-168 BCE	To regulate passing of property through wills	-	Livy (<i>Per.</i> 41) Aulus Gellius (<i>NA</i> 2.17.6) Cicero (<i>Rep.</i> 3.10; <i>Verr.</i> 2.1, 41-45) (cited in Dixon 1985, 167 n.88)
<i>Lex Fannia</i>	161 BCE	To restrict ostentatious display at dinner parties: limited number of guests, type of food permitted, and overall expenditure. Native wine only. Rotation of hosts. No more than 100 lbs of silverware to be used at table.	C. Fannius Strabo	Athenaeus (6.274.108) Aulus Gellius (<i>NA</i> 2.24.2-7) Macrobius (3.17.4-5) Pliny (<i>NH</i> 10.139)
<i>Lex Didia</i>	143 BCE	Extension of sumptuary law from Rome to rest of Italy	-	Macrobius (3.17.6)
<i>Lex Licinia</i>	Just after 143 BCE (103 BCE according to translator's notes for A. Gellius)	Essentially the same as the Fannian law. Established as old law was losing respect	-	Aulus Gellius (<i>NA</i> 2.24.7-11) Macrobius (3.17.7-8) Cicero (<i>Epistulae</i> 7.26)

Law	Date	Subject of Law	Imposed by	Source Reference
<i>Lex Cornelia</i>	81 BCE	Lower prices of foodstuffs <i>not</i> limit extravagance (yet still classed as a sumptuary law)	Sulla	Aulus Gellius (<i>NA</i> 2.24.11) Macrobius (3.17.11-12)
<i>Lex Aemilia</i>	115 BCE	?	?	Aulus Gellius (<i>NA</i> 2.24.12, see footnote commentary n.1)
<i>Lex Aemilia</i>	78 BCE	Limit on kind and quality of food, not the expense	Proposed by Lepidus	Aulus Gellius (<i>NA</i> 2.24.11) Macrobius (3.17.13)
<i>Lex Antia</i>	Passed a few years after the Aemilian law (although not clear which one)	Limited expenditure and severely restricted magistrates dining out	-	Aulus Gellius (<i>NA</i> 2.24.13)
?	? (Never repealed, nullified)	-	Antius Resto	Macrobius (3.17.13)
?	?	-	Proposed by Mark Antony	Macrobius (3.17.14-18)
<i>Lex Julia</i>	During principate of Augustus (27 BCE – 14 CE)	Alteration of the expenditure for festivals (300 HS) and weddings (1000 HS). Other days: 200 HS	-	Aulus Gellius (<i>NA</i> 2.24.14) Suetonius (<i>Augustus</i> 34.1)
?	During the principate of Augustus (27 BCE – 14 CE) or of Tiberius (14 CE – 37 CE)	Loosened the restrictions on festival dining expenditure (from 300 to 2000 HS)	-	Aulus Gellius (<i>NA</i> 2.24.15)

The general ‘liberalisation’ of opinion towards luxurious consumption, apparent in the foregoing discussion, may also prove evident in ancient literary sources in terms of the perspectives of the people affected by these *leges sumptuariae*. The following section will investigate broader implications and discuss what evidence is available for these shifting attitudes towards consumerism in the ancient world. Additionally, the methods individuals used in their attempts to avoid adhering to the legislations will be considered.

2.4: Broader Implications and Reflections of Attitudes

“Let there be no limit to expenditures and extravagance!”

Livy 34.3.9⁴

Using the evidence discussed above as a conduit for placing the act of commodity consumption in the realm of the socio-cultural arena, rather than as a catalogue of goods considered luxurious or extravagant, allows us to access the social topography surrounding the consumption of commodities. Taking the ancient literary evidence at face value, however, can be erroneous, especially if the examples of opulence that are provided revolve around the exceptional, rather than the more common. For example, Pliny considered gold, silver, gems, purple dyes, pearls, and oysters among the worst of luxuries (Wallace-Hadrill 1990, 87) and duly spent time bemoaning their consumption. His discussion of pearls as a luxury commodity begins with a description of the item as a wonderful product of nature, only to follow it with:

⁴ Translation: Johnston (1980)

“Women glory in hanging these on their fingers and using two or three for a single earring, and foreign names for this luxury occur, names invented by abandoned extravagance, inasmuch as when they have done this they call them ‘castanets,’ as if they enjoyed even the sound and the mere rattling together of pearls; and now-a-days even poor people covet them.”

Pliny *NH.* 9.114

This may seem relatively self-explanatory and a representation of the social climate of availability of goods such as these. It is, however, a situation that is far from the ‘normal’ and serves as a metaphor for the wastage of luxury. Pliny relates how some women, in order to go beyond possessing the form of pearl ornamentation that ‘even poor people covet’, attached them to footwear for decoration. Some went even further and attached them to the bottom of their slippers and literally “walk[ed] on these unique gems” (*NH.* 9.114). Valerius Maximus reports similar behaviour by King Antiochus “whose blinde and mad Luxury the Army imitating, had most of them Golden Nails under the soles of their shoes” (9.1.ext 4). The use of marble for flooring, as discussed in Chapter One, could be seen as a far less exaggerated version of this form of behaviour.

An even more extreme example given by Pliny is the demonstration of wanton waste by Cleopatra who dissolves a pearl earring in vinegar just to prove to Mark Antony that she could consume ten million *sesterces* without effort (*NH.* 9.120). This example is also used by Valerius Maximus in illustrating the lifestyle of the son of Aesopus: “a young man not only of a desparate, but a most furious luxury... he used to put Pearls of high value, dissolv’d in vinegar, into his drinks” (9.1.2). Whether this represents a conflation of two stories or just a manipulation of the example for exaggerated effect is uncertain.

There is a strong connection here to the criticisms of consumerism by individuals such as Veblen and Bataille. The latter argued for the strong role played by expenditure and waste in the actions of society, as a contrast to the significance of utility-value (Bataille 1998; see also Winnubst 2007 and Lamarche 2007). Veblen, perhaps best known for his ideas on conspicuous consumption with an emphasis on emulation, also signalled the central role of (conspicuous) waste as a signifier of status (Veblen 1994). This is also something picked-up in modern literature, such as by H.G.Wells in *Tono-Bungay* (2005 [1909]), in which waste is associated with entropy resulting in the “squandering of wealth and the ‘degeneration’ of traditional conceptions of cultural and moral value” (Brantlinger and Higgins 2006, 464).

Extremes of luxury are also encountered in passages relating to sumptuous feasts and examples of extravagant meals. One of the most striking is the case of Vitellius, who is said to have had three or four feasts a day with different guests at each and amounting to at least four hundred thousand *sesterces* a time. Of particular extravagance was a meal called the “Shield of Minerva”, which Pliny alleged cost a million *sesterces* (*NH* 35.163*ff.*) – although this could well be a vast exaggeration as it is a large, round number that sounds incredibly wasteful – and is described by Suetonius:

“Most notorious of all was the dinner given by his brother to celebrate the emperor's arrival in Rome, at which two thousand of the choicest fishes and seven thousand birds are said to have been served. He himself eclipsed even this at the dedication of a platter, which on account of its enormous size he called the "Shield of Minerva, Defender of the City"... In this he mingled the livers of pike, the brains of pheasants and peacocks, the tongues of flamingoes and the milt of lampreys, brought by his captains and triremes from the whole empire, from Parthia to the Hispanic straits.”

(*De Vita Caesarum*, 13)

Marx's interpretation of the constitution of a 'commodity' and its 'value' states that an object can only have value if it is an object of utility (1961, Ch.1). In the example of Cleopatra dissolving a pearl it could be argued that, in Marx's terms, this object has no value. I would argue, however, that it does have value, a *social* one, and it lies within her ability to demonstrate status and wealth, thereby fulfilling the intended function of many of the commodities that undergo conspicuous consumption. It also falls into the arguments of Veblen and Bataille regarding waste and conspicuous expenditure. It is therefore worth reiterating: that the primary outcome of such conspicuously wasteful actions is the display of wealth and status to others, and therein lies their symbolic value to the individual. This is again encountered in ancient texts with regard to perfume, a commodity regarded by Pliny as one of the ultimate wastefully luxurious goods: "Perfumes serve the purpose of the most superfluous of all forms of luxury... unguents lose their scent at once, and die in the very hour when they are used" (13. 20). It should not be ignored, however, that the Campanian region was famed for its perfume production, with evidence demonstrating a connection between the urban elite and the manufacture of these commodities (Mattingly 1990).

The fact that conspicuous consumption was satirised by Petronius, and mocked in several plays by Plautus demonstrates that these issues were not unknown to wider audiences. In fact, the very nature of satirical works was concerned with criticising immorality (Edwards 1993, 2). Johnston (1980, 148) also draws attention to plays by Menander, who would have experienced sumptuary measures himself. Similarly, Plautus uses dowries as a tool to showcase the demanding consumerist tendencies of women; a soliloquy by the character Megadorus includes the following passage where a nagging wife's expectations are expressed:

“I brought you a dowry far bigger than the money you had; so it’s fair that I should be given purple clothes, gold jewellery, slave-girls, mules, grooms, footmen, pages and a carriage.”

(Auluraria 499ff.)

The extravagance of women was a “popular prejudice” (Fantham *et al.* 1995, 261) at this stage in Roman history, and dowries, as seen in the above example, proved to be a topic that encapsulated many of these opinions. It should be noted, however, that dowries became less of a conduit for transferring practical household goods and more of an instrument of economic behaviour during (and after) the second century BCE (Fantham *et al.*, 1995, 263). In these terms it became easier for the stereotypical distortion of marriage and the continuation of the image of the husbands who had been “corrupted by the depravity of their wives” (Cicero, *Annals*, 3.34). This was especially the case once the Oppian law had been repealed and women were no longer “held in curb” but had now “cast their chains and ruled supreme in the home” (Cicero, *Annals*, 3.33).

At the same time, however, husbands could also use their wives as a statement of their wealth. By having your wife participate in festivals and ceremonial occasions, the affluence and assets of the household could be put on social display and judged in public; a key component of the category of conspicuous leisure identified by Veblen (1994). It would be no surprise, therefore, for husbands to encourage their wives into extravagant display, thereby stoking the fires of competition between women in terms of their attire. This may not have been viewed favourably by all, however, as Cato argued that personal adornment led to competition among women and if that competition were permitted, women would go to ever greater lengths to satisfy this desire for adornment (Livy, 34.4.15-18).

The question is one of how representative was this attitude, even among the wealthier members of the population? Astin (1978, 93-94) and Johnston (1980) argue that Cato was not alone in his hostility to luxury and extravagance stating that the fact that sumptuary laws were passed indicates “fairly widespread support” for these views (this expression is used by both Astin (1978) and Johnston (1980, 148); see also Dalby (2002), who states that his aim is the reconstruction of ancient views regarding the mental “geography of luxury” (2002, 1), with detailed attention to food in the Roman Empire). It is necessary to remember, however, that Cato’s moralising was of the second century BCE and referred to earlier times and the idealised past. But was it just a case of morals and frugality that created this support for the sumptuary laws? Daube (1969, 124-127) suggests that the support offered by the wealthy was driven by a fear of not keeping-up with the social pressures of displays of wealth and emulation of peers.

Literary evidence also provides indications that support was *not* widespread. For example, there are instances recorded of attempts to avoid adherence to the laws, as well as contempt for their existence. Not least is the case of the *lex Oppia* that, as already discussed, created much hostility in Rome, which culminated in it being rescinded in 195 BCE after mass public outcry (Livy 34.1-8). This, however, is not direct evidence for disdain for the law itself, as the objection is that the law still existed twenty years after its introduction as an emergency wartime measure.

One way in which the ineffectiveness of these laws is evident is through their replacement or nullification as respect for them diminished. This was something that was most apparent in the instances of the *lex Fannia* and the legislation of Antius Restio. There are other more subtle implications, however, such as one of the consequences of the *lex Fannia* reported by Athenaeus: “Although the expenditure

allowed was very small, the fact that people who broke the law and spent money freely drove the price of commodities up” (6.274d). It could be argued that it was factors such as this that motivated Sulla to introduce his statute in 81 BCE, which at first might seem contradictory in the theme of the *leges sumptuariae*. Lowering the prices could be interpreted as just providing wider accessibility of foodstuffs for consumption in sumptuous style but in itself it could represent an attempt to decelerate the rising prices that would make commodities *more* of a status and wealth indicator.

Sulla is reported to have, in fact, contravened his own sumptuary laws (Plutarch, *Sulla* 35), an indication that it was easier to enact such moral statutes than to enforce, or even adhere to them (Griffin 1976, 100). In addition to directly contravening these legislations there are also examples of avoiding them without actually partaking in unlawful activity. For instance, the *leges Fannia* and *Licina* both provided a clause that permitted people to consume unlimited quantities of vegetables and native wine (Athenaeus, 6.274; Macrobius, 2.24.7). This resulted in the dining experience including unprecedented quantities of such foodstuffs to maintain sumptuous levels of food. In an amusing anecdote related in a letter by Cicero, written in 57 BCE and probably referring to the *lex Aemilia* of 78 BCE (Fowler 1965; see commentary for Macrobius 1969, p243 n.7), the unfortunate consequences of eating excessive amounts of mushrooms and other such dishes are recalled. These dishes, we are told, were served by the host so as to avoid contravening a sumptuary law (*Epistulae ad Familiares* 7.26). This behaviour is concisely encapsulated in a line from the poet Lucilius: “Let us evade the law of Licinius” (Aulus Gellius 2.24.10). Such evasion is a direct reflection of the nuanced nature of consumption in both modern and ancient contexts.

One of the more significant conclusions to be taken from this evidence of *leges sumptuariae* is that, as indicated by Scullard (1980, 365), the rate of recurrence of such a form of legislation is suggestive of its ineffectiveness. Overall, there were successive attempts to make the laws more stringent but ultimately, as can be seen by the permitted expenditure on festivals, the restrictions were loosened. Valerius Maximus alludes to such things in Book 9 of his *Memorable Deeds and Sayings*, indicating that attempts to limit excessive consumerist behaviour through sumptuary legislation had little success, as does Aulus Gellius:

“Afterwards, when these laws were illegible from the rust of age and forgotten... many men of abundant means were gormandizing, and recklessly pouring their family and fortune into an abyss of dinners and banquets”

(Aulus Gellius 2.24.11)

Tacitus correspondingly states that sumptuary laws were problematic, with the old laws being obsolete resulting in the State being powerless to stop luxurious behaviour (*Annals* 3.53-54). In fact, in Tacitus’ time it appears that there were more successful ways in which the conspicuous consumption by individuals could be limited: “extravagant prodigality...went out of vogue” and the “love of emulating him [Vespasian] proved more powerful than legal sanctions and deterrents” (*Annals* 3.55). This power of emulating the tastes and the behaviour of the Imperial family – representative of ‘trickle-down’ theory (see Trigg 2001; 2004; Veblen 1994) – is visible in the archaeological record and can be witnessed in Pompeii, such as through the use of particular types of marble in the larger houses in the city (for example, in areas such as the *impluvium* in the House of the Faun (Fant 2008)).

By the first century CE sumptuary laws were either being disrespected or had become obsolete. Opinion was changing: Tacitus reports that, while Octavius Fronto

“pressed for a statutory limit to silver, furniture, and domestics”, Asinius Gallus saw wealth as relative to the state (*Annals* 2.33). Therefore, as the Empire grew in wealth, it was acceptable, natural even, for individual wealth to also increase. As can be seen in this example, even those opposed to conspicuous consumption and luxuriant display became more tolerant. For instance, Fronto sought the restrictions of particular types of materials and not consumerism in all its forms.

Tacitus notes that in a letter by Tiberius to the Senate he stated that the laws initiated by his ancestors were now “buried” or “in contempt”, causing “luxury its greater boldness” (*Annals* 3.54). A prime example of shifts in attitude is the funerary expenditure of Gaius Caecilius Isidorus, the freedman of Gaius, who in 8 BCE remarked that, despite losses during the Civil War, he could leave a substantial wealth comprising 60 million *sesterces* plus over 4,000 slaves and 250,000 heads of cattle. This in itself is not a remarkable occurrence, indicating a substantial change from earlier laws passed to limit the expenditure on funerary displays. Celsus’ observations, made in the latter part of the first century CE, and those of Athenaeus, made during the end of the second century to the beginning of the third century CE, regarding the material culture of household goods reveal a comparable situation in relation to household objects:

“People used to have household goods made of pottery, wood, glass, or copper; now they are of ivory, tortoiseshell and silver. Nowadays they even have them made from gold and precious stones. So one has to consider the nature of the objects rather than the material of which they are made, to decide whether they are household goods, silverware or clothing.”

Celsus 33.10

“But nowadays, according to Theopompus in Book I of his *History of Philip*, there is no one even among the only moderately well-to-do who does not set an expensive

table, own cooks and many other servants, and spend more money every day than people spent in the past at their festivals and sacrificial rites.”

Athenaeus 6.275b

Overall, in general terms, there was an apparent transition in opinion: (i) a ‘fear’ of the spread of luxury in the second century BCE; (ii) the imposition of sumptuary laws to the extent that they were “a recurring feature” by the time of Augustus’ principate (Astin 1978, 293); (iii) widespread ‘luxurious’ behaviour and the loosening of sumptuary laws in the first century CE.

Further consideration of documentary evidence in several forms could also prove useful in the study of consumption. In Chapter One I argued for the necessity of considering other mechanisms in addition to financial exchange to account for the acquisition of goods. Justinian could provide one avenue into this discussion: for example, in his *Digest of Roman Law* the following section headings appear, “Concerning Theft” and “Concerning Robbery with Violence and Riotous Assembly”. ‘Theft’ even appears in the subheading of the book, indicating the extent to which such ‘acquisitive behaviour’ was a problem in the ancient world.

Commentary from the first century CE is of particular interest to this study as it correlates with the latter stages of Pompeii’s existence as a functioning town. Evidence relating to social acceptance or patterns of consumption is therefore potentially significant in relation to the household assemblages of artefacts investigated later in this thesis; does the archaeological evidence depict consumer behaviour that is in keeping with the literary evidence discussed in this chapter? Analysis of the patterns of consumption evident from the artefactual assemblages

from twelve Pompeian atrium houses will address this in subsequent chapters of this study. Celsus' statement regarding the importance of the nature of the goods, rather than the constituent material, is one that is acknowledged as important in the vessel analyses in Chapter Seven, such as for cooking vessels. However, material is still a significant factor. Celsus stated that household goods *used* to be of pottery, glass, or copper, and that ivory or silver became more commonplace; however, the Pompeian data yields relatively few of these more ornate types of goods, with the exception of the Casa del Menandro silver hoard. It seems unlikely that a lack of such 'higher luxury' items is solely due to removal during abandonment of the city; some vestiges would be expected to endure in the archaeological record. The subject of occupation status and assemblage character will be discussed at greater length in the data analysis section of this thesis (Part II).

2.5: Consumerism: Ancient and Modern

Ubi uber, ibi tuber

‘where there is abundance, there is also malignancy’

Latin proverb quoted by Apuleius, *Flor.* 18.



Advertising slogan from
Leicester Highcross shopping centre

The attitudes and laws concerning conspicuous consumption and luxury have been presented above, demonstrating the various desires exhibited by some sectors of Roman society. In this section I will argue that this apparent desire for exotic material culture can be expressed more directly in terms of the consumer theory addressed in Chapter One. Furthermore, the satirical treatment of display and ‘consumerism’ in works such as Petronius’ depiction of Trimalchio also have resonance in the modern world.

Although forms of media have transformed since the writing of *Trimalchio’s Dinner Party* strong statements akin to this are present in today’s popular cultural representations. Petronius strived to create an image of an opulent display of wealth and waste through the conspicuous consumption of material objects (and time) as well as foodstuffs at the dinner party. With the latter, metaphors for excessiveness are

abundant, with imagery of stuffed or pregnant dishes featuring heavily (33.5; 36.1; 40.5; 49.10; 60.6; 69.6: stuffed pastry thrushes). In fact, this is such a powerful stimulus of depiction that it is also employed by Plautus: the stuffed stomach and womb (*vulva*) “exemplify moral excess” (Gowers 1993, 121) and mentioned on several occasions by Pliny, such as stuffed sow’s livers (8.209).

This use of pregnant and stuffed platters served as one element of dual representation for Petronius because the feast about which the story revolves is at the time of the Saturnalia (44.3; 58.2; 69.9), an occasion on which sumptuary laws permitted greater excessiveness and expenditure than at other times. Gowers states that by providing examples such as these in addition to the imagery of mixed dishes or mixed combinations of dishes “symptoms of moral frailty and corruption” are conjured in the mind of the reader (Gowers 1993, 120). The strongest example of which is that of the Vitellius’ “Shield of Minerva” discussed above. Once again it is the visual of compound creations that heightens the power of descriptions of the luxurious; whether the reference is to foodstuffs or to perfume, the effect is the same.

Striking images of the consumerist response also find a place in the modern world, to create satirical effect and vivid pejorative depictions. Karl Marx used such an approach in his analysis of capitalist cultures by applying the metaphor of vampirism as a means of focusing on concepts of the capitalist and commodity fetishism, with the image of the lustful capitalist draining the life-blood of workers in the ‘Circulation of Commodities’ (Marx 1961, Ch 3, 188-226; see also Godfrey *et al.* 2004).

The image of the immoral, wanton human takes many forms, such as the vampirism metaphor used by Marx. Just as Petronius exaggerates the conspicuous consumption by a Roman freedman, so George Romero satirises the ‘mindless’

consumer through an “exaggeration of consumer robotics” (Friedberg 2002, 448) in *Dawn of the Dead* (1978). This display of a literal zombified state coupled with the parodied ‘value of hedonism’ (Loudermilk, 2003; Paterson, 2006, 94) in *Day of the Dead* (1985) serve to invoke Marxist imagery of unregulated consumerism distanced from the forgotten productive origins of commodities.

This may seem incongruent in relation to Roman satirical treatment of consumerism but consider the following comment in relation to Romero’s work: it is “a vision of society consumed by its own appetites” (Pym 2004, 302). Now consider Livy’s expressions of disdain for luxury quoted more fully above: “two opposing evils, avarice and luxury... have been the destruction of the great empire” (34.4.2-3), “I fear that these things [luxuries] will capture us rather than we them. Tokens of danger, believe me” (34.4.4). In other words, the expressed concerns of the social costs of consumerist behaviour seem to transcend time. Similarly, Romero expresses the moral perils of the economic exclusivity of consumerism, questioning the value of consumption itself. Incidentally, the sexism demonstrated towards attitudes of consumption of luxury goods by Roman authors and historians is another link between ancient and modern media portrayals of consumerism.

Inclusion of modern satire in this study relates to Fiske’s work on popular culture, particularly his volume *Reading the Popular* (1989) and can be seen in more overt forms such as the animated series *South Park* (episode 3.10, ‘Chinpoko mon’ uses consumer satire to address social pressures). Fiske states that: “Popular culture is always a culture of conflict, it always involves the struggle to make social meanings that are... not those preferred by the dominant ideology.” (1989, 2). This reflects a twofold meaning. Firstly, it serves to illustrate the example of using cultural items (‘commodities’) as social indicators, as might be found in the Roman provinces or,

indeed, in Italy itself. Secondly, this quote is a reflection of the Romero example: although it is not in keeping with the dominant mode of usual economic descriptions and interpretations of antiquity, it creates a social narrative through the use of popular culture that serves as a bridge between the ancient and the modern in a memorably illustrative format. As Fiske comments, “the work of popular culture, then, provides the means...[for the] articulation with that dominant ideology” (1989, 91-2). Finally: “Consumption is not necessarily evidence of the desire for ownership of commodities for its own sake (that is the dominant ideological meaning of ownership), but is rather a symptom of the need for control, for cultural autonomy and for security” (Fiske, 1989, 32). This may mean that such consumption is in the form of controlling one’s identity in the face of a powerful empire, creating a social marker, or finding security in objects to face that unknown entity at the ‘door’ to your secluded world. Whichever form it may take, access to commodities can create a powerful articulation between person and object. Sometimes that articulation is strengthened through goods that were previously not available and represent either a ‘luxury’ item or an object with fetishistic quality.

Commodity fetishism, originally conceived by Marx (1961, Ch1), is an element that also requires consideration in this discussion. In Marxist theory this concept holds a significant place in social relations and the relationship between money and goods. In other words, private property (that is, material culture) creates, maintains, and organises social dialogues and processes; it bestows metaphysical subtleties and is imbued with ‘powers’ that extend beyond the object as a commodity (Marx, 1961). This is notably different to the psychoanalytical concept of the transitional object becoming a fetish when it “goes wrong” (Graves, 1999, 358).

Marx's example of such commodity ambiguity resonates with Pliny's descriptions of man's manipulation of nature's resources: Marx writes of the wooden table, which through manufacturing expenditure becomes a commodity but "so soon as it steps forth as a commodity, it is changed into something transcendent" in that it evolves into possessing (and possibly providing) relationships with other objects (see Lapavistas, 2004, for further commentary on Marx and the concept of the commodity; Marx, 1961).

I would argue that there are examples of commodity fetishism visible in the literary evidence from the Roman world. Not least is the aspect of social relations demonstrated through conspicuous consumption in attempts to display social position, or the "excessive vogue for Greek things" (Griffin, 1976, 96). Consumerism is economically exclusive (Harper, 2002, 8) leaving those who cannot afford commodity signifiers isolated from those who can. Once again we can come back to Trimalchio who attempts to place himself in a social tier above his standing through extravagance and opulence in a social territory that does not permit such vertical movement (D'Arms, 1981, 112, 118*ff.*). This exhibits a deviation from Marx's concept of fetishism being ultimately related to the social character of production, as the consumer, in this case Trimalchio, demonstrates a strong disassociation from the production-consumption dichotomy. The origins of these commodities are largely irrelevant because it is their power as signifiers of wealth which is important in Trimalchio's attempt to advance his social standing. I say *largely* irrelevant as there are exceptions in this play when origin heightens the luxury status of a commodity, such as the lambs from Tarentum (which was famous for its sheep (Pliny VIII.190-191, D'Arms, 1981, 118 n.89)), honey from Attica, and mushrooms from India; all

indicating quality and, more importantly, expense at importing these items (*Trimalchio's Dinner Party* 38.1ff.).

Through the shift in the availability of luxury goods in the second century BCE, there is the induction of commodity fetishism, particularly in terms of a fetish object being a sign of something 'new and exciting' (see Whalen 1991, 118) Osborne (2001) alludes to such phenomena between Etruscans and Athenian pots, although he evades the concepts broached in this discussion. Exotic luxuries from Asia became desirable in Rome, and later spread across Italy, serving to present new opportunities for the conspicuous consumption of commodities to communicate social relations. The increasing availability of luxuries also represented a transitional stage within which consumerism became less local and much more glocalised (see above *section 1.7.2* for my argument that 'globalised' is a misleading term to apply in this case).

By fetishising such commodities, objects can become politically inert (Harper, 2002, 1, 6) but not maintain social or moral passivity. The nature of this behaviour overlaps into what Baudrillard (for example, 1998; 2001) refers to as 'symbolic exchange', where Marx's use-value theory is extended to incorporate this added dimension. Consequently, changing cultural-economic environments generate new demands for access to symbolic status (Koch and Elmore, 2006), which, although usually experienced in capitalist societies, could be argued for here. Competing strategies employed by individuals thus propagate environments that sustain a state of non-satisfaction of commodity ownership in reflection of social placement and relationships.

A further way in which echoes of the commodity fetishism can be seen in the Roman Empire is through the notion of provincial identity. As shall be discussed in Chapter Four (which concerns pottery as a consumer durable), emulation is an over-

simplified concept when discussing the cultural interactions of ‘native’ versus Roman populations. It is not merely a question of dominance-resistance interfaces with unobstructed acceptance of incoming commodities, where resident populations passively consume the images and products imposed on them by the ‘dominant ideology’ (Fiske, 1989). This is potentially assuming a concern with ethnic exclusion and politically progressive provincially-internal relationships but also represents a prominent theme in modern consumer studies (for a discussion on consumer emotions and resistance see Sandlin and Callahan 2009; for modern identity and consumers, see Alcalde 2009; Richins 1994; Shankar *et al.* 2009).

Within this discussion there lies a further condition that should be acknowledged: that of economic instability, although not in terms of capitalistic market forces acting upon centralised financial institutions. Taking this at a basic level it is possible to consider the effects of extraneous factors upon consumer behaviour, as well as productive components of economies in antiquity⁵. An example of this has already been raised in the above discussion, namely that of the Second Punic War. The economic impact of this prolonged ‘event’ resulted in the need for the emergency introduction of economic regulations, amongst which was the *lex Oppia* to regulate the wealthy (female) consumer’s market activities. As previously stated, the effects of this were felt for a period that extended beyond the immediate aftermath of its institution.

Additionally, in a more economic reading of the context, there would have been increased tax levels at this time, something that became more common practice later in the Roman world (Frank, 1959, 66, 79). Livy informs us of the exaction of a

⁵ For this it is possible to take ‘economies’ as referring to those within the household, whether they are merely consumptive or whether they have a productive capacity raising additional income – not necessarily financial gain.

double tribute in 215 BCE, the same year as the Oppian law was implemented (23, 31), as well as a liturgy being imposed on the wealthy in 214 BCE (24, 11), which was “the first time that the Roman fleet was manned at the expense of individuals” (Frank, 1959, 79, 86; Livy 24. 11. 7-9). Furthermore, there were some ‘extraordinary’ forms of state income (Frank, 1959, 81ff): (i) debased coinage was introduced in the form of a one-ounce bronze *as* (formerly two ounces) and the silver content of the *denarius* was reduced by approximately one eighth (Frank, 1959, 91); (ii) in 210 BCE, rather than another liturgy (the idea of which caused much objection within the population), the Senate called for voluntary contributions that even included jewellery and silver plate. Frank goes as far as to suggest that due to the existence of the *lex Oppia* individuals would have already been limited in their ‘use’ of such materials so would have been more willing to use gold and silver for contributions (Frank, 1959, 88-90; see Livy 26, 36, 5-8, 11-12). This is far from the only example known from antiquity in which wartime measures were brought to bear because of financial concerns. Lysias, writing in the early fourth century BCE, makes mention of war taxes – *eisphorā* – (28.3-4), elaborating in one passage on a property tax and the punishment for non-payment (29.9).

2.6: Extraneous Factors and Consumption

The question thus becomes: how did other extraneous factors (or events) impact the socio-economic climate? Obviously without direct reference to the economic effects of events such as natural disasters in the ancient documentary evidence this becomes difficult. There is, however, one condition that could be accessible to the

archaeologist; one which is distinctly relevant to the topic of study in this thesis: natural disasters, and more specifically, the eruption of Vesuvius in 79 CE. Whether this destructive force precipitated the need for economic restrictions such as those discussed above is an interesting question, one that would with current evidence be problematic to answer with any degree of confidence. It could be the case that the Roman Empire had by this stage in history become so vast that the impact of the 79 CE eruption was not as catastrophic on a 'global' scale as it would have been in preceding centuries. Kaplan (2008) talks about culture trauma resulting from events like this, with a "proliferation of images" adding to the impact. In terms of relating to ancient natural disasters, only one of Kaplan's triad of responses is applicable: the aspect of 'witnessing', a response that "transforms the viewer in a positive pro-social manner" (Kaplan, 2008, 3). I would argue that the actions of Pliny the Elder in his attempts to provide assistance to those in the Bay of Naples fall into this category, although they could also be seen as the part of the duty of the resident imperial official. This serves to remind us that in the modern world we have open access to media coverage of any such disaster. In the ancient world, however, it was the local element, the eye-witness or the victim that was affected. This is testament to the fact that the idea of the Roman Empire being a 'global' state is not entirely appropriate; the local has a significant part to play, thereby providing added credence to the term 'glocal'. Needless to say, as is the case in the modern world, it would have been the poorer segments of society who would have been effected the most and suffered the most dramatic decline in 'household' welfare (see Auffret, 2003). Higher class, wealthier population segments would fare better, with public consumption representing the least impacted form of consumer activity.

In 2008 the United States of America felt the impact of fiscal fragility influenced at some level by military proceedings and the economic ramifications therein. Oil is the commodity that has been most noticeably affected as its price rises impact everyday life and ever-present demands fuel the economic cycle. On a less overt level the fragility of the economic climate can be seen in the household too, with the rate of the consumption of goods rapidly decreasing as less disposable income is available to the consumer. These shifts in purchase patterns (relating to consumption volatility) are a way in which the economic security of a population can be identified, with market fragility (whether in terms of credit or market spending) becoming evident. This raises the question of the visibility of such matters in the ancient world, with household consumption of commodities potentially reflecting economic conditions. Did the 79 CE eruption have a nationally felt impact, such as through a reduction in crop surplus (the Campanian region was noted for its fertility), that previously loaded the market, resulting in the need for state legislation or regulation? It is worth drawing attention to Auffret's investigative framework for looking at the impact of natural disasters. This work is based on the premise that "the volatility of consumption comes from production shocks which are transferred into consumption shocks" (2003, 2). In this scenario there is a three-stage process of events subsequent to catastrophes: "(i) a substantial decline in the growth of output, (ii) a substantial decline in the growth of investment, (iii) a moderate decline in consumption growth (most of the decline is in private consumption[)]".

Did the earthquakes in the region in the twenty or more years preceding Vesuvius' eruption create economic conditions that led to reduced acquisition of goods? There is plenty of evidence in the city for both public and private buildings undergoing renovation as a result of damage, especially from the 62 CE earthquake;

this surely would have reduced available means (money or otherwise) to use in acquiring goods. The first class of market items that would be expected to suffer would be the non-essential, in other words the luxury goods. It thus becomes a question of value ascription: in terms of the strength of financial conditions versus social stability how 'valuable' is the display of status and social standing? As Berg (2002, 15) points out, wealth and prosperity needed to be signalled to the community in order to visibly express status. Maintaining high value ascriptions would obviously have caused conflict in periods of restriction of economic means, whether it was a case of state-induced regulation or a matter of reduced acquisition ability. It would be a leap to suggest that sumptuary legislation could have been brought into effect, even if just on a regional basis, during the upheaval in Campania but it is not impossible. The artefact assemblages from Pompeian residences could reveal information relating to the consumption activities of households in an atmosphere of economic uncertainty and this is an aspect that will be considered during data analysis.

2.7 Concluding remarks

This chapter has discussed in depth many aspects of the use of ancient documentary sources for investigating consumption and consumer behaviour, including moralistic perspectives, the supposed origins of the 'desire' for goods in the Roman world, and how these elements are reflected in the sources. Additionally, documentary sources can provide levels of information that are lost to us in the archaeological record, such as symbolic meanings behind everyday objects, and the significance perishable objects can hold (items such as food and clothing). The

sources help to remind us that many facets of consumer goods are not static: opinions shift, accessibility to goods is variable, and ‘fashions’ change.

The nature of the evidence is a significant aspect that warrants comment, as it is one of the primary limitations when integrating this form of evidence with archaeological data: the material tends to focus on the ‘luxury’ end of the commodity scale, and not the ‘mundane’ consumption discussed in Chapter One that forms the bulk of most consumer actions. This is highlighted by records of impositions of sumptuary laws, and moralists’ warnings of the dangers and immorality of the desire for objects. However, at the same time these facets can also serve to indirectly indicate more general behaviour and attitudes through actions such as the apparent lack of adherence to sumptuary regulations. Nevertheless, it must be remembered that the Roman authors had their own motives for documenting this type of material; for example, do the documents represent part of a political speech? or part of a satirical play? In asking these questions before engaging in the evidence we can address biases and subsequently take them into account – although we cannot remove them completely.

The following chapter will develop some of these issues further and address alternate forms of documentary sources, such as papyric evidence. Furthermore, historical probate records and household accounts will be discussed to highlight the kind of rich data that are missing from the archaeological record. Such records will also serve to illustrate methodological limitations and pitfalls that will relate to the Pompeian data analysed in Part II.

CHAPTER THREE:

CONSUMPTION AND DOCUMENTARY EVIDENCE – DATA SOURCES

This chapter continues the discussion of investigating consumer behaviour through documentary sources. Whereas Chapter Two dealt with Classical sources to elucidate the consumption of material culture in antiquity, the following discourse has an emphasis on methodological concerns. To fulfil this task, sixteenth to eighteenth-century English records of probate will be considered, along with household and itinerant accounts, as well as introducing the potential of ancient papyri for studies of consumer behaviour in the Roman world.

Incorporating such a discourse in a thesis on Pompeian material culture serves a twofold purpose: firstly, these sources of evidence will help in addressing questions and limitations relating to methodology and data concerns that are inherent in any archaeological consideration of consumption behaviour; secondly, they will help to identify and better understand consumer goods and practices that are not available from the archaeological record, such as textiles and socio-cultural emotionally-laden ascriptions of value.

The significance of these historic records to consumption studies on the whole can be summarised by emphasising the following two facets:

- firstly, the manner of recording the records is itself a reflection of cultural behaviour and perception, as is the case with the Pompeian household assemblage data introduced in Chapter Five. Through consideration of the probate records we can learn from associated methodological problems and limitations.

- Secondly, these records provide an alternative perspective to household consumption and materiality; they permit access to facets of consumption behaviour that are not always evident when considering material culture in terms of single objects. For example, it could be argued that domestic goods (such as utensils) could have potentially enhanced their meaning from their place in an ensemble of items in which they were used in series or in parallel (Ingold 2000, 195). In other words, an object/commodity is given added meaning through its associative use with other objects that complement its functional use, creating a collective use-value; or rather, its use-value becomes greater in a cumulative sense when used in conjunction with other utensils.

Significantly, this function-value attribution is supportive of Weatherill's principal assertion that the "material culture of domestic life was closely associated with the social and practical lives of households" and that, consequently, the 'meaning' of consumption can be found in everyday activities and experiences (1993, 206). In turn, this emphasis on use-value based bequeathal could be seen in some circumstances as a progressive process that added family identity and history to the functional value of an object as it was passed down the familial generations (Richardson 2006, 71); most recognisable in statements such as, "that was your grandmother's bed" or "that was the bed in which your mother gave birth to you."

2.1: Probate Inventories

Probate inventories are lists of the personal estate of a deceased person, comprising moveable goods, credits and debts, and leasehold property for the purposes of settling and dispersing that person's estate. Once the initial list had been made, the next stage was to cost these items according to their *resale* prices. These inventories were compiled by reputable friends or relatives after the person's death (Arkell 2000; Weatherill 1988, 1993); in some European countries inventories were also made at the time of marriage (Jones 1982, 278), although these will not be discussed here.

The reason behind the creation of this documentation was one of legal procedure and therefore forms representative records of testamentary strategies as opposed to records of household interiors and the personal/household consumption of material culture (Richardson 2003, 434). As such, they only represent goods shortly after the death of a person and not those within the stages of an individual's lifetime (Salter 2003, 392; Weatherill 1986, 156).

Two further related problems that need to be acknowledged are typicality and level of population representation. In order to understand these methodological issues, it is necessary to consider *who* was involved in the probate process. The answer is a relatively distinct category of people, that of legally independent adults, comprising adult males, widows, and mature spinsters. Married women were excluded from this grouping as they required their husband's permission to make a will (Zell 1984, 110).

In addition to this Zell has created a profile of social and economic characteristics of males associated with probate inventories and demonstrated that it is not just a matter of reflection of the wealthy, as "quite poor men do appear in the

testamentary records” (Zell 1984, 111). Significantly, these ‘quite poor’ individuals are still classed as ‘householders’. From this several conclusions can be made. Firstly, that these individuals were wealthier during their lifetime but may have passed on objects to their progeny prior to death and thus material wealth may not be reflected in the inventories. Secondly, as a consequence of this, the term ‘householder’ is one not just encapsulating wealth but also social status (Zell 1984, 110-112). Furthermore, the poor avoided the attention of the courts as their families did not make a probate inventory (Brown 1986, 660; Zell 1984, 112).

Overall, therefore, the probate records do not constitute a representative cross-section of the population (Zell 1984, 109-113), with the economically marginal historically (and archaeologically) obscured. These conclusions are significant in several ways, the foremost being the nature of the inventories: they fulfilled legal customs and were not drawn up by the individuals themselves.

A further methodological consideration particularly relevant for this thesis that also needs to be addressed is that of objects not included in the inventory. There are several possible reasons for omission, such as objects being passed on to friends and family, especially to progeny, prior to death, or items being removed from the house before they were recorded in the inventory. Furthermore, items of little value and those not considered to be ‘moveable’ may have gone unrecorded (Arkell 2000, 8; Richardson 2006, 100 n.93), thus affecting the statistical viability of data analysis. This may be due to several factors, the foremost of which being dependent on the people making the lists: some records may have been created more conscientiously than others (Arkell 2000, 12-13; Weatherill 1986, 137-8). In other words, as encountered by Weatherill, the people recording the material goods sometimes ignored the mundane items that had little financial value (1988; 1993). However, she

maintains that although they do not give a full account of the person's wealth, they do normally give a full account of household contents (1988, 2-3).

2.1.1: The Contents of Probate Inventories

The moveable goods listed in probate inventories comprise a large range of objects, from furniture (although not fixtures belonging to the house) and basic utensils through to higher-grade goods, such as china (Weatherill 1988, 3; 1993, 209). Trade goods and tools of trade were also often included. Other items recorded in the inventories included farm stock and harvested crops, weapons such as swords, daggers and muskets, and tobacco, which sometimes represented a trading commodity (George and George 2002). Cultural differences, as discussed below, could dictate the way in which items were recorded, such as through ascribed 'valuation' of goods. For example, it is not uncommon to encounter stored food (such as dried/salted fish and meat, flour and grains, butter and cheese) recorded in domestic inventories, whereas other foodstuffs were apparently without value and deemed for day to day use (Cox and Cox 2000, 30) apart from salt which is sometimes listed (Richardson 2003, 440).

Textiles represent one class of material good that is of particular interest to this thesis. They are frequently present and demonstrate how such commodities, which have very low archaeological visibility, might have a high level of occurrence in households of various periods. Despite Weatherill's statement of textiles being poorly listed (1988, 3), they appear to figure prominently in many inventories. It is striking how frequently textile-based commodities are listed among objects of household

material consumption in studies by George and George (2002), Richardson (2006), and Salter (2003). Such items include the following:

- carpet (and ‘dornix carpet’; or ‘dornick’ which is used as a more general term to refer to hangings, carpets, vestments, etc.)
- cushions (and ‘needlework cushions’)
- window cushions
- tablecloths
- cloth
- cupboard cloths (fringed and unfringed; sometimes with more detailed description such as ‘fringed diaper cupboard cloth’; ‘diaper’ being linen cloth with a pattern woven into it (George and George 2002, xiii))
- sheets
- napkins
- towels
- featherbeds
- bedding
- coverlets (for featherbeds)
- tapestry coverlet
- bed curtains
- tester and valance (from standing bedstead)
- fabric hangings
- hanging painted cloths – a suggestion of luxury
- fabrics (varying in colour and patterning)

As can be seen from this list the prevalence of textile commodities would have been high. It can be expanded further, however, when consideration is given to the range of materials these objects could be made from, for which only an indication is provided above, such as with the cupboard cloths. Frequently, statements of status and luxury can be made from such evidence, as is the case with the “curtains of green taffeta fringed with silk” in one household from Kent (Richardson 2006, 90).

The conspicuous absence of apparel from the above list is apparent; a phenomenon referred to as ‘nudism’ by Lindert (1981, 657-8). The explanation he gave was that clothing in the seventeenth and eighteenth centuries was most likely hidden among nondescript categories, or omitted completely due to being deemed ‘unsaleable’ (also see Jones 1982, 278). The interpretational problems encountered by historians due to the low level of significance given to clothing in historical records are exaggerated for archaeologists and ancient historians because they deal with texts with relatively poor survival; this is in addition to the very low archaeological visibility of such consumed goods due to differential preservation conditions.

As with clothing, domestic objects had the ability to convey or transfer cultural associations, such as perceptions of identity. Furniture, such as chests, provides a good example of this, with varying cultural meanings being dependent on the beneficiary. For men, a recipient might receive a chest containing documents relating to his father’s land and property ownership. Women, however, might have received dowry chests as young girls within which their ‘marital identity’ is maintained until they come of age (Richardson 2006, 72; Vionis 2005, 180). Upon reaching marriageable age, her accumulated goods would become “part of the negotiations of her status in the marriage market, representative of her family’s

prosperity” (Richardson 2006, 78), and consequently serving a dualistic representation of identity. Thus, material items such as chests can serve to create a narration of the lives of individuals, households, or families through the process of identification and ‘self-historicizing’ via biographical objects (see Hoskins 1998). With respect to probate inventories, this symbolic interaction is encapsulated in the statement by Howell (1996, 39): “each [object] placed its owner socially, each resonated with cultural significance, each forged a link between giver and receiver, each told a life-story.”

2.1.2: Cultural Associations

The process of bequeathal can be seen from the varied perspectives of the testators involved. The value a father would see in the objects he left to his son would be in the connection to the previous generation, whereas a woman would see the process as continuing the matrilineal family through a symbolic action of transferring the ownership of an object; thus the value is not financial, nor is it use-value, but one of sentimental symbolism of dynastic identity (Richardson, 2006, 69).

An intriguing pattern in the formulation of wills is that there was an apparent differentiation in bequeathal habits by gender: the beneficiaries of men were primarily to reinforce lineal family relations, or business associates, whereas women often bequeathed objects individually, identifying members of their social network, marking friendship (Howell 1996, 25-29, 35ff; also see Howell 1996, 5ff.; Weatherill 1986).

This distinction between the types of ‘value’ ascribed to an object is also significant. Value, being the familiar materialistic concept assigned to commodities

of comparative worth independent of potential functional use, is a different label to *use-value*, which refers to specific properties of any particular object (cf. Ingold 2000, 194; Marx 1961). The cultural concept of use-value is not a static one, as can be demonstrated through probate inventories. In Salter's study of north and west Kent, she reaches the conclusion that "Yalding residents appear not to value the ownership of material goods while their contemporaries in Gravesend and Greenwich enjoy displaying these items" (2003, 406). This is comparable to the model of Sandwich proposed by Richardson (2003) in which the inventories, when they note differences in the physical nature of objects, do not refer to quality to create social statements; rather, it is the domestic rituals and actions that are important to the individuals (2003, 439). In other words, the use-value of the objects is important to the residents of this town and the use of household goods on a day-to-day basis related to domestic (habitual) practices, increasing the ascribed functional value. This is not to say that no bequeathed items were financially valuable and agents of status expression, but that domestic function was an important criterion affecting bequeathal (Richardson 2003, 439-41; 2006, 77).

Another area of the study of probate inventories that is of significance to archaeological investigation of households comes in the form of spatial significance (for example, Cornforth 2006). Predominantly this is represented by examination of the location of objects within a house. Sensitivity to physical positioning is discussed by Richardson (2003; 2006) in two forms: (i) in terms of the specification of object location by room as stated by the testators in their wills, indicating an associative spatial context; (ii) in terms of cultural behaviour indicated by the function placed upon – or rather, within – a certain room. Furthermore, Richardson (2003, 444) concluded that multi-functionality of rooms was more common in the earlier phases

of the probate records, but as time progressed it is possible to witness an increased specialisation in room use. This behaviour becomes a more transparent social statement as it provides a “much clearer spatial expression to the change between work and leisure and production and consumption” (Richardson 2006, 83). This is relevant in two ways: the concepts of waste and the consumption of time, and, more significantly, the spatial functioning and organisation of households. This second facet is of direct relevance to this study because the data population applied in the thesis has previously been subjected to spatial examination and identification of room function (Allison 1992b; 1997; 1999; 2004).

3.2: Household and Itinerant Accounts

Household accounts are a logical step forward in the discussion from probate records as they form one of the principal types of documentary record to survive from English medieval household administration and examples are known from the ancient world. Although such medieval evidence is restricted to households of the nobility and monarchy (Woolgar 1992, 3-4), it can provide valuable information in the study of consumer behaviour. Various areas of medieval life can be brought into focus, including the study of food and diet, living conditions, fashion, education, politics, literacy, and travel. The majority of household accounts to survive are ‘itinerant’ or ‘travelling’ accounts (also referred to as ‘diet accounts’), “reflecting the peripatetic nature of the medieval household” (Woolgar 1992, 7-8).

Unfortunately, there are few known household accounts from the ancient world, with those that do exist being incomplete and isolated cases. For instance, two

well recognised examples from Egypt represent important sources for discussions of economic rationality in the ancient world: the third century BCE Apollonius Estate examined by Rostovtzeff (1967), and the Heroninos Archive documenting the third century CE Appianus Estate, studied by Rathbone (1991; see also Kehoe 1992; 1994). In terms of studying patterns of consumption orientations there are inherent limitations and methodological problems due to lack of comparable contemporaneous documents.

The accounts of the Abinnaeus Archive were the documents of a Roman officer and predominantly relate to foodstuffs, such as high-grade olive oil (No.72), a 'schedule of wine' (No. 75), and accounts of corn (such as No. 76 and No. 78; Bell *et al.* 1965, 151-160). However, there is also an example of a domestic account (No. 81) relating to clothing including: tunics (at 154 myriads), hides (at 120 myriads), a cloak (at 71 myriads), and a 'sleeved garment' (at 58 myriads; Bell *et al.* 1965, 140, 164).

This list is valuable for the construction of an individual narrative for the officer but is an isolated example that has restricted interpretational and comparative potential, even in terms of the prices of these goods. Therefore, this form of evidence has limited merit for studies of consumption orientations and consumer behaviour in antiquity. A source with greater potential is that of the Oxyrhynchus Papyri, for which there are well over fifty volumes so far published and, although requiring the attention of specialists, represent an invaluable source for socio-economic studies. For instance, price comparisons on a large scale are more viable. Volume LIV alone (Coles, Maehler and Parsons 1987) provides numerous examples of price declarations for commodities⁶ (see also Parsons 2007).

⁶ 'Declaration of prices': Nos. 3731-3740 (pp.91-107), Nos. 3742-3753 (pp.113-33), No. 3755 (pp.135-38), Nos. 3760-3763 (pp.174-78), Nos. 3765-3766 (pp.181-94), No. 3768 (pp.197-99); 'Commodity prices': No. 3773 (pp.206-14), No. 3776 (pp.217-22).

Travel itineraries are a further form of papyric documentation that requires brief discussion here. These records provide significant enlightenment on socio-economic aspects of the ancient world, such as consumption. The foremost example is the Archive of Theophanes, which, although incomplete, provides an amazing wealth of detail. The same problems encountered with papyri in general afflict this source as well, namely ones of reading, interpretation, and presentation (cf. Bagnall 1995).

This archive is a collection of early fourth-century papyri that primarily concern the six-month journey (a ‘business trip’ of unknown purpose (Adams 2001, 160; Matthews 2006) of Theophanes (of Hermopolis, in the province of Thebaid) from Hermopolis to Antioch. The texts, dating from the second and third decades of the fourth century (Adams 2001, 160), include building memoranda, petitions, personal documents such as letters, financial records, wine accounts, and (of most relevance to this thesis) household inventories. The cumulative result of all this rich evidence is a unique one of elucidation of social setting, travel in the ancient world, living and expenditure costs, as well as diet and religion.

The first part of the archive (*P.Ryl.* 627⁷, relating to the preparation and early stages of the journey) is commonly interpreted as a packing list, comprising inventories of clothing, linens, blankets and various coverings, utensils, provisions, household articles. Matthews (2006, 42-7), however, justifiably questions this interpretation, suggesting that it is more likely to represent a household inventory prior to the trip. Although items of jewellery may be explained by the high level of social entertaining associated with governors, Matthews questions why a travelling-

⁷ *P.Ryl.* = standardised abbreviation (Roberts 1952: *Papyri in the John Rylands Library at the University of Manchester*).

party would find need for “a hanging lamp and a lamp-stand and two footstools” (2006, 43) and “linen chests containing 16 linen sheets, 24... undyed garments... 184... loincloths, regularly worn by slaves” (2006, 44; recto iii, 63-64). Additionally, the foodstuffs listed “suggest the contents of a kitchen or storehouse rather than food prepared for a journey”. Consequently, this papyric evidence is of value to studies of household consumption as it documents a level of detail the archaeological record cannot achieve. Unfortunately Matthews does not elaborate further on this inventory as it is not concerned with the subsequent journey to Antioch (2006, 45) but it provides great potential for future study – as do the appendices; particularly Appendix 3.8, which lists costs of ‘other items’ (i.e. non-foodstuffs).

The accounts recorded in the Theophanes Archive provide details of expenditure: in addition to 900 Dr per day on provisions for the slaves, Theophanes himself spends “between 2,000 and 3,000 drachmas per day on a variety of items, mainly luxuries. His daily spending on food and wine made up most of his expenditure, but much also was spent on bathing, soaps and papyrus” (Adams 2001, 162).

The final category of papyric evidence that presents great potential for consumption studies are customs house receipts and registers, which document records of duty paid on products that passed through customs houses; even transport animals were listed in addition to the quantities of goods being carried, which may have prevented the smuggling of animals (Sijpesteijn 1987). This provides a valuable insight into trading patterns and the import-export of commodities in Roman Egypt. However, other than Sijpesteijn’s (1987; see also Adams and Gonis 1999) invaluable work, the material awaits analysis; consumer theory and examination of consumption patterns would provide an excellent framework for this.

In addition to the papyric documents discussed above, there are resources such as the Vindolanda Tablets, which present the perspective of the army as consumers, in both aggregate and individualistic terms. This perspective, as noted by Adams (2001, 153), can also be addressed through the substantial amount of papyric material relating to army supplies, particularly grain and animals.

3.3: Significance of the Evidence

Probate records deserve a place in the discussion in this thesis as they form a useful tool to study the consumption of material culture. The study of such documents provides us, as scholars of the ancient world, with an alternative perspective in examining consumption behaviour and materiality – one that has a wealth of information but can be subject to similar recording restrictions as archaeological data. We can learn from these associated methodological problems and limitations, especially when researching domestic material culture, such as the Pompeian data in this thesis. Additionally, it draws attention to a different area of material culture consumption in a household, such as textiles.

The predominant methodological issue that can be taken from these studies is the importance to emphasise that these inventories were not made by the individuals themselves; rather, they were made by ‘associates’ after a person’s death. As Cox and Cox (2000, 37) point out, those involved in the system had their own agenda and thus manipulated it to best suit their ‘desires’. The evidence cannot be dismissed on such principles, however, and interrogation of the data is still viable, providing that research objectives are appropriate to the data. The situation is the same for

archaeological evidence, with Pompeii being no exception. In Chapter Five the data and method to be applied to this study will be discussed and some of the concerns raised in this chapter will be evident; it is worth recalling the human factors involved in data collection, both in terms of excavators recording what they deem ‘important’ and the removal (or theft) of objects by the ancient inhabitants. Therefore, both data examples carry inherent problems of completeness of assemblage and recording practices.

In defining consumption in Chapter One, it was argued that the act of consumption can be fulfilled through different modes of acquisition, not just the assumed one of market purchase. Papyri can provide evidence to remind us that theft and banditry were concerns in the ancient world. For instance, Adams (2001, 154) draws attention to a third century papyrus that records that Petesouchos, son of Pasis, had his clothing and money stolen by bandits during his journey from the village of Tebctnou to Corphotoi to visit his sister (*P. Lille I 6*). Little can be said regarding whether the stolen commodities were obtained for personal consumption, or as an intermediate stage for financial gain. References to such acquisitive behaviour add a further layer to any interpretations we make but what is often ignored is the idea that these actions in themselves could motivate consumption: through a need to replace lost goods.

During the process of examining this form of evidence, numerous significant aspects became apparent. Further to interpretational elements such as the storage of goods in furniture creating explicit spatial contexts (Richardson 2006, 74), behavioural actions relating to particular objects being given to individuals at certain stages in their life can be addressed (for example marriage, divorce, death). This is a

facet of consumption behaviour that will be addressed in Chapter Eight, with particular attention to life events.

Several other aspects are important to note before proceeding: first, Salter compares lifestyle choices in three Kentish towns based on the categories of furniture, furnishings, and clothing (2003, 401-4). For my analysis of the Pompeian household data, the concept of lifestyle choices is a significant one that will be addressed in Chapter Eight. The framework for my analysis, however, will not follow Salter's but integrate the constructs of materialism and discretionary expenditure discussed in Chapter One.

Second, Richardson (2003) argues that, overall, the evidence from probate inventories demonstrates a shift from a pattern of social inclusivity to one of distinction and display. This is significant as Martins (2005) reaches a similar conclusion in his study of Roman villas: collective identity is replaced by individualistic ones.

Third, the discussion of global-local interactions surfaces in relation to this form of evidence. Salter argues that medieval consumption and commodification was largely influenced by locality" (2003, 393) and that local variation was of great significance (2003, 406), with Richardson arguing for the added importance of provenance for consumer durables (2006, 68; also see Jardine 1997, Ch. 1). Finally, as with examples of consumption studies discussed in Chapter One, probate records have demonstrated that "factors other than wealth were influencing the distinct patterns of household consumption" (Salter 2003, 395).

3.4 Concluding Remarks

Overall, there is much potential to be drawn from these forms of documentary material. The focus of existing studies into the aforementioned ancient sources is predominantly concerned with trade, exchange, and travel; but the theoretical framework I have developed in Chapter One can complement this by examining the sites of consumption as well as addressing consumer orientation, demand, and identity in the ancient world. The methods used to interrogate probate inventories are of great value to studies of ancient documents, although it must be noted that there are large discrepancies between these two periods in the preservation of sources; there is relatively poor survival of ancient documentary evidence, especially in comparison to the richness of records from the medieval and early modern periods. One repercussion of this is the exacerbated problem of determining typicality, a factor that must be addressed when consulting such evidence.

There are inherent methodological problems and limitations with documentary records that must be taken into account when employing this form of evidence. For example, one issue that is a significant concern, and is recurrent across all periods of study, is the question of typicality. This can be affected by multiple elements, such as the practicalities of *what* was recorded (i.e. what was deemed worthy of recording by the ‘observer’), and *who* was represented by the process. The ‘who’ was also influenced by socio-cultural factors, such as literacy. It must be remembered that data collation and the creation of documentary records, are cultural constructs that are often representative of the interests and value-ascriptions of those performing the recording. This will be discussed further in Chapter Five in relation to the household data from Pompeii.

Nevertheless, there is great potential within documentary sources, providing that critical awareness is maintained in their scholarly application and interpretation. One of the most beneficial results of integrating documental data with material culture studies when investigating consumer behaviour is that perishable materials, which are frequently invisible in the archaeological record, become perceptible; this has been demonstrated both Chapters Two and Three, such as through textiles and food, symbolic meanings and statements of extravagance, as well as perceptions of consumption and consumerism.

In the next chapter, pottery as an indicator of consumption patterns and orientations will be discussed, with theoretical concepts from Chapter One and methodological considerations raised in this chapter becoming apparent through the discussion of appropriate case studies, both Roman and historical; the latter has experienced an advanced start on the application of consumption compared to Classical archaeology but their methods are of relevance.

CHAPTER FOUR: CONSUMPTION AND POTTERY

Pottery assemblages constitute one of the predominant and most accessible forms of evidence from the archaeological record for investigating economic activity in past societies. However, the recurrent focus of such studies is upon supply and its relationship to productive processes, for example: North African amphorae (Arthur and Oren 1998; Gibbins 2001), African red slip ware (Mackensen and Scheider 2002), *sigillata* (Fülle 1997; Poblome 2001), and Roman finewares (Fentress *et al.* 2004; Roberts 1997). Recently, analysis has been conducted considering the evidence from an alternative conceptual standpoint: consumer behaviour and consumption. Primarily, application has been within the Medieval and Victorian periods, although the expansion into Roman studies is slowly becoming more prevalent. Throughout the literature on the subject, there are several common themes and theoretical issues that have been examined. For example, there is a heavy emphasis at the level of the household, within which factors such as socio-economic position and the rural-urban divide are stressed. In the following pages, several of these studies will be reviewed to illustrate the potential of consumption studies in this area of archaeology, as well as the limitations and concerns presented by the data. First, the role of pottery studies in looking at consumer behaviour in historical contexts will be considered. Subsequently, the literature concerning the position of pottery in approaches to the subject of supply and consumption in the Roman world will be outlined.

4.1: Historical Pottery Consumption

In an influential paper, Miller (1980) introduced a method for measuring the differential cost of ceramic assemblages that allows for economic scaling based on expenditure. Generated from historical documents such as price lists, bills, and account books, a set of index values were constructed resulting in a quantified interval value scale. This framework was then applied to the study of nineteenth-century ceramic consumption and socio-economic standing through the analysis of expenditure on cups, plates, and bowls from archaeological assemblages. Plain undecorated creamware vessels represented the cheapest refined earthenware available in the nineteenth century, and thus formed the measuring device for Miller's scale. This category of pottery was given the value of 1, with index values being generated by dividing the cost of a creamware vessel into the cost of other types for which the value is desired. The cups, bowls, and plates are then grouped by decorative type and a year is selected for which data are available. Then to reach the value for the assemblage, the indices (per functional category) are multiplied by the number of vessels recovered for each type (Miller, 1980). Although Miller discovered that index values from archaeological assemblages tend to be weighted towards the low value (everyday) dishes due to usage and deposition patterns, as well as differential breakage rates (also cf. Going, 1992), the method employed was used to scale sites relative to their expenditure on ceramics (Miller, 1980). Although this method is an improvement on presence-absence analyses for consumer behaviour and has been an important step forward in the analysis of ceramics and socioeconomic scaling, it is highly reductionist in nature with an interpretation of the results that over-simplifies the interrelationships between variables; socioeconomic status (that is, "the position in society occupied... by a household, based primarily on social and

economic factors” (Henry 1987: 361)) are influenced by many variables, including occupation, wealth, income, and education (for example, see Kassarian and Robertson 1973; Willigan and Lynch 1982).

There are, therefore, several methodological problems to consider. For example, the scaling is based on prices recorded in documentary evidence and not only were prices not stable (wholesale prices of creamware were seen to have been the most stable (Miller 1980: 11, 15)) but the required specific information is not always included in historical documents. Furthermore, the ceramic data can only be related to other classes of vessels, such as tin and glassware, *if* the right documents can be found (Miller 1980: 11-13).

Discard and differential breakage rates are also problematic. Miller acknowledges that the index values obtained were lower than expected, which could have been due to the fact that averaged creamware indices were probably weighted towards the ‘everyday’ objects (1980: 15) because of discard/curation behaviour: not only would metal drinking vessels have outlasted ceramic and glass vessels, but expensive items, such as silver, would not have been discarded (1980: 13). The problem could also have been compounded by the limited scope of some of the categorisations. For instance, bowls could have generated a low index value because less expensive kitchen ware bowls were grouped with more expensive tableware bowls (1980: 12; Spencer-Wood and Heberling 1987).

Price-scaling indices have subsequently been applied in a multitude of forms, but of most relevance to this current research can be found within an edited volume on consumer choice in historical archaeology contexts (Spencer-Wood 1987a). The papers that relate ceramics and socioeconomic status are listed here, according to the

influential factors considered in addition to socioeconomic status, with the cases with more pertinent methodological and conceptual components being discussed below:

- Ethnicity: Henry (1987), Spencer-Wood (1987), Spencer-Wood and Heberling (1987).
- Access to consumer goods: Baugher and Venables (1987), McBride and McBride (1987), Spencer-Wood and Heberling (1987), see also Klein (1991), and Miller and Hurry (1983).
- Household size/structure and life cycle: Baugher and Venables (1987), Henry (1987), LeeDecker *et al.* (1987), Spencer-Wood (1987).
- Political status: Baugher and Venables (1987), McBride and McBride (1987), Spencer-Wood (1987).
- Functional utility: Spencer-Wood (1987).
- Differential discard: Baugher and Venables (1987), Henry (1987), LeeDecker *et al.* (1987), Spencer-Wood and Heberling (1987).
- Additional classes of material (other than ceramics): Heberling (1987) considers glass (as well as architecture and settlement pattern), LeeDecker *et al.* (1987) consider glass and faunal remains.

Spencer-Wood and Heberling (1987) applied Miller's method to ceramic data from sites in North America and compared them to documentary indications of socioeconomic status. As in the article by Spencer-Wood (1987b) the authors recognised that Miller's index value system was reductionist and attempted to refine it to take into account additional variables, such as market access, and ethnicity. Although measurement was not possible, they also recognised that religious and

political affiliations, as well as personal preference could also influence consumption behaviour in households.

Baughner and Venables' article (1987) is relevant for two important reasons: one methodological, the other interpretative. The main problem with their method is that it relies on a considerable subjective element in the categorisation process: "the data was divided into two broad categories, expensive and inexpensive wares. Within each broad category, the material was divided into ware types" (1987: 46). The authors do not, however, specify *how* the point for this division between 'expensive' and 'inexpensive' was arrived at. Similarly, they do not state whether it was maintained as a constant across the data population, or whether it varied depending on the interpreted socioeconomic status of the households investigated, or locational factors. This becomes a particularly relevant factor when one of their principal conclusions is considered: the middle and upper classes sought similar ceramic wares, but the latter could afford *more*, thus making the difference quantitative not qualitative (1987: 31, 38, 50). It should therefore be questioned whether such patterns are a result of modern subjective categorisation rather than a blurring of a class divide due to emulation and aspirations. Even if this does create a bias in the results, one of their cautionary statements should still be kept in mind when examining the archaeological data: ceramic assemblages are not reliable as the sole indicator of economic status (1987: 46, 50).

Spencer-Wood and Heberling (1987) demonstrated that relative economic status can be indicated through the consumption of cups and saucers alone, representing status display functions. This method was found to be more accurate than comparing plate or bowl indices, or even the total assemblage indices (Spencer-Wood and Heberling, 1987). From these results, it was argued that socio-economic

positioning was of high significance in accounting for consumer behaviour, with market access also contributing (1987).

Miller and Hurry (1983) analysed a ceramic assemblage from the Hale Cabin site (*circa* 1810-1830) in the Ohio Western Reserve, which produced low index values (indicative of a low socio-economic position) despite the relatively high socio-economic status of the occupants. By also considering the historical context of the site it became evident that the region was isolated from major urban markets (Miller and Hurry, 1983), thereby causing the authors to attribute this factor as the cause for the low index value. However, Klein (1991) argues that this model of accessibility is too simplistic (cf. Riordan and Adams, 1985) and that it could have been possible for the occupant of this site to purchase goods directly from regional urban markets due to his known socio-economic standing. A similar conclusion is reached by Baugher and Venables (1987) who argue that, rather than spatial considerations such as market proximity, buying power is the significant factor.

The concept of purchasing power is one that can be addressed for the Pompeian data, through coinage, although 'value' in terms of assessment of pottery expenditure is limited because of the lack of price information available to us.

Through comparative analysis, Klein applies the concept of Miller's ceramic index values (1980) to investigate whether the two principal models for consumer behaviour in the nineteenth century are valid; they are:

- *The socio-economic model*, which links the status and economic position of a household to a ceramic assemblage; the upper-bracketed households would have greater ability to purchase ceramics in both greater quantity and quality.

- *The accessibility model*, based upon a household's access to a market; those further away from a market will possess a ceramic assemblage that reflects a lower total economic value. This is highlighted through the rural-urban divide. The Pompeian data analysed in this thesis is unlikely to demonstrate significant evidence for discrepancies in consumption patterns due to differential accessibility. This is because the sample is from an urban environment (see Chapter Five).

Klein convincingly argues that these two models are over-simplistic and offer insufficient explanations by themselves for the patterning demonstrated by ceramic assemblages (1991). Therefore, he also considers the merits of two further models: *the ceramic market model*, which proposes that important changes in the market impact upon consumers' purchasing decisions (Klein, 1991); and *the changing role of women model*, which proposes that changes in the patterns of ceramic purchase and use correlate with the changing roles of women in the household (Klein, 1991). Overall, Klein argues that his study (and numerous others) demonstrates that there was no simple correlation between the value of a ceramic assemblage and the socio-economic position of the associated household; rather, a multitude of inter-related factors are involved, such as household size and structure, income strategies, and external economic conditions.

More significantly, particularly with regard to this study, Klein arrives at two important generalised conclusions: Firstly, he recommends the level of *household* as an appropriate scale for consumption analysis; a conclusion emphasised by Deetz (1982), and echoed by Henry (1991) and Gibb (1996), although Fincham (2002)

questions the feasibility of this investigative resolution for some facets of the Roman period. Secondly, it is stated that further research in this area should include additional forms of material culture because ceramics are not accurate, or stable, measures of short-term changes in consumption patterns among households of different socio-economic positions; a point also raised by Evans (1993) and Baugher and Venables (1987). Addressing the full constellation of consumer durables at the level of the household in the Pompeii assemblage data will enable identification of nuances in consumption patterns and orientations that would be missed by solely considering the ceramic evidence.

Gibb (1996), in his investigation into household consumer behaviour within seventeenth-century Chesapeake Bay, reaches similar conclusions to those above, rejecting simplistic, positivist arguments for consumption being direct expressions of status. Moreover, he views decisions about the acquisition of ceramic (and glass) vessels to be reflective of a household's self-communication of ideas of identity and 'membership', as opposed to the expression of social status. This is a significant conclusion and will be investigated in its applicability to the Roman world; I support the rejection of simplistic models for explaining consumptive habits because status represents only a fragment of an explanation for acquisition-related behaviour. However, I would argue that mundane consumption also needs to be studied to address stimuli for consumption orientations. By also accounting for this level of commodity in the examination of the Pompeian household data a range of factors can be evaluated, permitting targeted analysis of goods and subsequent nuanced interpretations.

Various pottery studies have applied ceramic data to questions of socio-economic status, serving as an aspect of consumer behaviour. For example, Shephard

(1987) tests the hypotheses that variations in quality, quantity, and variety of ceramic assemblages are associated with social status and class membership in nineteenth-century Antebellum Alexandria, North America: he uses Miller's (1980) price indices discussed above to assess ceramic quality, percentage values to assess quantity, and an variety is measured through an index of form representation within overall ceramic assemblages. The study revealed that of these three factors, quantity and quality were the two variables with the strongest correlation to socio-economic affiliation, whereas ceramic variety within assemblages was not a significant indicator (Shephard, 1987). Following this, Shephard constructed two generalised comparative descriptions of the consumed household ceramic assemblages:

- Middle-class ceramic assemblage:
 - There is a greater quantity of vessels per average person-year of residence on the site,
 - Variety of specialised vessels is greater,
 - More expensive vessels of the latest forms are present,
 - The ratio of tableware to stoneware is greater, with an emphasis on material display.

- Lower-class ceramic assemblage:
 - Vessel quantity is lower,
 - There is less variety,
 - There are fewer expensive vessels,
 - Most specialised vessel forms do not occur,
 - The proportion of stoneware to tableware is greater.

Certain problems, however, are raised through studies such as this. For example, Shephard focussed on the *cost* of ceramics, which constitutes only a single factor out of several relevant to consumer choices. Leone and Crosby (1987) argue that cost is the basal criterion (as it is necessary to have the resources to purchase an item), but not the sole defining explanation for consumption practices. Furthermore, they suggest that it is important to take context into consideration, as the meaning behind assemblages stems from the use of the objects (1987). Shephard offers the possibility that dietary differences could be influential on the composition of ceramic assemblages as they necessitate the use of different vessel forms. He suggests that lower-class households depended on growing and storing food to a greater extent, although Leone and Crosby (1987) believe the storageware:tableware ratios to be ambiguous, as nothing can be ascertained from Shephard's study about food collection, purchase, preparation, or serving and eating. Further to this, in a similar context, Otto (1977; 1980) demonstrates a reverse correlation to that of Shephard's, in which there is an increase in the proportion of storagewares in an assemblage with higher status affiliations. An important omission here is a discussion of the type of storage vessels involved, which is a significant aspect to consider in the Roman world as differentiation between small storage vessels and larger amphorae (which also act as transport vessels) is required. Furthermore, it does not allow for storage vessels of non-ceramic material; for example, glass bottles and jars serve a different function to amphorae and could indicate smaller-scale consumption of commodities such as oil.

4.2: Roman Pottery Consumption

Within Roman pottery studies, 'consumption' itself is not always conceptually acknowledged, with researchers preferring to approach economic issues from the more established conceptual framework of *supply*; an aspect that can heavily impact upon consumer behaviour. The same can be said of the use of the term 'consumer', with other less contentious alternatives being preferred, such as Rhodes (1989) who opted for the term 'user'.

The investigation of supply of ceramic goods is primarily achieved through quantitative studies (for example, Evans, 1993; Going, 1992; Marsh, 1981; Willis, 1997, 1998), while qualitative studies tend to focus on trends in socio-cultural aspects of antiquity. The latter can be exemplified by Cooper (1996), who uses pottery from two programmes of excavation in Britain to qualitatively examine the transference of 'Roman' objects into indigenous material culture. By considering the issue from the perspective of production and supply he demonstrates that it is neither possible nor valid to simply account for use of 'Roman' material culture by indigenous groups as part of an acculturation process. Instead, it is necessary to consider whether such use is representative of restricted availability in the market place. Put another way, these objects might have provided the only functional option to people, and it was not a reflection of cultural emulation but the adaptation of available resources that were incorporated into the existing indigenous cultural framework (also, cf. Meadows, 1994).

Quantitative studies appear to support approaches such as Cooper's, by indicating that the range of pottery types and forms available in Britain in the late Roman period had considerably narrowed from those available in the first century CE

(Cooper, 1996; Evans, 1993; Going, 1992; Marsh, 1981; Willis, 1997, 1998). For example, Marsh (1981) argues that there was a marked variation over time in the volume of *terra sigillata* (samian ware) occurring in Britain, reflecting changes in supply mechanisms but independent of consumer demand. He suggests that importation of *terra sigillata* to Britain during the second century CE was at a lower level than the previous century (1981). Although this is a significant study into pottery supply in Roman Britain, not only is it limited to *terra sigillata* but it does not properly consider rural sites in the data population, or the differences between urban and rural assemblages. This is a criticism shared by Willis, who also examined distribution patterns for *terra sigillata* pottery in Britain (1997; 1998). Willis largely agreed with the conclusions reached by Marsh, although argued that his study did not reflect patterns for Britain as a whole (Willis, 1998).

Further to these studies, Going (1992) demonstrates the extent to which ceramic evidence can potentially illustrate empire-wide cyclical trends in production. Using a broader data sample, he convincingly argues that other ceramic forms in Britain parallel the trends demonstrated by the *terra sigillata*, combining to illustrate a series of lengthy cyclical phases in pottery production that represent a sequence with far-reaching effects across the Roman world. For example, he states that coin use and circulation appears to be congruent with the pottery evidence: high speed circulation of coinage (indicating high transaction volumes) appears to coincide with periods of high pottery production (Going, 1992; also, cf. Hopkins, 1980; 2002).

Evans (1993) investigated pottery assemblages in northern England in an attempt to distinguish trends in functional composition and quantities of finewares. He identified a cessation in the supply of *terra sigillata* in the third century, with the resultant void in the market of fine tablewares not being filled on any scale until the

late fourth century (1993). Evans concludes that, overall, the results appear supportive of the hypothesis that fineware proportions vary consistently between different classes of site, with several discernable patterns. Firstly, rural sites collectively demonstrate a similar assortment of finewares that is of a generally lower value than those recovered from forts and urban centres. Further, there are no obvious differences between villas and other rural sites (1993). Secondly, corresponding to the observations by Millett (1980), Evans states that forts and towns apparently possessed the greatest supplies of finewares, even at the end of the fourth century (1993). Thirdly, he suggests that the proportion of finewares within forts is a product of the aggregate purchasing power of the site serving as a redistributive centre (see also Evans 2001). A mechanism such as this would be essential in order for finewares to be supplied to rural areas where there is low consumer demand (1993); a feature also identified by Weatherill within the seventeenth and eighteenth centuries, with merchants and inhabitants of urban centres more capable of obtaining such goods (Weatherill, 1988, 1993). It is also possible, however, that soldiers getting paid with money had a significant influence on the fineware presence in forts through an ability to acquire these vessels more readily, thus supporting Hopkins' 'taxes and trade' model for the ancient economy (Hopkins 1980; 1983; 2002 [1995]; Millett 2001).

The principal problem that arises from the application of fineware proportions to issues of social status is that high status sites also utilised non-ceramic vessels (such as glass, silver, and bronze), whereas low status sites had few alternatives to coarse pottery other than wooden vessels. Consequently, the fineware proportions may demonstrate a lower-status pottery assemblage for high-status sites (Evans, 1993). A situation such as this could help to explain the low tableware-storage ware

ratio encountered by Otto's (1977; 1980) study of American plantation contexts (see *section 4.1*).

Pewter vessels, for example, have an additional consequence for consumer behaviour that has been acknowledged by Weatherill (1988) in her studies of probate inventories. She indicates that pewter was better value than ceramic vessels because it retained its monetary value to such a degree in the eighteenth century that old vessels could be part exchanged for new ones at a value of about two-thirds of the new cost (Weatherill, 1988). Although there is no direct equivalent in the Roman world, the recycling of objects is an issue that needs addressing, particularly for glass and metal objects (cf. Keller 2005; Peña 2007a; Tomber 2008). Information regarding objects retaining monetary value, however, is something that cannot be easily extracted from archaeological evidence.

Furthermore, sites from the higher end of the socio-economic spectrum may use vessels in a different way to those lower down the spectrum. Not only could this concern prestige items and their use for display, but also issues of disposal and subsequent deposition. Functional issues with vessel re-usage can be highlighted by an example from Catterick in Britain: a small enamelled flask that would have once been an elegant item from a toilette, was found in a third-century context where it had been used as a container for adhesive (Cool, 2002). Most re-use, however, is not as recognisable as this because functional application of the object remains constant. Alternatively, objects can be recycled, although this is less of an issue for an analysis of consumption such as this one (refer to Peña 2007a for an extensive discussion of this subject).

Studies that directly consider consumer behaviour in the Roman world are scarce, although the scope offered by such concepts is starting to be recognised. The

work of Martin Pitts on consumption and identity in late Iron Age to early Roman Britain is of particular significance for this study and will be discussed in depth in *section 4.* below. First, however, it is worth considering some additional studies that approach the subject.

Fincham (2002) uses quantified ceramic data to investigate whether native populations in North Africa consumed material culture in an attempt to ‘become Roman’ (also, see Woolf (1998) for a more general discussion). He highlights several key factors that influence consumption: the social meaning of an object, the process through which an individual acquires an object for consumption, and factors external to the object, such as wealth and social status. The data used for Fincham’s study were a little restrictive, however, comprising two types of pottery (African Red Slip and Tripolotanian Red Slip), which were divided by form and size, then organised by site type. This division by form, however, is a subjective categorisation that implies function (see Allison 1999a: 9; Miller 1985: 51-74) and can therefore be misleading as a sole classification structure for data analysis.

The basic observed pattern (although a little simplistic) is that assemblages consisted of “some bowls, many dishes, a few platters” (Fincham, 2002), with the core mode of pottery consumption consisting of medium size dishes. Subsequently, the more that is consumed, the greater the number of “fringe items” relative to the core mode, rather than a general increase across the range of pottery forms (2002). This concept of fringe goods is of interest in my study, and will be quantitatively addressed through the use of weighted ranking of goods; this will be introduced in Chapter Five prior to its application later in Part II (Chapters Six and Seven). Fincham offers two interpretations based upon his results: firstly, he suggests that this demonstrates evidence of purchasing power dependent on, and limited by, wealth;

secondly, this is a demonstration of active consumer choice, with wealthier sites reflecting forms that could indicate social selection and elitist markers (2002). Within the study, one site (Gasr) exhibited a striking difference in inhabitants' consumption patterns when compared to the others. Fincham argues that this is an example of discrepant consumption due to differing social locations within the consumption spectrum. Although a promising use of consumption as a workable framework, the conclusions are largely limited to economic factors and a question of access to goods; these are important factors but models of consumer behaviour require an approach that does not limit interpretations to singular explanations (refer back to *section 4.1* on ceramic studies in historical archaeology).

Monaghan (1995) proposes a five-level gradation system of pottery demand by households in an attempt to contend with assumptions regarding free-market trade and to demonstrate that consumer choice in Roman Britain was limited. He argues that not only was the capacity for consumer selectivity of commodities low and exercised at a very low level, but that assumptions about consumer-led production are inaccurate.

Moore Morison used survey data and the concept of the anthropology of cuisine to offer an interpretation of ceramic consumption in Epirus (2006, 12-13). She concluded that trends were consistent with trade patterns elsewhere in Greece, and did not reflect an "unusual range of choices on the part of the Epirote consumers", thus demonstrating agreement with perceived social values. Although the application of the cuisine model to her data provides a method of interpreting ceramic assemblages that considers consumer behaviour as part of an integrated cultural system, it is limiting in terms of conceptualisation of consumption, ignoring other uses for the vessels. Moore Morison that this method permits the incorporation of

factors such as choice indicated by local imitation of imported wares, which can subsequently be reflected in the need to learn new technologies to meet consumer demand (see also Greene 2008); this is important in pushing the discussion of consumption forward but it still offers a simplistic link between social perceptions and trade links, once again looking at questions of accessibility.

The application of Miller's (1985) ceramic variability method by Roth (2003; 2007) to examine cultural identity, reflected through stylistic change in black gloss ware in Roman Italy, is valuable to the study of ceramic consumption in the ancient world. However, his choice to sustain the use of the outmoded concept of Romanisation has to be questioned. Nevertheless, there are some important factors to take from this study. First, attempting to access information regarding non-elite consumption practices is valuable, with ceramic data forming the principal investigative avenue for this. Second, the use of a two-level system for defining vessel type is productive as it permits broad trend identification with scope for subsequent refinement incorporating social contextualisation, which is a dynamic facet.

The imitation of pottery styles in the Roman world has been investigated in different forms, from more generalised studies such as Willis' (1995), who refers to the 'culture of copying' in Iron Age Britain, to more specific ceramic types such as *terra sigillata* (for example, Greene 1982; Monteil 2004; Zanco and Galetti 2001). Monteil addressed the specific topic of the consumption of imitation *terra sigillata* to attempt to answer questions of identity and cultural change, and argued that there was continuity in the acquisition of both *terra sigillata* and imitation forms; this was interpreted as indicating a reluctance to change despite the availability of alternatives (for consumer resistance see *sections 1.5 and 2.5*), resulting in marginal production of

imitation wares that did not establish a significant place in the market (2004). Therefore, Monteil's analysis concurs with some other studies into ceramic consumption, such as those discussed in *section 4.1*, which state that economic cost was not the sole motivating factor for consumer choice. It is, however, a study that addresses a very particular aspect of pottery consumption and is, as a result, of limited scope for interpreting overall consumption patterns.

The amphora is an example of a type of ceramic vessel that did not possess a simple producer-consumer commodity flow because it was a proxy for other commodities, such as wine and oil, making it an indirect consumer durable (see Peña (1999, ch.1) for an in-depth analysis of this subject with regard to supplying Rome). As such it represents a 'consumer package' (Peña 1999, 37; Twede 2002a; 2002b), which once having fulfilled its purpose became either reused (see Peña 2007a) or 'post-consumer solid waste' (Will 1977). Monte Testaccio in southern Rome serves as an illustration of the volume of ceramic waste that was generated, creating a feature in the landscape. By the third century CE, this pile of pottery sherds had become fifty feet high (Peacock and Williams 1986, 13; Peña 2007, 300-301, fig. 10.5; Will 1977, 265). Moreover, this feature was a result of civilian consumption and does not take into account the army as consumers (for discussion of this facet, see: Erdkamp 2002; Funari 2002; Greene 1997; Whittaker 2002).

One study that investigates the role of the Roman army as consumers of amphorae products, specifically wine and oil, is Egri (2007) who calculates cumulative capacity of imported amphorae. The potential of Rhodian amphorae indicating the acquisition of 'vintage' or high quality wine is raised, although it is not possible to state whether the consumers would have been military or civilian (Egri 2007, 49). Furthermore, I would argue that there is an assumption being made here

that Rhodian amphorae equate to high quality products. This point has important repercussions because such assumptions can invalidate interpretations; we should be careful not to just assume ‘better’ quality containers denoted luxury consumption because it could be that the contained was of a much greater importance, rendering the container irrelevant in some terms. The assumption thus becomes one of conspicuous consumption, rather than private consumption for the sake of preference.

The concept of the army serving as a reference group is addressed in Egri’s study in terms of military demand influencing consumption habits in nearby settlements (2007, 55; see also Mattingly 1988), although it should be considered that changes could also be due to military sites serving as redistributive centres resulting in increased commodity availability for civilian populations, such as mentioned earlier.

‘Product labelling’ is another facet of the consumer packaging of amphorae (see Twede 2002a; 2002b; Will 2001). This occurred in terms of simple graffiti on the vessel as well as standardised systems indicating an organised exchange system, such as the *tituli picti* – executed in red and/or black paint on the upper region of the vessel, such as the shoulder or neck. This topic, however, falls outside of the scope of this thesis; for further discussion see Peña (2007b) and Peacock and Williams (1986, 7-19). The shape of amphorae represents much more than just functional characteristics, as they would have signalled to the consumer the place of origin and the vessel contents, especially after about 30 BCE (Peacock and Williams 1986, 5; Twede 2002a, 104), much as some wine bottles do today. Both the shape of amphorae and the act of labelling can be viewed as examples of package communication, adding to the ease of information recall.

A significant study investigating diachronic trends in the consumption of commodities transported in amphorae was conducted by De Sena and Ikäheimo

(2003). They used the ceramic assemblage from the Casa di Vestali in Pompeii (VI.1.7) to assess chronological trends in the supply of wine, olive oil, and fish products, as well as domestic pottery itself. The evidence shows that the consumption of such commodities can be mapped in the following terms: in the earlier phases of the city, wine was exclusively regional west-central Italian in origin. However, over time this declines to a point in the final phase of the city (c. 50-79 CE) where only half of the wine was regional (2003). In terms of olive oil and fish products, supply in the early phases of Pompeii was heavily dominated by North African imports. In the early first century CE there is a dramatic change in the supply of amphora-borne commodities, manifested through a decrease in North African products, and an increase in Iberian products (2003).

Overall, the picture is one of decline in regional amphora-borne products, less exportation of goods, and increased long-distance importation; a trend reflected by the pottery, which demonstrates the introduction of provincially manufactured domestic wares (2003). Continual increase in the wealth of the city, combined with extended trade links, served to provide greater consumer choice; a factor exaggerated by the increased demand for the consumption, and conspicuous display of, luxury items – also mirrored in secondary products (2003). It is hoped that vessels of other materials from the Casa di Vestali assemblage will be examined in a similar way to see if comparable trends are evident, thereby serving to construct a more definitive model. However, it should not be forgotten that, although this is a very useful investigation that considers multiple explanations for the evidence, the data come from a single house context; therefore, extrapolation of patterns into wider trends for the city is dangerous and fraught with problems.

Recently there have been several significant publications synthesizing data relating to pottery production in Pompeii and these will be considered here from the perspective of consumption. Peña and McCallum (2009a; 2009b; see also McCallum forthcoming, 2009; McCallum and Peña forthcoming, 2009) have produced a long-overdue assessment of production capacities offered by pottery workshops in the city in relation to aggregate supply demands. Peña and McCallum (2009b) suggest a method for calculating the annual consumption of non-amphora pottery by a residence such as the Casa di Julius Polybius based on extrapolation of existing data; however, they consider it too fraught with uncertainties to carry out meaningfully. As an alternative, they produce an approximation for the total city-wide consumption of such goods, suggesting that there would have been several tens of thousands acquired each year. This equates to “a few score of non-amphora vessels each day”. When the scale of this is considered in terms of pottery consumption by individual households, interesting questions arise concerning consumer choice and decision-making in the acquisition of goods. Although specific quantifications are not provided for this endeavour, the authors do provide an indication of the scale of consumption and pottery production.

Peña and McCallum (2009b) also consider the distribution to consumers of non-amphora pottery imported from outside the region, the presence of which is abundant enough to suggest regular distribution mechanisms involving middleman merchants. They suggest a conjectural reconstruction of Pompeii’s economic territory, covering an area of approximately 200 km² (2009b, *esp.* 165-166). They posit that this territory, referred to as the ‘Pompeii service area’, served as the principal local market centre but was also part of an extended economic territory that incorporated the nearby municipalities of Herculaneum, Nola, Nuceria, Salernum, and

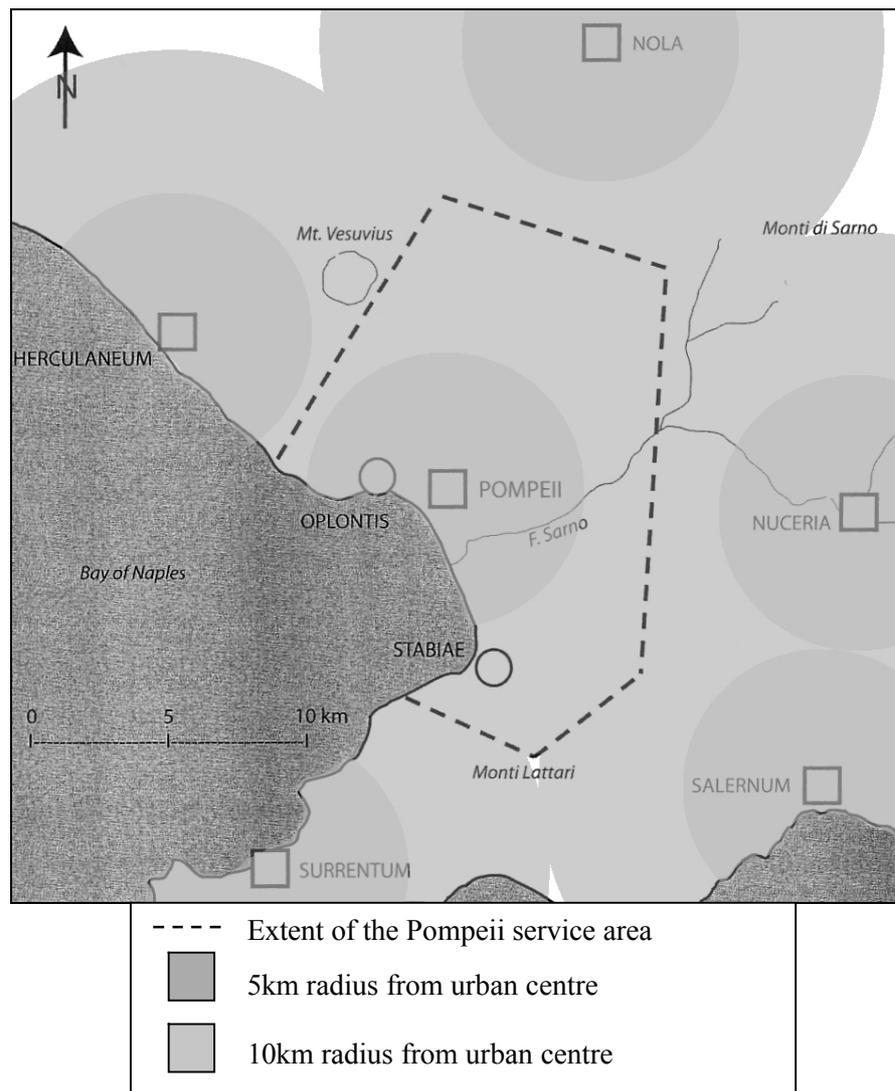


Figure 4.1: The Pompeian region with 10km rural market radii indicated (after Peña and McCallum 2009b, figure 1, with additions)

Surrentum. Such a scenario must be considered in terms of the landscape as a territory that has an integrated rural component, in which the act of consumption is not absent. De Ligt (1993, 128ff.) argues persuasively for the occurrence of rural markets, positing that they would have been located at a minimum distance of 10km from an urban centre (see also Shaw 1981). We must add to this the itinerant traders

who would also have contributed to this rural-urban exchange pattern creating a dynamic network of exchange to supply the region's consumers (*cf.* McCallum forthcoming, 2009). However, if the context of the region as a whole is considered in these terms, the role of rural markets in the Pompeian hinterland is not as significant as might initially be expected. *Figure 4.1* illustrates the Campanian region and the extent of Peña and McCallum's (2009b) Pompeii service area with de Ligt's hypothetical 10km radii from the urban centres indicated. As can be seen, a very small proportion of the rural landscape lies outside of one or more of the urban market regions. Consequently, this suggests that much of the exchange activity (i.e. that in addition to inter-house exchange) would have been conducted within the urban centres.

Social relationships were a significant part of the acquisition and/or exchange of goods and commodities, representing what Polanyi described as 'embeddedness' (1957). Though I do not accept Finley's assertion that status and civic ideology governed all economic decision making (1985), the social component was not a static phenomenon, varying from person to person, and group to group, as well as facilitating discrepant consumption across a range of goods. For example, goods used in a conspicuous manner (or of a more socially visible nature) would be of greater social importance than those that were functional yet held a usage pattern that was of limited visibility. This loose dichotomy can be exemplified by serving vessels versus food preparation vessels and utensils.

4.3 Pottery and Correspondence Analysis

The last section of this chapter deals with papers by Pitts, and Cool and Baxter that are of significance to this thesis and will be addressed here in greater depth than the foregoing studies. They are relevant for two main reasons: (i) Pitts' studies focus on the consumption of pottery (Cool and Baxter predominantly consider glass vessel trends); (ii) and the principal method of quantitative investigation used is Correspondence Analysis (except Pitts 2007b; Pitts *et al.* (2007) used correspondence analysis to also study lipids as foodstuffs in terms of global supply). Although their conceptual standpoints sometimes differ, as do the research questions being addressed, their methodologies and the manner in which they are applied holds relevance to this study, as I will be apply Correspondence Analysis to the Pompeian data in Part Two. I will start by examining Pitts' work and considering how he uses consumption conceptually and then will address his methodology.

4.3.1 Conceptual considerations

Pitts has applied the concept of pottery consumption to investigate identity (2004; 2005b; 2007b) and globalisation (2008) in Roman archaeology. Through the examination of pottery from southeast Britain, Pitts has predominantly followed two main research aims: to create a basic narrative of changes in ceramic vessel consumption in the frame of the "arrival of Roman hegemony in Britain" (2007a), and to investigate changes in patterns of vessel consumption and deposition in contextual settings. In doing so, however, in many cases he extends the lifespan of the debate

over the concept of 'Romanisation' (e.g. 2005a; 2005b; 2007a; 2007b; 2008) even though he states that it is a simplistic model (2005b: 143; 2008: 497) that suffers from cultural determinism (2008: 501, 504) and is therefore a "tired issue" (2007b: 693). However, he still refers to 'Romanized' sites and groups of people (e.g. 2005a:61; 2005b: 150; 2007: section 4.1) despite his rejection of the universal desire to 'become Roman' or 'aspire to things Roman' (2008: 504). Although his sentiments are correct (he is right to dismiss Romanisation as a workable concept, despite attempts to redefine the term – such as Keay and Terrenato 2001) he is flogging a dead horse: this debate has previously been convincingly shown elsewhere to be redundant (see Mattingly 2002) and therefore should be moved beyond.

During the course of Pitts' articles, there is a progression in his conceptual stance: he initially takes Romanisation as a starting point and suggests the use of consumption and identity as an alternate interpretational tool (2004; 2005b); identity is then criticised because he sees it being used simply as a replacement for Romanisation (2008: 494; 2007b)); finally he proffers the concept of globalization as an alternative to Romanisation and identity as it provides cultural neutrality and does not "imply a corresponding blanket acquisition of Roman social practice" (2008: 500). There is little value in comparing the concept of globalisation to the already defunct frame of Romanisation. Greater benefit would have been had from focusing more on the comparison to identity (such as in Pitts 2007b) or developing the argument of how to further integrate 'globalisation' into Roman archaeology; after all he states that it is a descriptive term (rather than an explanatory concept), and "like Romanization, comes with much unhelpful baggage", thus requiring critical application (2008: 504).

One of my main criticisms of Pitts' studies is the limitations he instils upon the act of consumption: he approaches the subject from the perspective that the act is represented by "the material by-products of eating and drinking", with functional aspects of ceramic vessels being the focus (2007b, 701). Pitts refers to such material culture and its social use as 'consumption technology' (2004: 17; 2005a: 50; 2005b: 154; 2007b: 701, 704); in past research this has been referred to as '(utilitarian) foodway functions' or behaviour (Spencer-Wood and Heberling 1987)

Although this is a constructive study for analysing some everyday social practices, it ignores other uses for vessels; for example, objects such as those relating to physical appearance and hygiene ('dress') are categorized outside of this construct restricting the breadth of future application. More importantly, non-ceramic vessels for consumptive ('eating and drinking') practices are not included in his analyses, apart from limited incorporation into a later publication (Pitts 2008). However, in relation to pottery he states that "it is the form of the vessel, rather than what it is made of, that is important" (2008: 51). If this is the case, then one has to question why more attention is not paid to vessels of other material. He acknowledges that the methodological structure he uses could be extended to other artefact classes offering "even greater interpretative potential" (Pitts 2007a: section 5; see also section 2.2).

Nevertheless, even with the prospect of the discussion of "non-ceramic consumption accoutrements (i.e. glass and metal objects)", attention is restricted to funerary assemblages. Although this is largely understandable because comparative data from stratified pottery levels were not available for domestic assemblages (2008: 496), there are no attempts to quantify these alternate material items or to incorporate them into the discourse on consumer habits in a qualitative format; this is especially surprising considering that, although glass vessels were used for a wide range of

functions, the commonest functions related to what Pitts terms ‘consumption technology’ (i.e. serving, storing and consuming food and drink: Cool and Baxter 1999: 73). Furthermore, as the adoption of glass vessels was not a uniform occurrence within societies or communities (Cool and Baxter 1999: 73), Pitts’ work could benefit from trying to integrate such data. This additional consideration of non-ceramic vessels is an aspect that is integral to my analysis of the Pompeian household data. As noted in Chapter Two, Celsus remarked in the latter part of the first century CE that household goods of various materials were owned and used (Celsus 33.10). The reasons Pitts gives for focus being solely on ceramic vessels relate to artefact survival in the archaeological record, and pottery being ubiquitous and subjected to less re-use than materials such as glass and metal (2005a: 50; 2007a; 2008: 495-96). Importantly, however, the potential for alternate material culture is acknowledged by Pitts.

Other aspects of Pitts’ study can also be seen as holding relevance for my research study. For instance, I would argue that “consideration of how changes at the top of the social hierarchy came to influence broader changes in daily practice” (2007b, 708) equates to product perception and product involvement within a cultural framework maintained and regulated through social reference groups. I believe studies such as this example would benefit from a theoretical stance that conceptually acknowledged actions in these terms. Moreover, these constructs permit consideration of subconscious actions of selection and utility as well as conscious ones; an issue that Pitts mentions as being of “potential importance” (2007b, 700).

4.3.2: Methodological Considerations

Pitts' work, helps highlight the benefits and hazards of using correspondence analysis on archaeological data (for example, 2007a; 2008; Pitts and Perring 2006). Correspondence Analysis produces an output consisting of two biplots for the data variables: one of the row data (such as different assemblages) and one of the column data (such as different types of artefacts). These can either be depicted separately or as a single plot with the information superimposed. There are, however, several important considerations that need to be taken into account in the interpretation of these outputs (for more detailed discussion of the method for this technique, see Chapter Five):

- i) The average (or 'most typical' Pitts 2008: 497) assemblages/artifact types are located closest to the centroid.
- ii) Similar assemblages will be located close to one another in a plot, and assemblages with similar compositions will be found to cluster near to each other in the other plot (e.g. Pitts 2005b: 145-46). In either case, the variables of one plot can be compared directly (row to row, column to column; i.e. assemblage to assemblage, artefact type to artefact type).
- iii) Although "[p]oints on the first plot can be directly referenced with equivalent areas of the second, and vice-versa" (2005b: 146), comparison of the two biplots (in other words, artifact types to assemblages), can only be carried out in relative terms, and not as absolute spatial distinctions. This is an important consideration in the interpretation of the statistical technique and requires to stressing (Pitts 2007a: 2.2; Pitts and Perring 2006; SPSS 2005; StatSoft 2007).

Due to this importance of recognising the limitations of cross-referencing, Pitts uses the separate biplot format for his data as it minimises the risk of misinterpretation with regard to the spatial relationships. In this study, however, the biplots will be displayed as a single superimposed figure, rather than a pair of figures, as it is a format that allows quick reference and does not necessitate the additional use of space. I believe that, if the limitations of cross-referencing are recognised, there is not the same danger of misreading the results. Similarly, the size of the data population being investigated does not cause significant data ‘congestion’ on the plots, which would inhibit the ability to distinguish associations; if this were the case, separate biplots would be preferred.

Furthermore, Pitts demonstrates that when using the technique, more complex patterning required further verification with reference to the original tabulated data because Correspondence Analysis is a tool for description rather than a means of interpretation. Therefore, clusters of vessels and assemblages in the correspondence analysis biplots cannot always be explained by simply reading the graphic outputs. Pitts has also demonstrated that the technique of Correspondence Analysis enables the manipulation and filtering of data to generate successive alternate descriptions of the assemblages and artefacts (2005b; 2007a; 2008; Pitts and Perring 2006) – a process referred to by Cool and Baxter (1999) as ‘peeling the onion’. For example, it is possible to remove dominant categories or outliers that obscure patterns, thereby realising less dominant relationships. Similar data manipulation was also carried out in more straightforward analysis by Spencer-Wood (1987b: 299) who removed an anomalous site assemblage from her data population because it obscured a pattern of status level for households. In the same volume Henry (1987) also demonstrated the

value of data management in the analysis process through different levels of analysis revealing complex interactions that a single level of investigation would not have depicted. This awareness of data management to clarify trends (as opposed to its manipulation to create false, desired trends) will be of significance to my data analysis in Part Two of this thesis when examining the household assemblages and artefact classifications.

Relating to data management is the consideration of data quality; this does not just refer to the archaeological material itself but also to the condition of the recording of data. This is an oft-indicated problem for archaeological studies, with many of the research studies in this paper referring to it. For example, Pitts (2005a) and Cool and Baxter (1999: 74) cite the inconsistent and poor recording of archaeological data as one of the limitations to their analyses. In Chapter Five the topic of differential data recording will be considered in depth in relation to the Pompeian households material (see also Allison 1992b; 2004a). The problem is not one limited to the documentation of archaeological material; in some cases if written records are being integrated into studies, the problem can be compounded through similar instances of poor recording and documentary biases (see Baugher and Venables 1987: 40, 43; Spencer-Wood 1987a: 3, 13ff.; also, refer to the discussion of probate records in Chapter Three).

A further valuable methodological aspect of Pitts' studies is that vessel function is not considered as the sole category of vessel classification; he also uses vessel form and re-categorises the data according to the type of feature that they were recovered from (e.g. Pitts 2005b: 151). The use of multiple forms of vessel categorisation is a feature of my later analysis in Part II and will be discussed in Chapters 5-7.

Pitts does, however, at times imply an assumed link between use and form, for example he states: “those with specific forms of cultural practice, such as the crater vessel used to mix wine and water” (2005a: 51). This is a very specific use and although such a vessel form may have indeed held social significance as an exotic good, would it necessarily have been used in the same way? (the Greek *symposion* and the Roman *convivium*; see Dunbabin 1993). I am not negating the use of vessels as a part of creating “hierarchy in social practice” (Pitts 2005a: 61) but am questioning the narrow functional application of vessels. This ties in closely with the discussion about prestige practices as opposed to prestige goods that Pitts raises (e.g. 2005b:158). Pitts’ argument is an interesting and strong one, but it is necessary for us to remain aware that Roman vessel forms do not necessarily equate to Roman-style practices in the provinces (see *section 4.2*). For example, Pitts does get close to making these connections implicitly, such as through the reference to forms associated with Roman eating habits (2008: 500). However, he also states in an earlier paper that it is “debatable whether this typological link implies a parallel transmission of Mediterranean social practice...” (Pitts 2005a: 60; see also Spencer-Wood and Herbling 1987: 56 for their consideration of foodway functions/behaviour and ethnicity).

My intention is not to understate the value of ceramic data, or to overly criticise Pitts’ method – which is a strong approach to the subject – but to question how it can be improved or built upon, as well as identifying interpretational considerations. The lack of data could well be a critical factor but while it is possible to address quantification and statistical analysis, it would be in the best interests of our discipline as a whole to avoid the segregation of studies if the data is available to us. This kind of treatment of the archaeological data in terms of individual classes of

goods by Pitts seems to go against his following two assertions: i) that splitting up local and imported pottery for study creates a fragmentary and artificial construction of the past (2005a: 144); ii) that it is “necessary to examine the pottery in the context of its deposition in *whole assemblages*, not as individual types or isolated finds’ (Pitts 2004: 17, my emphasis; see also Allison 2006: 3-4). I would argue that this is just as pertinent for vessels as a whole, and not just ceramic ones. Pottery is not the only class of artefact that receives this separation: just as Pitts limits his scope to ceramics, the same could be said for Cool and Baxter (1999; 2002; Baxter 1991; Baxter *et al.* 1995) who often tend to focus on analysing glass vessels. However, they have significantly also given consideration to ‘small finds’ (for example, Cool and Baxter 2002; Cool *et al.* 1995)⁸.

With regards to quantification, due to the nature of the ceramic quantification Pitts encounters in his data population (estimated vessel equivalent, EVE, and minimum number of vessels, MNV), accurate numbers of vessels in the assemblages are problematic, especially as direct comparison between MNV and EVE values cannot be made. Therefore Pitts modifies the values into percentages so comparison is possible and error is minimised (2005a: 53; 2005b: 145; 2008: 496-97). This is one of the problems with using these forms of vessel quantification, as to use EVE values for Correspondence Analysis they need to be converted to percentages (Cool and Baxter 2002), which in itself is not necessarily problematic as an assemblage is described by the percentage of artefacts in each category (Cool *et al.* 1995: 1641). However, questions arise relating to the weighting of variables and subsequent data misrepresentation when categories are of very small sizes. This is because

⁸ They have also applied alternative multivariate statistical techniques to study glass vessel composition: Principal Component Analysis (e.g. Baxter 1991); Discriminant Analysis (Baxter *et al.* 1995); and Cluster Analysis (Baxter *et al.* 2006).

Correspondence Analysis weights the artefact assemblages according to their *absolute* size, “so that large assemblages have more influence than small ones” (Cool and Baxter 1999: 78). The use of relative values could therefore cause an incorrect assumption to be made: the assemblages possess equal weight. For example, if an artefact count for a site has a value of one, the representation would be translated to one hundred per cent, regardless of the fact that the site only yielded a single object of that class. Therefore, one way to minimise such an influence is to avoid the use of very small assemblages (Cool and Baxter 1999: 78; Cool *et al.* 1995: 1642). This problem does not appear to be fully acknowledged by Pitts, however, who displays his tabulated data as percentages without indications of assemblage weight; for example, Pitts and Perring (2006: 199) state that “assemblage size was less important” for their study because their main concern was well-stratified contexts for the material. This concern will be addressed in my investigation of the Pompeian household material, primarily through the presentation of the data in absolute format and with notated omission of potentially problematic groups of material in the course of the sequential quantitative analysis.

One final note regarding the quantification of data needs to be made. The methodological problems of comparing glass and ceramic assemblages are an important consideration because of the different breakage properties of the artefacts and consequent estimations of vessel numbers. Obviously this is not cause to dismiss the analysis of vessels completely; the studies discussed above demonstrate the potential in these data, particularly Cool and Baxter (2002) who illustrate how much can be gained from even ‘poor quality’ data. Nevertheless, it is a condition of the artefactual evidence that can bias results and is a necessary consideration for the household data that I will be using. Consequently, to reduce comparability problems,

vessel fragments will be minimally used to avoid such problems; fortunately, the majority of the vessel data is in whole vessel counts, meaning that the same methodological concerns held by Cool and Baxter are not influential in my analyses (fragmentary ceramic and glass vessels were largely not recorded before the 1930s (Allison 2004a: 32).

4.3.3: Concluding Remarks and Discussion

Overall, Pitts' work offers a significant contribution to the study of consumption through the use of ceramic material and Correspondence Analysis. Nevertheless, it does have limitations in some areas, both conceptually and methodologically, including his use of the concept of consumption being restrictive, and his work being limited to certain components of ceramic data. Despite these criticisms, however, there is much promise for the theoretical structures he promotes, with his recognising the need for critical awareness of terms and concepts. I would question his strong reliance on identity as the sole explanation for the consumption of ceramic material because there are other variables to take into account, as discussed in this chapter. Although there is an interpretive overlap between this current study and those of Pitts', the advantage of the framework I use is that it takes many variables into account – identity is just one of these. Chapter Eight will discuss this in greater detail when the data is subjected to analysis using consumer theory introduced in Chapter One.

Importantly, the work of Pitts, and Cool and Baxter has demonstrated that Correspondence Analysis is a valuable tool for investigating material culture and

patterns of artefact occurrence, and that one of the primary advantages it holds is its ability to compare and present the objects from multiple assemblages in a visual format. In 1991 Allison carried out an exploratory exercise using Correspondence Analysis on her Pompeian household data to assess for concordance between architectural room type and their contents (1992b: 105-107; 2004b). The analysis highlighted components that had a substantial influence on the output: predominantly coins and building material (these will be dealt with in more detail later in this thesis; see Chapter Five for a more detailed consideration of these classes of artefacts). Consequently, the “variation between room contents often indicated the state of occupancy of a room” rather than habitual use of the space (Allison 1992b: 106).

Allison also identified two further dominant factors that impacted on the multivariate analysis: i) date of excavation (represented through varying excavation and recording strategies), and ii) post-depositional disturbances. Although she could allow for the effects of these in her contextual studies of the data, statistical analysis does not permit actions such as these (1992b: 107). Consequently, Allison concluded that using the dataset in its existing form for multivariate analysis was problematic (Allison 1992b: 107). Therefore, further analysis using such methods would require a restructuring of the data and a reassessment of the artefact categories used. Consequently, the methodology used in this thesis will take these comments into consideration and manage the data accordingly.

The approach used by Cool and Baxter (1999) is one that will be adapted for application in this thesis, especially in Chapters Six and Seven; it is an approach that “moves from the general to the more particular” with sequential analyses to identify key influences – ‘onion peeling’ (Cool and Baxter 1999: 78-79). The initial analyses are designed to examine broad patterns and to identify subsequent avenues of

investigation. One further difference that will be evident in this study is the level of investigation; as with Pitts' work, Cool and Baxter's research is carried out at site-level resolution due to the nature of the data, with "individual assemblages often [coming] from more than one excavation in a town or fort" (1999: 79).

This current study is at the household level and will be at a greater resolution of investigation, enabling in-depth questions to be asked in relation to patterns of consumer behaviour. Furthermore, it will address the artefact assemblage as a 'totality' rather than treat a single class of object in isolation. Once the broader patterns are identified, key components will be highlighted for further analysis, before being re-integrated into the assemblage to investigate specific questions of consumption behaviour. My analysis of the Pompeian household data is therefore ambitious, as not only does it marry together quantification of glass and ceramic vessels, and also incorporate metal vessels, but it takes into account many other forms of artefacts.

4.4: Concluding Remarks on Pottery Case Studies

In reviewing the literature on the application of consumption studies in archaeology, several points have become evident. Firstly, there is potential in the Roman ceramic evidence, just as for the eighteenth- and nineteenth-century examples discussed previously, to identify and indicate changes in social stratification based on socio-economic circumstances, illuminated through consumption practices. Secondly, we consistently encounter studies that are restricted to pottery as a single class of artefact, or a subdivision of that (be it by form, material, geographical representation, etc.), but such methods are not entirely exclusive: they represent important staging posts on the way to broader, integrated interpretations of research. Nevertheless, it is clear that the potential the ceramic data provide us is equally prominent for artefactual evidence on the whole; a point that has been raised in several studies that call for comparable studies based on other facets of material culture in order to identify patterns supportive (or otherwise) of the ceramic data (for example, Baugher and Venables, 1987; Fincham, 2002; Klein, 1991; Miller, 1980).

It is therefore valuable to take an interdisciplinary approach and consider methods used in other subjects when approaching similar questions in the Roman world, including those applied in historical archaeology (cf. Courtney, 1997). As Dyson noted, (1985, 79): “The marked increase in material goods, especially ceramics, noted by American historical archaeologists at sites during the course of the 18th century, provides a convincing parallel to what happened in Roman Italy during the 1st century B.C. and the 1st century A.D.”

Another conclusion frequently reached in analyses of consumption patterns, irrespective of the chronological frame, is that stimuli for consumer behaviour are

rarely the result of a single, easily explained, prime mover. Rather, complex inter-relating factors are the motivators, and consumption models should reflect this. Courtney (1997), Gibb (1996), Klein (1991), Leone and Crosby (1987), Shephard (1987), and Weatherill (1988), to name but a few, all argue that simplistic models for consumption are ineffectual, citing factors including:

- standard of living
- household size and structure
- income strategies
- purchasing power
- cost
- competing items
- durability
- process of acquisition
- personal (or group) customs and tastes
- external economic conditions
- social expression (communication of identity)
- object use and function
- emulation
- peer pressure
- cultural differences (such as diet)
- market impact
- choice availability in the market place
- market accessibility
- the role of women in the household

It has been shown that studies which consider the consumption of goods and material culture in archaeology are integral to the study of the economy (economies) in antiquity, not only because consumption is inherently linked with modes of production, which must be reflected in studies (Cooper, 1996), but also because questions pertaining to broader issues can be addressed. An example of this is the

study by De Sena and Ikäheimo (2003) which relates Pompeii to economic base models, arguing that the ceramic evidence from the Casa di Vestali suggests that the city sees a shift from a somewhat 'primitive' base form in the second and early first century BCE, to a form in the Imperial period that could be considered a 'consumer city' (2003). It is, therefore, possible to tackle issues with wider economic significance through examination of consumer behaviour. However, the ceramic evidence demonstrates that the picture of consumption is far from a simple one that can be explained by a single factor. There are repeated statements of non-simplistic consumer behaviour, ranging from historic accounts of price indexes and expenditure practices through to amphorae and associated commodities, as well as non-amphorae vessels.

Addressing socio-cultural or economic-related subjects, such as consumer behaviour, from these multidisciplinary perspectives enables us to investigate Roman archaeology from fresh viewpoints – ones often overlooked or discounted by Classical archaeologists. However, the ancient city of Pompeii provides a wealth of material evidence that presents an uncommon opportunity to investigate consumption orientations in this way.

4.5: Summary

In this first part of the thesis the theoretical discussion concerning consumption has been completed, introducing the main concepts with definitions and arguments for their application to studies of the ancient world. Methodological considerations were considered in Chapter Two, drawing upon previous studies of documentary records (such as probate records) to investigate consumer behaviour. Chapter Three expanded the foregoing arguments into an overall discussion relating to classical documentary evidence, consumerism, and perceptions of materiality and luxury in the ancient world. Finally, in this chapter, pottery was examined as a tool for investigating consumption patterns in the Roman world, with reference to methodological approaches used in studies of historical ceramic consumption.

Part II will now apply some of these ideas and concepts to an in-depth analysis of household assemblages at Pompeii. The methods to be used will be outlined in Chapter Five, with subsequent data analysis in Chapters Six (functional categories) and Chapter Seven (vessel analysis), with a bottom-up approach forming a general analysis of the data, and Chapter Eight (materialism), which uses a top-down approach to analyse the data using a model based on consumer theory from Chapter One. The last of these will serve to bring together the two halves of this thesis more explicitly by investigating the data in terms of how facets of materialism are expressed at different conceptual levels. In Chapter Nine the main arguments will be brought together and conclusions will be drawn.

PART II:

Pompeian Household Assemblages

CHAPTER FIVE:
DATA AND METHOD

It has been stated that “one of the major problems faced by archaeologists is to find optimal methods by which assemblages can be presented, described and analyzed” (Gilboa *et al.* 2004, 682); and, more specifically, Allison has stated that “investigations of household consumption are often thwarted by the lack of usable models” (1999a: 9). Having provided a summary of conceptual and methodological concerns raised through past studies of pottery consumption, this chapter will now outline the methodology to be employed in this thesis that will demonstrate that these problems are surmountable and that such models can exist.

Prior to an explanation of my method, however, it is necessary to introduce the data population and the sampling procedure. This, along with an explanation of the artefact categorisations, is an essential stage in the data processing cycle to produce an arrangement appropriate to this study and one that minimises potential error margins.

5.1 Sampling Procedure

As previously outlined, the purpose of this study is to test a novel approach to the study of consumption in the archaeological record, particularly at the level of the household. In order to accomplish this, the data to be used has to be from a known context and diverse enough to permit suitable categorisation and statistical analysis. In future studies the latter may be less of a significant requirement as a framework

will be already established to which data of a more fragmentary nature could be applied.

Pompeii provides a highly apposite source of data for this investigation because not only does the site present opportunity for investigation at the household level but it also permits examination at the level of urban centre through comparison of different households. Furthermore, data such as these provide an opportunity to investigate material diversity and possession, in a complex urban area with assemblages coming from an occupation phase generally limited to the pre-eruption phase, albeit a non-static period of time (Allison 1992b: 4). Chronology was much more sensitive factor for Allison in her studies of artefact distribution and room use because of contemporaneity of use or changing spatial function over time (see Allison 1992phd; 1993: 3 2006: 14-15; for example situations, see Allison 2004a: 78-82); it is, however, a complication that is not as much of a concern for this study; the exception being state of repair or level of occupation (this will be considered in Chapter Five). Such a sample population is atypical of many archaeological sites in that it is not 'rubbish' *per se* or representative of accidental loss; ritual deposit is also most likely not to be a cultural process involved in the production of the assemblages. It is, therefore, much more representative of a collection of goods within households that can be used to address questions of acquisition, consumption, and consumer behaviour.

Nevertheless, contrary to popular belief, the site of Pompeii does not represent a moment in the lives of the city's inhabitants that has been frozen in time, impervious to outside interference or influence (for detailed discussion of the 'Pompeii Premise' refer to Allison 1992a; 1992b; 2004a; Schiffer 1985). It is, therefore, not the ideal site with 'perfect' assemblages as often expected, but one that carries its own inherent

obstructions. Allison states that depositional circumstances and the processes of abandonment are important considerations (1999a: 6; see also Inomata and Sheets 2000; McKee 1999). For Pompeii, these include removal of objects prior to the interment of the city, and post-depositional processes such as ancient, and more historically recent, looting of objects (Allison 1992b: 17-19; 2004a: 21-24; 2006: 12-15).

As such, it is necessary to acknowledge that the data being subjected to analysis in this thesis are themselves a reflection of the excavator; they are a cultural construct just as probate inventories are (see Chapter Three). Archaeological data are only as reliable as the recovery strategy, and these are usually different for archaeologists today than they were for those who originally excavated the material (Allison 1999a: 7; see also Allison 1999b; Ault and Nevett 1999); for example, Allison states that “the primary purpose of recording excavated finds was administrative control of the material removed” (2004a: 31), and that the excavators were predominantly interested in objects of valuable material (2004a: 31-32). The assemblages considered here are, therefore, a collection of recorded observations; this factor was highlighted in Chapter Four, particularly for the historical archaeologists, and in *section 5.2* the influence excavator(s) can have on the recording of artefacts from houses in my data population will be demonstrated.

In addition to raising questions of sampling, this problem also enters into a discussion inherent to archaeology studies: are the populations in question representative samples? This is not easily answered. What constitutes a ‘representative’ sample? The answer to this may, in fact, be more evident after analysis, as it will then be possible to assess how ‘typical’ the household assemblages seem to be when compared with one another. The typicality of Roman consumption

patterns across the Empire as a standardised measure is not the aim here, for this is an impossible task; statements can only be made within the sample population, with subsequent careful extrapolation of consumption trends. The archaeologist can only make use of the data at hand and, once again, minimise the potential error margins in the data set. This has been demonstrated by Allison (1999b), Ault and Nevett (1999) and Goldberg (1999) in their examination of household material remains. Furthermore, although statistical techniques are valuable tools for testing hypotheses and generating outputs that enable further discussion and interpretation, they do not automatically validate the results of an analysis (Richards and Ryan 1985, 7; refer to *section 4.3*).

The original data population comprises artefact assemblages from a database of thirty Pompeian houses and their contents from across the city (refer to *figure 5.1*). These data were collated by Dr. Penelope Allison, and consist of approximately 16,000 artefacts (the spread of which is illustrated in *figure 5.2*). They were collected from three main sources: the published reports in *Notizie degli Scavi di Antichità*, the original records from the *Giornali degli Scavi*, and the Pompeii archives containing the artefact inventories. In addition to these are the extant architectural remains of the houses themselves (Allison 1992b, 22-27; 2004a; 2007). They are therefore taken from a single architectural group (that of so-called *atrium* houses, also referred to as forecourt houses (Allison 1993)) for reasons of documentary availability: nineteenth-century excavators focused their efforts on the larger, wealthier domestic residences, rather than the smaller households or commercial buildings (Allison 1992b; Ellis 2004). The sample to be used in the analyses in this study, however, does not comprise all thirty houses due to variables that affect the reliability and validity of the output of analysis. This will be discussed in the following section.

5.2 The Data Population

One of the most prominent of these variables is the date of excavation (Allison 1992a; 2004a; 2004b), listed in *table 5.1* (for the test of correlation the excavation date is considered to be the terminal date when disinterment⁹ was over multiple years, and is indicated in the column on the far right). This factor will be considered first as it is one that will in part dictate the sample selection. The second variable to be considered is house area. This is, however, not a variable that determines sample selection; rather, it is a descriptive tool.

Figure 5.3 displays the relationship between the number of artefacts recovered from the properties (y) and the date of the disinterment of the houses (x). As can be seen, the form of the relationship (a positive correlation) is depicted by the regression line. This can also be demonstrated through the application of a statistical test of linear correlation: the correlation coefficient (r) can be calculated using simple linear correlation (Pearson r) to indicate the covariance of two variables. Expressed differently, it denotes the strength of the relationship between the variables of x and y , thus assessing the accuracy of estimates given by a trend line (also called a line of regression). This is a statistical statement regarding the distribution of plot points in terms of distance from the regression line; if the data points are close to the line the correlation is strong, if r is zero there is no correlation and the data of x and y will be independent of one another (Fletcher and Lock 2005, 115-121; Shennan 1997, 131-142).

⁹ 'Disinterment' is seen as a valid term for the clearances of these houses, as it refers to the unearthing of things; in this case buildings buried during the eruption of Vesuvius in 79 CE. For the purposes of this study, the terms 'excavation' and 'disinterment' will be interchangeable as the process of house clearance only minimally extended as far as investigation of pre-eruption levels.

The coefficient of determination (r^2) indicates the variation in the data in relation to the regression, or in other words the proportion of common variance (Abdi 2007). Put plainly, r^2 refers to the ‘strength’ or ‘magnitude’ of the relationship (StatSoft 2007). The percentage level of explanation is given by multiplying the r^2 result by one hundred. Finally, the statistical significance of the analysis is noted according to the T-test, to ensure that the correlation statistics are not spurious due to outliers.

The correlation coefficient (r) for the covariance of the date of excavation and the total number of artefacts in the houses is 0.550 and thus indicates a moderately strong correlation. The coefficient of determination (r^2) in this case has a value of 0.302. Overall, therefore, the percentage level of explanation ($r^2 \times 100$) is 30.2 per cent, meaning that the date of excavation provides a 30 per cent explanation for the variation in artefact recovery witnessed in this data set (Fletcher and Lock 2005, 120; Shennan 1997, 142-143); the correlation is not statistically significant at the $p=0.05$ level, thereby indicating a spurious relationship. It is not the *number* of artefacts, however, that are the important consideration here; rather, *what* was recorded in the nineteenth- and early twentieth centuries, as excavators had a tendency to ignore the more mundane everyday objects (including pottery), thus meaning they are absent or minimally represented in the assemblage records. The substantial impact date of excavation had on recording was a factor noted by Allison during her analysis, including exploratory multivariate statistical analysis on the data (1992b).

Clearly, all of the houses did not undergo the same sampling strategies. Although the predominant part of excavation was after 1870, it was with Amadeo Maiuri in charge of the process in the early twentieth century that recovery of artefacts improved. One of the factors, and its subsequent influences, to take into

consideration in this thesis is the potential bias in artefact constituent material; this is not just a question of preservation in the archaeological record, it is also a question of human recording. For instance, the earlier excavators demonstrated a bias in recovery towards metal objects, such as hinges and fittings in addition to vessels. Conversely, fragments of glass and ceramic vessels largely went unrecorded until the 1930s, and amphorae were predominantly ignored until the later excavations, unless an inscription was evident (Allison 2004a: 32-33). As discussed in Chapter Four, the recording of fragmented vessels (or lack thereof) is not a problematic occurrence for this current study, and will be a topic discussed further later in this chapter..

From a statistical standpoint, especially regarding tests of significance, samples should be random presupposing an independence of selection. Nevertheless, it should be remembered that this is not possible in this study as *no* archaeological sample can be considered as a random representation of what remains in the archaeological record (Shennan 1997, 61).

One interesting point to note is the weak bias for selective excavation of houses according to size, thereby not necessarily indicating that larger residences were targeted prior to smaller ones (*figure 5.4*): the negative correlation is a weak one, and the r^2 value is 0.052 indicating only a 5.2 per cent level of explanation (this is not significant at the $p=0.05$ level, indicating a spurious relationship).

The date of excavation, however, is not the sole variable to exert an influence on artefact recovery. The size of the individual houses also requires attention as a larger assemblage might be expected from houses that cover a greater area. This variable has therefore been given the same treatment as that provided above for the excavation date (*figure 5.5*). The value for the correlation coefficient (r) of house

Table 5.1: The thirty houses from the original data set with area and excavation dates indicated (*Figures taken from Allison 2004b)

(with address)	House Area (m ²)*	Date of Excavation*	
		Date Range	Terminal Date
Regions I, III, and IX			
• Casa del Sacello Iliaco (I 6,4)	500	1912-1913	1913
• House I 6,8-9 (I 6,8-9)	200	1912-1927	1927
• Casa dei Quadretti Teatrali (I 6,11)	575	1912-1927	1927
• Casa dei Ceii (I 6,15)	300	1913-1914	1914
• Casa di Stallius Eros (I 6,13)	300	1927	1927
• Casa del Sacerdos Amandus (I 7,7)	300	1924	1924
• Casa dell'Efebo (I 7,10-12)	650	1925	1925
• House I 7,19 (I 7,19)	350	1925-1926	1926
• Casa del Menandro (I 10,4)	1800	1926-1932	1932
• Casa del Fabbro (I 10,7)	320	1932-1933	1933
• House I 10,8 (I 10,8)	265	1932-1933	1933
• Casa degli Amanti (I 10,11)	460	1933	1933
• Casa della Venere in Bikini (I 11,6)	200	1954	1954
• Casa di Trebius Valens (III 2,1)	500	1913-1915	1915
• Casa di Julius Polybius (IX 13,1-3)	700	1913, 1966, 1978	1978
Regions V and VI			
• Casa delle Nozze d'Argento (V 2,i)	2000	1891-1908	1908
• Casa di M. Lucretius Fronto (V 4,a)	570	1900	1900
• Casa dei Vettii (VI 15,1)	1100	1894-1896	1896
• House VI 15,5 (VI 15,5)	800	1895-1897	1897
• Casa del Principe di Napoli (VI 15,8)	270	1896-1898	1898
• Casa degli Amorini Dorati (VI 16,7)	800	1903-1904	1904
• Casa della Ara Massima (VI 16,15)	200	1903-1904	1904
• House VI 16,26 (VI 16,26)	600	1904-1905	1905
Regions VIII			
• House VIII 2,14-16 (VIII 2,14-16)	2200	1826, 1890-1899	1899
• House VIII 2,26 (VIII 2,26)	550	1826, 1887-1888	1888
• House VIII 2,28 (VIII 2,28)	600	1826, 1886-1887	1887
• House VIII 2,29-30 (VIII 2,29-30)	1000	1883	1883
• House VIII 2,34 (VIII 2,34)	700	1885	1885
• Casa di Giuseppe II (VIII,2,39)	850	1767-1769, 1885	1885
• House VIII 5,9 (VIII 5,9)	650	1881-1882	1882



Figure 5.1: The locations of the thirty houses from the original data set (After Allison 2004b)

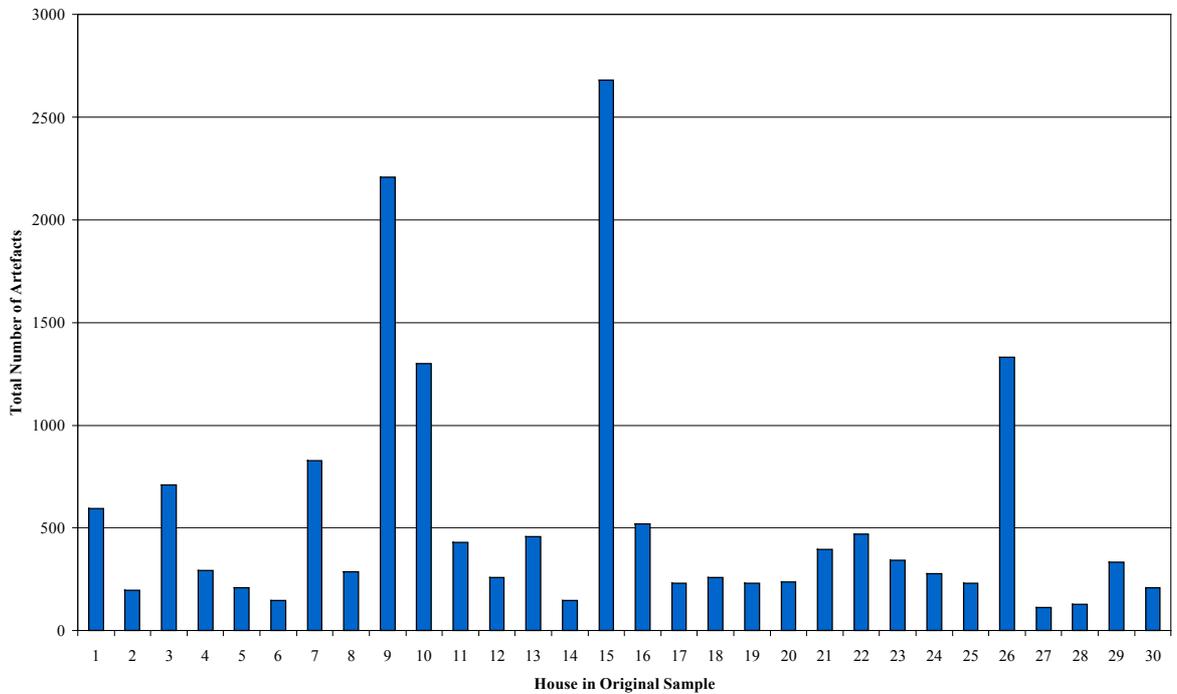


Figure 5.2: The artefact totals for the thirty houses from the original data set

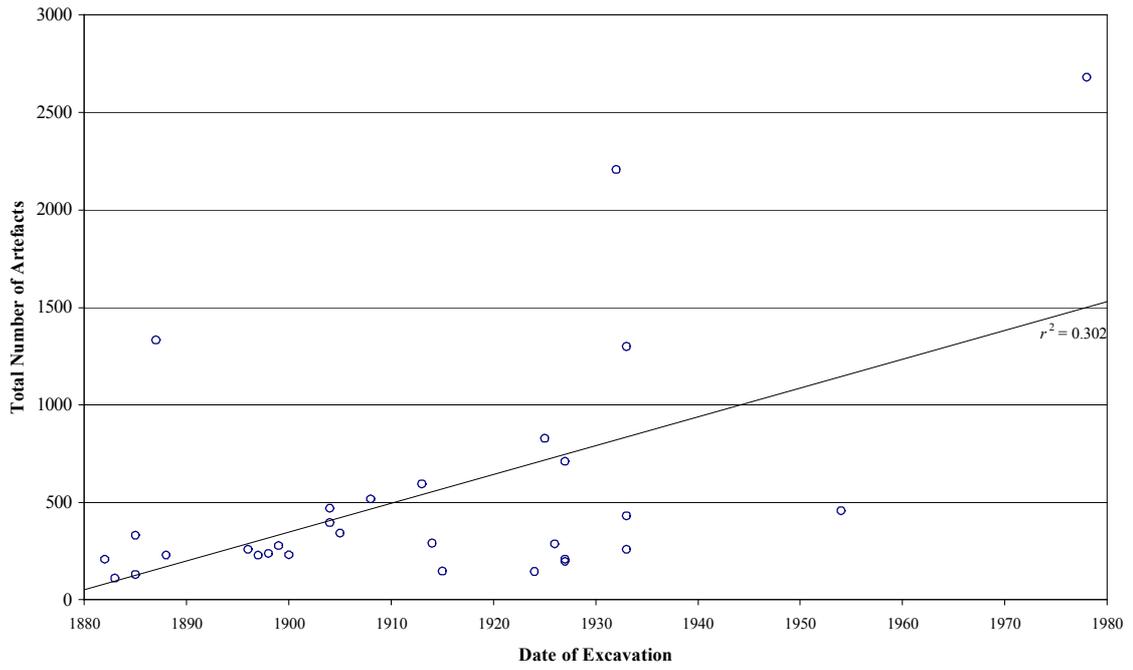


Figure 5.3: The effect of date of excavation on assemblage size

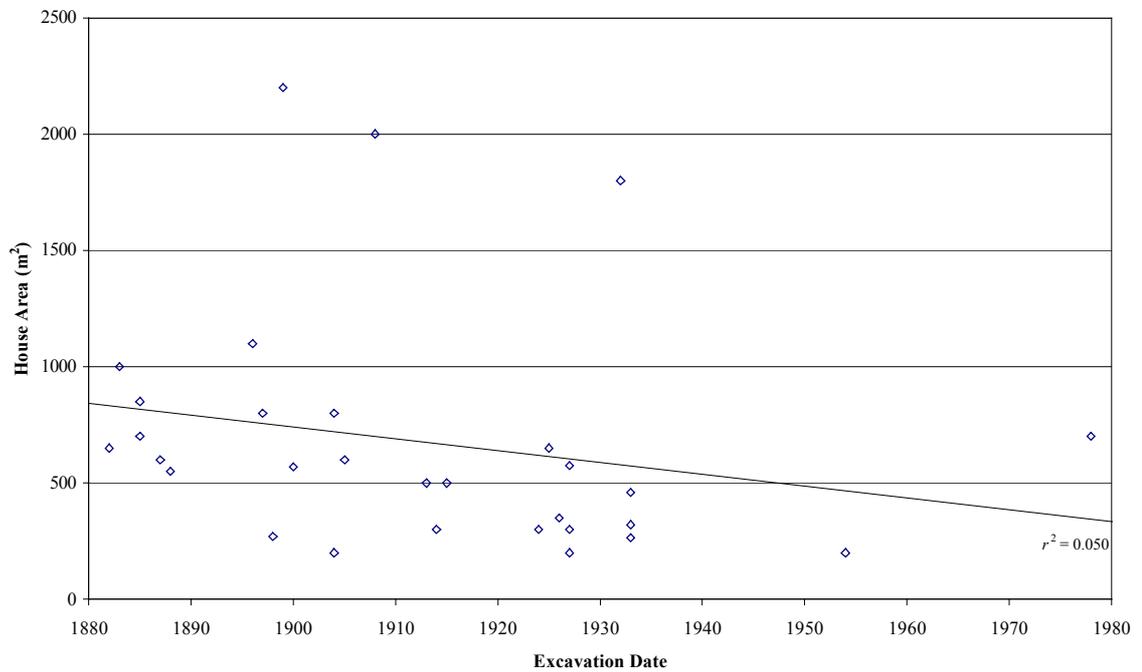


Figure 5.4: The relationship between date of excavation and house size

area (x) and assemblage size (y) is 0.208, indicating a positive correlation but not a particularly strong one (once again, not significant at the $p=0.05$ level). In this case the coefficient of determination (r^2) is 0.043 and is therefore not a statistically significant factor in this data set, as the house area provides a 4.3 per cent explanation for the variation in assemblage size. For a more visual display of the variables given attention to here see *figure 5.6*, which depicts *figure 5.5* but with the size of the data points representing the area of the houses. In this graph it can be seen that there were several sizeable houses disinterred around 1900 but they yielded low total artefact counts. Interpreting the already shown effect of excavation date, it is probable that artefact recovery strategy was thus poor, rather than there having been few artefacts present to recover.

Due to the effect the date of exaction would have on skewing the data, the sample of houses used in this study consequently focuses on 12 of the original 30 houses. It is recognised that 30 assemblages would make a better population for statistical analysis but it is felt that a judgement sample of twelve cases will prove more valuable than a larger population size that carries greater inherent error margins.

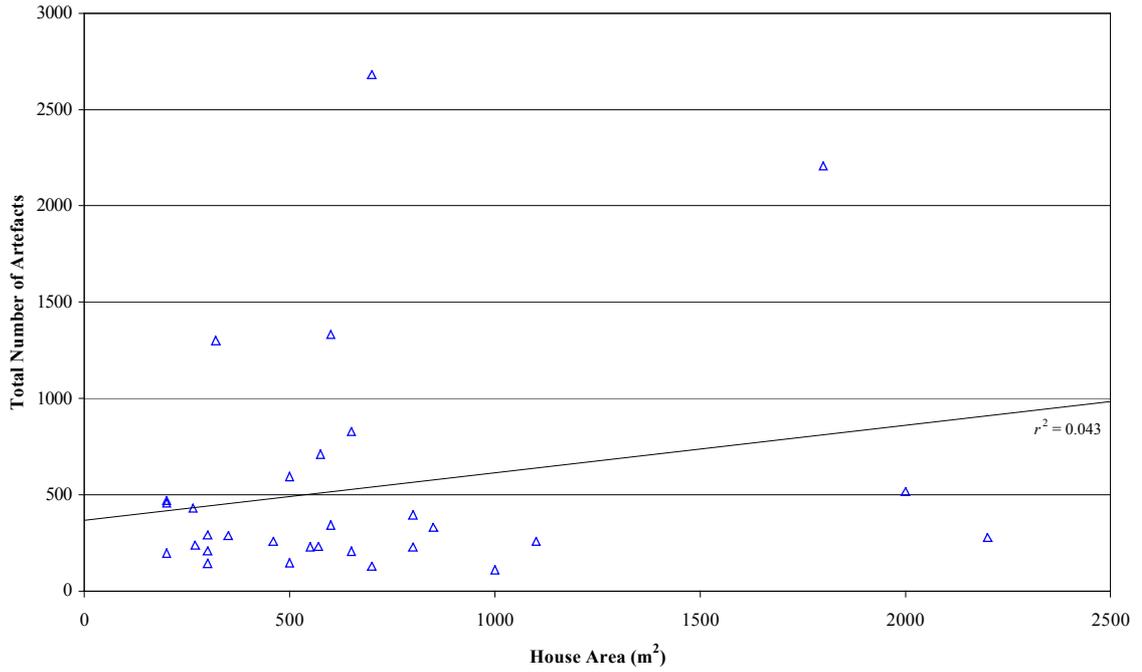


Figure 5.5: The effect of house area on assemblage size

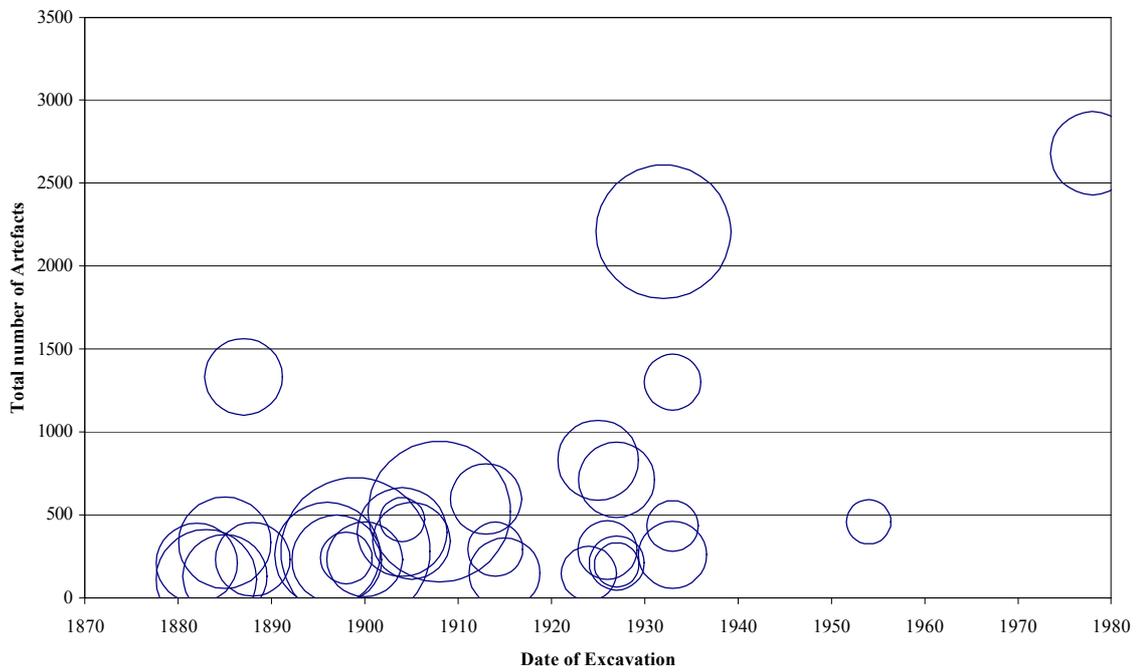


Figure 5.6: Assemblage size, excavation date, and house area

The sample population thus comprises:

<i>House 1</i>	House I 6,8-9	<i>House 7</i>	Casa del Menandro (I.10.4)
<i>House 2</i>	Casa dei Quadretti Teatrali (I 6,11)	<i>House 8</i>	Casa del Fabbro (I.10.7)
<i>House 3</i>	Casa di Stallius Eros (I.6.13)	<i>House 9</i>	House I.10.8
<i>House 4</i>	Casa del Sacerdos Amandus (I.7.7)	<i>House 10</i>	Casa degli Amanti (I.10.11)
<i>House 5</i>	Casa dell'Efebo (I.7.10-12)	<i>House 11</i>	Casa della Venere in Bikini (I.11.6)
<i>House 6</i>	House I.7.19	<i>House 12</i>	Casa di Julius Polybius (IX.13.1-3)

As can be seen from *figure 5.7* the sample population is clustered in a single district of the city, which in itself will act as a reducing factor for error introduction or data variability due to urban location. If consumption patterns are dictated by social position, which in turn is reflected by habitation location within the urban frame, by selecting households from the same neighbourhood data skewing is minimised.

The system of numbering the houses for reference purposes is different to that used by Allison in her online database due to requirements of the statistical software being used (a program called 'R') regarding data input and analysis. As an extension of these necessary changes, the numbering for functional categories will also be different to those of Allison's designations and will receive a lettered shorthand reference system as well; the latter will be explained in greater depth in *section 5.3* below.

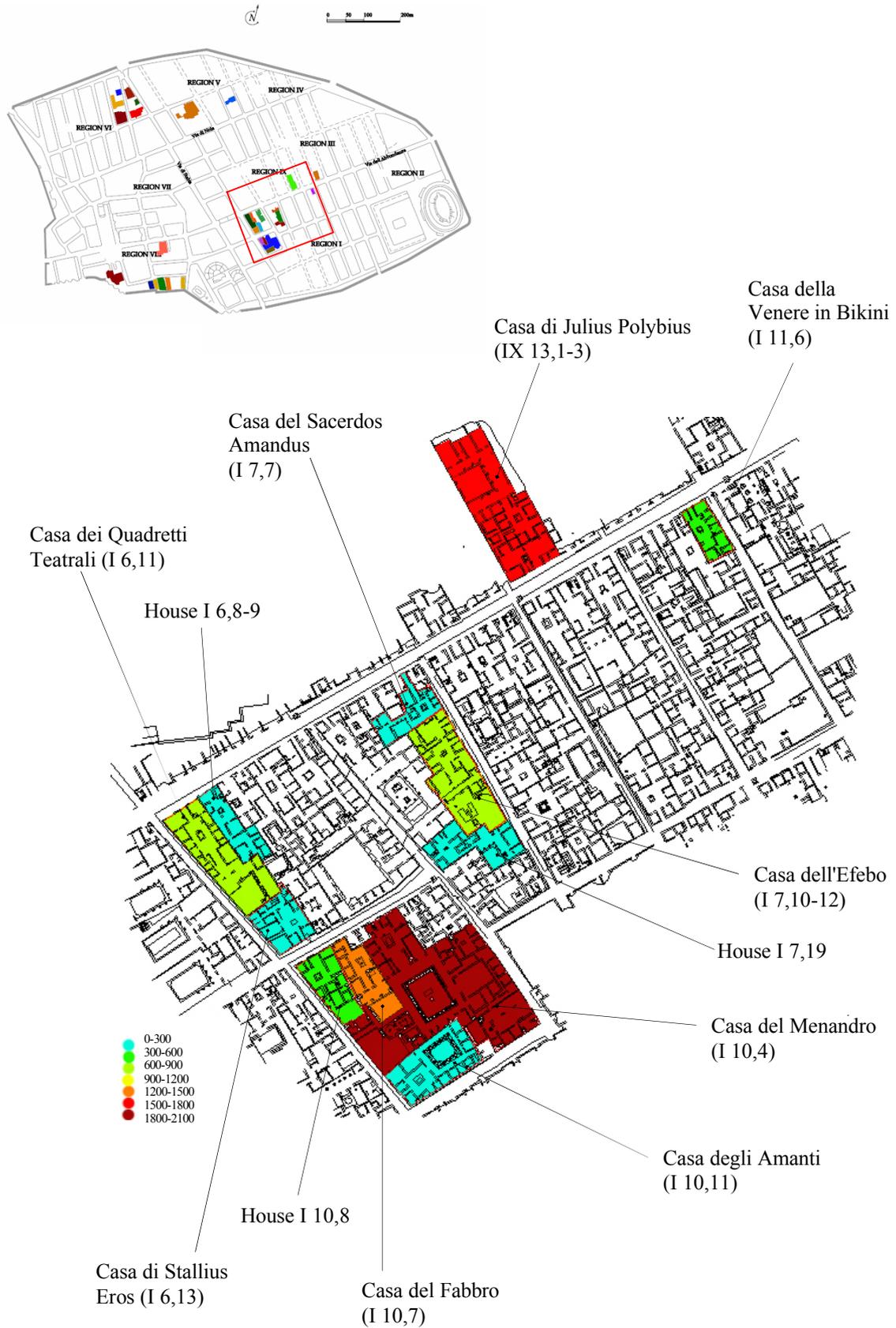


Figure 5.7: The houses in the data population (with artefact frequencies indicated)

5.3 Artefact Categorisation

In order to maximise the output from the assemblage analysis it is necessary to categorise the artefacts so that they are in a more useful and practicable form. When studying artefact assemblages, interest is fundamentally in *groups* of artefacts rather than single objects, so manipulation of the components into categories permits comparison and examination in a way that can be more constructive in revealing behavioural patterns. However, there is an inherent problem with such actions: the process is one that subjects the evidence to labelling and association by the archaeologist. Such clustering of material can be fraught with danger as ascribing function is not a straightforward practice. Furthermore, labelling an object with a specific use can ignore the matter of multifunctionality, or even re-use (for a prime example of re-use see Cool (2002, 30-31); see Peña (2007a) for different classes of re-use and recycling).

The fundamental purpose of categorising data into types and functional groups is to produce systems relating to specific research purposes, with an underlying requisite for practicality. Groupings are primarily intuitive and rational interpretations with artefact types having both individual and group identities, being polythetic in nature (that is, “no single attribute or attribute cluster is a necessary or sufficient condition for membership in any type” (Adams and Adams 1991, 355)). Therefore, categories being used are designed to be practical in purpose and communicate (behavioural) information through separate but interrelated material. Furthermore, having differing levels of categorisation leaves the assemblages as fluid entities following no *fixed* criteria.

The subjective nature of categorising artefacts and the associated potential introduction of marginal error is not something that can be avoided, but it can be minimised. Allison categorised the data from her sample population in several ways, with those of artefact type and artefact function being of most interest to this study, consisting of 239 and 35 categories respectively. The existing categorisation system for functional groupings, however, was found to be impracticable due in part to the large numbers of groupings. Consequently, it was re-worked based upon Crummy's (1983) groupings of artefacts from Roman Britain, so that the framework is more flexible. Allison's assignments to functional categories were maintained where possible to maximise consistency. All of Crummy's groupings are incorporated, as well as some adjuncts to the system allowing all of the artefact types from the Pompeian data to be categorised. Even where some of these categories are not represented in the data being used in this study, the framework exists for others to make use of the information in the future. Not only will this provide a more manageable and useful data set, it will also make the methodological framework accessible for those working on other sites, especially those in Britain already familiar with the system. The functional categories (FuncCats) to be used hereafter are listed in *table 5.2* along with the explanatory descriptions; *Appendix B* lists the artefact types included in these categories.

The identification and classification of individual artefacts (as opposed to grouped categorisation) is not assessed in this research, with those previously assigned being retained. It is beyond the scope of this thesis to enter into a discussion of artefact *classification*; for this the reader is directed to Adams and Adams (1991), Hurcombe (2007a; 2007b), and Read (2007), and for specific scientific advances see, for example, Gilboa *et al* (2004). In relation to the artefacts in this study, a glossary

of terminology and further information can be referred to at the companion website to Allison's *Pompeian Households* (2004a; 2004b). Not all artefacts could be identified by Allison, however, due to problems such as ambiguous artefact labels and unsubstantiated statements of function in the original records (*cf.* Allison 1999). These excavation reports also often gave different names to similar objects depending on the individual recorder's predictions, resulting in Allison compiling an 'artefact type' category to group similar objects together (Allison 1992b; 2004a). As a result, unlike the 'functional artefact' groupings, the existing category divisions for 'artefact type' will remain in place in this study. An important aspect of this is that it will provide a second-level of investigation as it allows a method of assessing the validity of the functional ascriptions. For example, if the results are significantly different to those yielded by the analysis of the functional categories, then it may become necessary to reconsider the use of such divisions, or the application of modern preconceptions about object use.

The sequence of the stages in the categorisation of artefacts can thus be simply represented as:

Artefacts → Artefact Types → Functional Categories

in which artefact types have both individual identities, as well as identities in keeping with their functional assignments.

Table 5.2: Descriptions of 'Functional Categories' (after Crummy 1983)

Functional Category	Description
1. <i>Objects of personal adornment or dress</i>	Finds such as jewellery, garment fittings (such as buckles). If preservation conditions are favourable, this category also includes the garments themselves
2. <i>Toilet, surgical, or pharmaceutical instruments</i>	Objects used solely for personal grooming, such as combs, and objects which have a multiplicity of uses such as spoon-probes, which can be seen as either toilet, surgical, or pharmaceutical instruments
3. <i>Objects used in the manufacture or working of textiles</i>	Objects used for the preparation and conversion of raw materials into textiles and objects associated with the working of textiles into garments or other items
4. <i>Household utensils</i>	Objects used in the preparation, cooking, and serving of food (other than pottery, glass, and metal vessels), and objects used for, or associated with, household lighting.
5. <i>Household furniture</i>	Objects relating to items of furniture (includes furniture fittings)
6. <i>Objects used for recreational purposes</i>	Objects such as pieces for board or other games
7. <i>Objects employed in weighing and measuring</i>	Finds such as balances, scale pans, and weights
8. <i>Objects used for, or associated with, written communications</i>	Finds such as styli or seal-boxes
9. <i>Objects associated with transport</i>	Objects such as harness or car fittings
10. <i>Buildings and services</i>	This category covers objects associated with the fabric of buildings, such as worked stone, which are best examined in the light of the structure from which they derive, rather than as isolated small finds
11. <i>Tools</i>	Tools that cannot be assigned to one of the more specific categories, such as agricultural or military equipment. Therefore items such as knife blades, tool handles, and hones are included in this category
12. <i>Fasteners and fittings</i>	This category is very much a 'blanket' designed to cover those finds which form obvious groups but which may, when used, be found in any one of several categories. Objects with a multiplicity of applications frequently have one thing in common, that is, that they are used as fasteners or fittings. If their original contexts were known it would be possible to allocate them to other

	categories, most commonly categories 1, 4, 8, 9, and 10. Thus, in this category are placed objects such as studs, nails, keys, locks, hinges, and joiner's or carpenter's fasteners.
13. <i>Objects associated with agriculture, horticulture, and animal husbandry</i>	Should include spade-irons, sickle and scythe blades, and other agricultural tools. Also, cow/animal bells
14. <i>Military equipment</i>	Finds such as weapons, fittings from armour, tools with military associations, and phallic amulets possibly used by the army
15. <i>Objects associated with religious beliefs and practices</i>	Objects such as figurines, coffin-fittings, textile fragments from burials, and grave goods
16. <i>Objects the function or identification of which is unknown or uncertain ('Miscellaneous')</i>	As well as unidentified objects this category includes objects with a wide range of possible uses, such as wire or chains
17. <i>Organics</i>	Finds organic in nature, includes human and (unworked) animal bones, as well as vegetative matter (such as straw)
18. <i>Ceramic Vessels</i>	Pottery. Includes different classes, such as serving and storage wares. Ceramic lamps, however, fall into the <i>Household utensils</i> category as they represent 'objects used for, or associated with, household lighting'.
19. <i>Other Vessels</i>	All vessels not included in the 'ceramic vessels' category (primarily glass and metal)
20. <i>Coins</i>	This includes single stray coins, as well as parts of coin hoards.
21. <i>Objects and waste material associated with metal working</i>	Objects such as the tools specifically used by a smith, or crucibles and metallurgical waste products
22. <i>Objects and waste material associated with antler, horn, bone, and tooth working</i>	As the same tools are used to work both wood and bone etc., they could only be identified as associated with bone working if they were found with bone waste or objects
23. <i>Objects and waste material associated with the manufacture of pottery vessels or pipeclay objects</i>	Finds such as moulds or stamps

5.4 Sampling Validity and Limitations

The lack of time depth involved in this data population, while providing data from more secure archaeological contexts, does also create a limitation to this study. Consumption patterns can be investigated with these data but the nature of the assemblages does not permit a “measure of access to *replacement* items” (Cooper 2000 77, author's emphasis). It is, however, considered a small sacrifice in relation to the benefits outlined above. Furthermore, it could be argued that by being able to answer questions pertaining to acquisition, if availability of goods and market conditions are relatively consistent, the statements of replacement could be extrapolated from the current study.

In addition to the concerns of artefact retrieval and recording noted above, a second problem was recognised: during categorisation of the artefacts it became evident that there were several groups that would skew the data and potentially disguise genuine associations evident in the analytical output. Consequently, a process of data ‘cleaning’ was implemented to reduce any such phenomena, a process that is necessary in some areas of research (StatSoft 2007). Cleaning was implemented at two levels: (i) the functional category and (ii) the artefact type.

It can be immediately recognised which of the functional categories would be disruptive and they comprise the following:

- Organics (O): This category presents a twofold obstacle: preservation and recording. The latter is particularly pertinent as earlier excavators would have been less likely to record some aspects of such material, therefore introducing a recording bias to the data. Some of the component artefact types would have

been omitted even if the Organics category was left in place: human remains are present in the records for some of the houses. Although people can be classed as consumed commodities (cf. Coffee 2006; 2009; also discussion of sumptuary laws in Chapter Three), for instance in the form of slaves¹⁰, the examples in this study cannot be considered as such because the social positions of the individuals are unknown and they can, therefore, not be assumed to be targets of consumption.

- Buildings and Services (BS): This category will be discussed in detail below.
- Miscellaneous (M): This category will be included initially but removed during analysis to assess the level of distortion that this group has on the associations within and between the assemblages.
- Coins (C): These are not items that are themselves consumed (for example, refer to Panagopoulou 2007). They are, more accurately, objects that assist in the navigation and negotiation of the consumption of material culture. As noted in Chapter One, they may represent the predominant conduit for acquiring commodities but not the sole one. Consequently, this category will be treated in the same way as the ‘Miscellaneous’ grouping, with further analysis relating to purchasing power (*section 6.3.1*). Furthermore, coins have already been identified by Allison (1992b) as being able to have a significant skewing effect on results.

¹⁰ We can also find reference to such perceptions in literary sources such as Shakespeare: “such a commodity of warm slaves” (Henry IV, Part 1: Act 4, Scene 2, line 17).

- Objects and waste material associated with metal working (OMW), Objects and waste material associated with antler, horn, bone, and tooth working (AHB), and Objects and waste material associated with the manufacture of pottery vessels or pipeclay objects (PVP): These will not be employed in the analysis as there are no artefacts present in the data set that fall into these categories. If kept, their presence would cause problems when implementing Correspondence Analysis due to a recurrence of ‘zero’ values.

The second level of cleaning targeted data that would inflate artefact counts within assemblages, such as artefact fragments and arbitrary values for objects. This predominantly affects the categories of Ceramic Vessels (CV) and Household Furniture (HF). With the former the items that required removal were the fragments of vessels that were given arbitrary values of ‘10’; although calculations for Estimated Vessel Equivalents (EVEs) are not possible, removing the fragments minimises the error margins introduced by high counts for fragments of potentially the same vessel. Base fragments were, where possible, not removed as they do not present the same problems as body fragments and can be used to indicate a single vessel. The household assemblage that was most heavily affected by CV data cleaning was Casa di Julius Polybius (‘House 12’): the category was reduced from a total of 1185 to 327, a reduction by 72 per cent, represented in *figure 5.8*. This is not surprising considering that it was the most recently excavated property in the sample and, therefore, would have received more stringent recovery procedures; prior to the 1930s fragmentary pottery was largely ignored (Allison 2004a, 32).

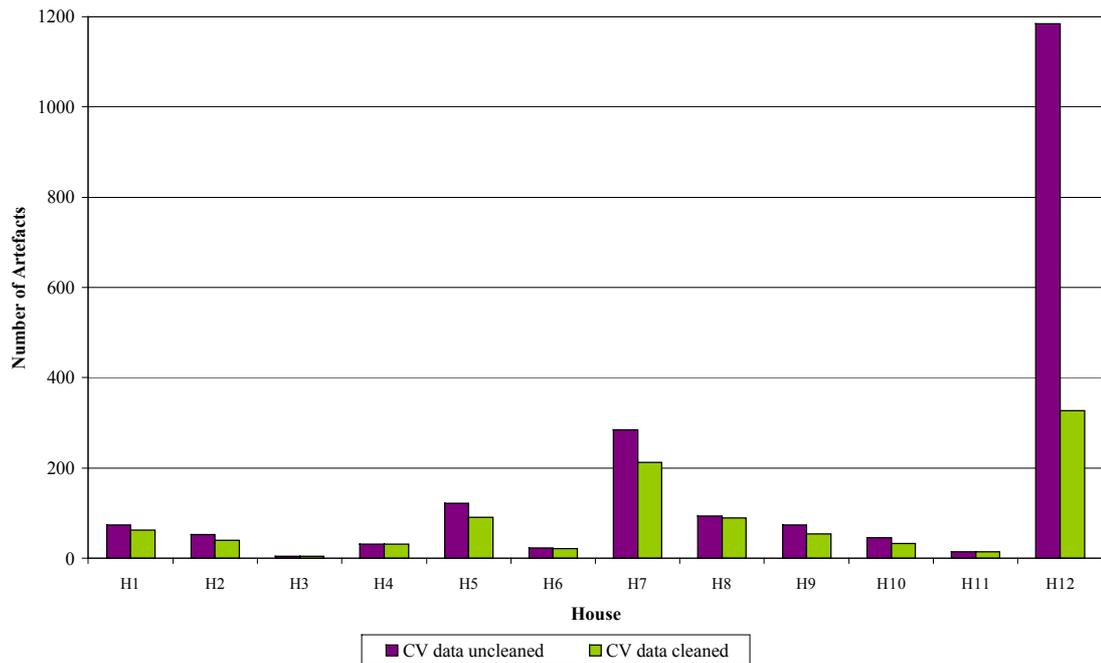


Figure 5.8: Values for ‘Ceramic Vessels’ before and after data cleaning

The functional category of ‘buildings and services’ is particularly pertinent for illustrating the need for data cleaning. As indicated by the description in *table 5.2*, this category covers objects associated with the fabric of buildings, which are best examined in the light of the structure from which they derive, rather than as isolated small finds. *Table 5.3* displays the constituent parts forming the functional category of ‘Buildings and Services’, with the artefact counts for both before and after data cleaning. It is immediately observable that the artefact type of ‘Building material’ is the dominant component in the ‘uncleaned’ data, making up 76.7 per cent of the total.

Indicated below are the artefacts that comprise this artefact type; once again there is a strongly dominant component, that of ‘heap’. In particular this is where the potential for error through recording bias is evident. ‘Heap’ and ‘pile’ are used to indicate an amount of material, for example lime, that would most likely be used for building purposes, such as reconstruction or renovation. The counts given to these

‘artefacts’ are arbitrary and usually in the form of ‘10’ or ‘20’, apparently depending on the quantity present although this is unclear and has no specific measure of quantification. Therefore, these elements were likely to present a significant problem in skewing the data and required cleaning, the result of which (in terms of the house assemblages for the ‘Buildings and Services’ category) can be seen in *figure 5.9*.

Table 5.3: Composition of 'Buildings and Services' functional category

Artefact Type	Uncleaned Data	Cleaned Data
Architectural fitting	31	21
Building material	570	14
Cistern head	4	4
Drain/pipe/tap/cess pit	14	14
Fixed block/support/ledge	3	3
Impluvium/compluvium	17	17
Latrine	16	16
Niche	18	18
Pool	1	1
Recess	37	37
Stairway	28	28
Water tub/pool	5	5
<i>Total</i>	<i>744</i>	<i>178</i>

Components of ‘Building material’:

▪ building material	-	20	▪ <i>pile</i>	-	40
▪ column	-	5	▪ roof tile	-	20
▪ demolition material	-	20	▪ strata	-	20
▪ <i>heap</i>	-	361	▪ tile	-	61
▪ obsidian fragment	-	3	▪ tile fragment	-	20

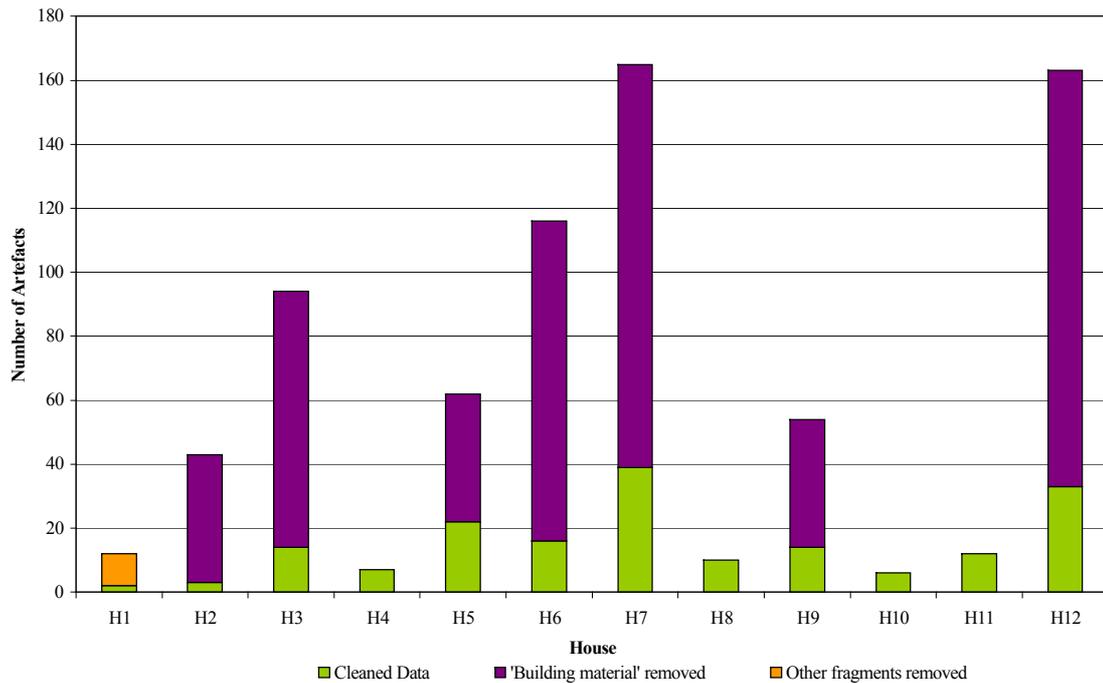


Figure 5.9: Values for 'Buildings and Services' before and after data cleaning

As a result of this data cleaning, initial Correspondence Analysis will include this category as an indication of the contribution it makes to the cross-tabular associations, but in subsequent analyses it will be removed as it primarily reflects architectural composition rather than the consumption of material culture. Although architecture is a consumed item, it is outside the bounds of this study. It may prove beneficial at a later stage to consider the building material category by itself as an inter-house comparison of materials present; in other words, the consumption of building materials for architectural elaboration/renovation.

Finally, it is worth noting upper storeys and the role they will play in this study. It is currently not possible to recreate data that would enable complete reconstruction of this element for each property. As the only variable that is affected by this is the house area, the impact on the outcome of the data analysis and system of interpretation is negligible. One possible way to get round this problem would be to

assume upper storey coverage that was consistent across all of the houses in the sample. For example, the first floor extent is known for *Casa di Julius Polybius*, so the percentage this represents of the base plan could be calculated and then applied as a consistent percentage factor of alteration to the entire sample. However, a potential bias accounted for by a consistent ‘corrective’ treatment of the data is an inconclusive solution that could introduce its own error margins. It has therefore been decided that manipulation of the data in such a way would not be beneficial to an extent that merits further investigation.

5.5 Method

Preliminary investigation of the data comprises overall assemblage comparisons by artefact frequency and assemblage representation by house. This serves to identify any general, broad inter- and intra-assemblage trends, or associations. Where necessary, a correlation coefficient (r) will be calculated using simple linear correlation (Pearson r) to indicate the covariance of two variables, as described in *section 5.1.1* above. The use of the correlation tool can therefore help determine whether one set of data values are associated with another. For instance, are large values in variable x associated with large values in y , or is it that large values in variable x are associated with small values in y , or are both sets unrelated? Tests for statistical significance address the question of the probability that any identified associations are random chance occurrences rather than actual phenomena. It must be remembered though that *statistical* significance is not the same thing as *substantive* (that is the practical, or in this case archaeological) significance (Fletcher and Lock

2005, 12; Shennan 1997, 68). Both forms must be considered when discussing the results from analyses.

Correspondence Analysis will subsequently be applied to cross-tabulate the data to further distinguish potential patterns and systems of associations (this process is detailed in *section 5.2.2* below). Using these outputs will permit the identification and isolation of specific assemblage components that are then subjected to further examination by their constituent parts. Also in this phase of analysis, categories of vessel artefacts will undergo more detailed interrogation. Multiple graphical tools of analysis will be incorporated including scatterplots, biplots, radial graphs, and ternary diagrams.

As already noted, various levels of data inspection will be employed, primarily those of functional category and artefact type. It is predicted that general, and subsequently hopefully more intimate, patterns of consumer behaviour and orientation will be revealed in the clustering of artefact classes. Once the general patterns have been identified, particular categories can be investigated in greater detail and more target-specific questions can be broached. For instance, the categories of various vessel types can be analysed by their material to answer questions such as: is there a high proportion of glass or metal vessels in some of the houses (relative to the remainder of the sample)? If this is the case, what statement can be made about those households?

During this analysis, especially with regard to Correspondence Analysis, only one variable at a time is removed so that the effect at each stage of the analytical cycle can be assessed. Not all of the results from these intermediary stages are presented but they have been carried out. Some of these are included in Appendix C and will be indicated as appropriate.

5.5.1 Ranking Goods

Modern consumption studies have already been discussed in Chapter One as being of value to archaeological investigations into consumer behaviour. Of particular interest here is the work of Fine *et al.* (1992a), in which they examined data from the recent National Readership Surveys in two ways: firstly, they contrasted frequencies of ownership across different sections of the population; and secondly, they ordered, or ranked, the durables by frequency for the population as a whole, and for sub-samples. In addition to this, another study (Fine *et al.* 1992b) applied a method motivated by social choice theory using data from National Readership Surveys for five-yearly intervals between 1975 and 1990; for this, consumption norms for consumer durables are theoretically identified, together with consistency across the population. Goods were ranked in order (accompanied by a measure of confidence) with those at the top of the poll representing standard items, whereas goods lower down in the average level of ownership indicated items consumed by relatively few people. By examining the consumption patterns expressed by the data, the authors attempted to identify varying patterns exhibited by different sections of the population. Although the methods used in these studies are not directly applicable to Roman Pompeii, they do indicate methods of ranking observed patterns. Adapting this concept for use in this investigation will be carried out through ranking the ‘consumer durables’, in other words the artefacts, by their occurrence in the houses in the sample population.

Such an avenue of data interrogation is relevant to this research because it provides a technique for identifying ‘fringe’ and ‘core’ goods within the data set. Identifying such distinctions is an important stage in establishing consumption patterns, as demonstrated by Fincham (2002). The ranked list of goods can then be

subjected to inter-house comparison, as well as the individual observed patterns being compared to the average trends and the overall pattern exhibited by ranking the total population of goods. There is little to be gained from ranking the artefact functional categories, with greatest value coming from the more abundant categories of type. It is not, however, necessary to establish ranked representation of all categories, such as HF (Household Furniture) and BS (Buildings and Services), as this would tell us little. The categories most suitable and valid for this stage of the analysis are CV (Ceramic vessels) and OV (Other vessels). In order to control the data ranking, it will be weighted by the occurrence of artefact categories in the houses. In other words:

$$\frac{\text{(total frequency by type} \times \text{number of houses type occurs in)}}{\text{number of houses in sample population}} = \text{weighted total of artefacts}$$

5.5.2 Correspondence Analysis

“[F]ormal multivariate analyses of this database of Pompeian house contents could potentially produce informative results.”

(Allison 2004b)

Correspondence Analysis is a multivariate statistical technique for creating visual displays of cross-tabulated data, specifically those comprising non-negative frequencies. It is similar to Factor Analysis and Principal Component Analysis but carries several advantages over these methods, such as the fact that Correspondence

Analysis is applied to frequency data, as opposed to interval data, which is required for Factor Analysis. In addition to these benefits, Correspondence Analysis is especially useful for studies involving large amounts of data (StatSoft 2007), such as might be encountered on archaeological sites. The term ‘multivariate’ simply refers to that fact that there are multiple dependent variables; having only one such variable is referred to as ‘univariate’ (Abdi 2003; Baxter 1993). For use in this study, Classical (or Simple) Correspondence Analysis is applied¹¹ and will hereafter be referred to as Correspondence Analysis.

During Allison’s research into household data, Correspondence Analysis was at one stage carried out to “assess for concordance between architectural room type and their contents” (Allison 2004b). She also noted that due to some ‘characteristics’ of the data, such as the variance in quality of artefact recovery and subsequent excavation records, future work using multivariate analysis would require account to be taken of these factors. As discussed in the foregoing examination of the sample population and artefact categorisation, these elements have been addressed in this study and will not create the sizeable biases previously presented.

Correspondence Analysis is a technique that is receiving growing application in the Roman archaeological community, predominantly through the work of Mike Baxter and Hilary Cool (such as Baxter 1991; 1993; Cool and Baxter 1999; 2002; Cool *et al.* 1995), as well as in a more cultural context by other scholars such as Pitts (2005; 2007a; 2007b) who considers identity and social practice by the associations between ceramic vessels. The value of this technique has thus been demonstrated as, more importantly, has its applicability to archaeological assemblages.

¹¹ Computation of Correspondence Analysis was carried out using the statistical programme ‘R’ (R Development Core Team 2007); for use of this program refer to Cool and Baxter (in prep.) as well as Greenacre (2007) and Nenadic and Greenacre (2007).

Correspondence Analysis has not, however, until now been used as a tool for the study of consumer behaviour.

The output of Correspondence Analysis is computed from a two-way table, such as *table 6.1*, referred to as a *contingency table*. The value in this technique is that it displays systems of associations between the variables, which in this study will be those of artefact categories and household assemblages. A biplot is produced from co-ordinate values deriving from the contingency table, comprising information regarding variables such as sites and artefacts. The biplot permits a graphical comparison in low-dimensional space of category associations (or ‘correspondences’) thus indicating which rows and/or columns of the table are similar, or different (Greenacre 2007; Ringrose 1992), and it can be thought of as a spatial map of the data. The distances between category points in a biplot reflect the relationships between the categories and variables, with those having close associations being plotted close to one another. For instance, the correspondence output (also referred to as the ‘solution’) might demonstrate that a particular house has a strong correspondence with a particular artefact category.

In addition to the biplot, there are several statistical measures that result from the analysis, such as *mass* and *inertia*, which will be briefly introduced here. The examination of these concepts relating to the Pompeian household data will be expanded upon during the analysis, so for their direct application refer to Chapter 6.

Correspondence Analysis processes the cross-tabulated data into numerous dimensions (the maximum number being one less than the number of active rows or columns in the table; whichever is smaller). The biplot illustrates the first two dimensions, which are the ones with the strongest relative contribution to the analysis. The dimensions display the *inertia*, which is a measure of the variation in the data (or

the dispersion of row/column points in a spatial plot), with the first dimension representing as much of this as possible and successive dimensions ‘explaining’ less and less. Therefore, after the first dimension, the second displays as much of the remaining inertia as possible, then the third, and so on (SPSS 2005; StatSoft 2007). The *singular value* is analogous to the Pearson Correlation Coefficient (r) and represents the correlation between the row and column values. For each dimension displayed, the square of the singular value is called the *eigenvalue* and represents the inertia, therefore indicating the importance of the dimension (Greenacre 2007; SPSS 2005; StatSoft 2007).

The Correspondence Analysis solution also provides row and column profiles, which display the row and column proportions for each cell based upon the variables’ marginal frequencies; the marginal frequencies being the cumulative total for the variable category. In other words, a column marginal frequency would, for example, refer to the total number of artefacts from a household, whereas a row marginal frequency would refer to the total number of artefacts from a category, such as ceramic vessels, across the data population. These profiles indicate the proportions of row categories in the column categories (and vice versa), forming the basis for computing the distances between the plotted points in the biplot (SPSS 2005; StatSoft 2007).

Mass is a measure of the influence an object has based on its marginal frequency (the total of the values for that variable category). If you imagine all of the frequencies in a two-way table were translated into values where the overall total equalled 1.0, those values would be the mass of the table entries (SPSS 2005; StatSoft 2007). This attribute affects the centroid, which is the weighted mean row or column profile, with points possessing a large mass exerting a strong ‘pull’ on the centroid’s

location. Conversely, a point with a small mass exerts a lesser locational attraction on the centroid, thus only slightly altering its relative location. An example of this might be a dominant category, for instance ceramic vessels, having much more of an affect on the centroid than a weaker category would have. Both the mass and the distance from the origin dictate the contribution that a plotted point will have on the inertia of the dimensions (Greenacre 2007; SPSS 2005; StatSoft 2007). In other words, the measure of the variation in the data is dependent on the influential nature of an object and its location with respect to the origin.

5.5.3 Limitations and Potential Statistical Errors

A statistical factor that needs addressing is that sample size affects measures of significance: when small sample sizes are being dealt with, they will potentially be less representative of populations. This is because such statistical tests make assumptions about the distribution of the deviations from the regression line for the x and y variables relating to normal distribution (for further discussion see StatSoft 2007). It is, however, important to note the difference here between small sample-size and a small number of samples. The household assemblages being used have large counts of data, totalling nearly 8000 objects, thus forming large samples. While thirty houses in the data set would be preferable from some statistical perspectives, it is felt that the chosen judgement sample of twelve houses with the highest quality of data outweighs this component in that having the total thirty houses would introduce greater error margins overall.

Outliers, which are atypical, infrequent observations within samples, could also produce a margin of error into the analyses to be performed by raising questions about the validity of observed correlations. Due to the method in which a regression line is calculated, outliers can have a large influence on the slope of the line and therefore on the value of the correlation coefficient. It is possible to use quantitative methods to exclude outliers, such as through removing values that fall outside the range of ± 2 standard deviations from the mean (StatSoft 2007). This will not be conducted in the following analyses because when such values occur, it appears that they are not outliers but extreme values that could have a profound archaeological significance. Furthermore, through using Correspondence Analysis the influence of outliers is taken into account. In the Correspondence Analysis solutions, each plot point has a mass, and outliers that have very low frequency values will consequently have low mass, which reduces their influence on the output of the analysis. As a result, small categories have a minor impact and can thus be omitted from the analysis without changing the solution in a perceptible manner (Greenacre 2001, 9-10, 17).

Where outliers are still present in the data analysis presented in Chapters Six and Seven, their ability to cloud patterns and skew results has therefore been reduced in two ways: (i) through the systematic cleaning of the data, as discussed in *section 5.4*, and (ii) the computation of Correspondence Analysis. The ability to combat outlier impact is obviously a beneficial characteristic of Correspondence Analysis and this will be demonstrated in the following chapters. In Chapter Six, functional categories are subjected to Correspondence Analysis to determine patterns in the overall character of the assemblages. Chapter Seven specifically focuses on vessel data to investigate consumption orientations.

CHAPTER SIX:

FUNCTIONAL CATEGORY RESULTS

The structure of the following data analysis chapters is arranged in way that will maximise the results of the statistical analyses. To start with, this chapter will present the results of the analysis conducted in the course of investigating the Pompeian assemblages of household goods by functional category. Subsequently, Chapter Seven will continue to examine discernible patterns from the assemblages but will focus on vessel data; this will start with pottery and then consider glass and metal vessels. The final analysis chapter (Chapter Eight) will take a top-down approach and apply theoretical constructs from Chapter One to frame an investigation into materialism, analysing the data categorised according to the theoretical model.

Before interrogating the data population, some basic statistical characteristics are explained, and then the artefact assemblages are explored both in terms of absolute and relative totals. Correspondence Analysis will be performed iteratively on the data, with successive analyses serving to eliminate outlying categories and enable investigation with increasing focus on the most significant and constructive artefact classes and categorisations.

6.1 Analysis by Functional Categories

Discussion starts with the data in both absolute (*figures 6.1 and 6.3*) and relative frequency form (*figure 6.4*) indicating comparative proportional representation of

objects divided into Functional Categories. *Table 6.1* presents all of the household assemblage absolute data after the ‘cleaning process’ discussed in Chapter Five.

The first impression from the table and graphs is one of an irregular occurrence of artefact categories across the sample population, with certain houses (such as House 7, Casa del Menandro, and House 8, Casa del Fabbro) possessing a greater range of objects classed by Functional Category compared to others (such as House 3, Casa di Stallius Eros). Similarly, and not surprisingly, some functional categories of artefacts have greater representation than others. For example, it is immediately apparent that the dominant category is that of HF (household furniture), while those of WC (written communications) and ME (military equipment) have low occurrence totals. The low total for ME is not unexpected in household assemblages but the inclusion of such a category also serves to demonstrate the flexibility of the framework developed in this thesis in terms of its future application to other sources of data; for example, assemblages from garrison settlements.

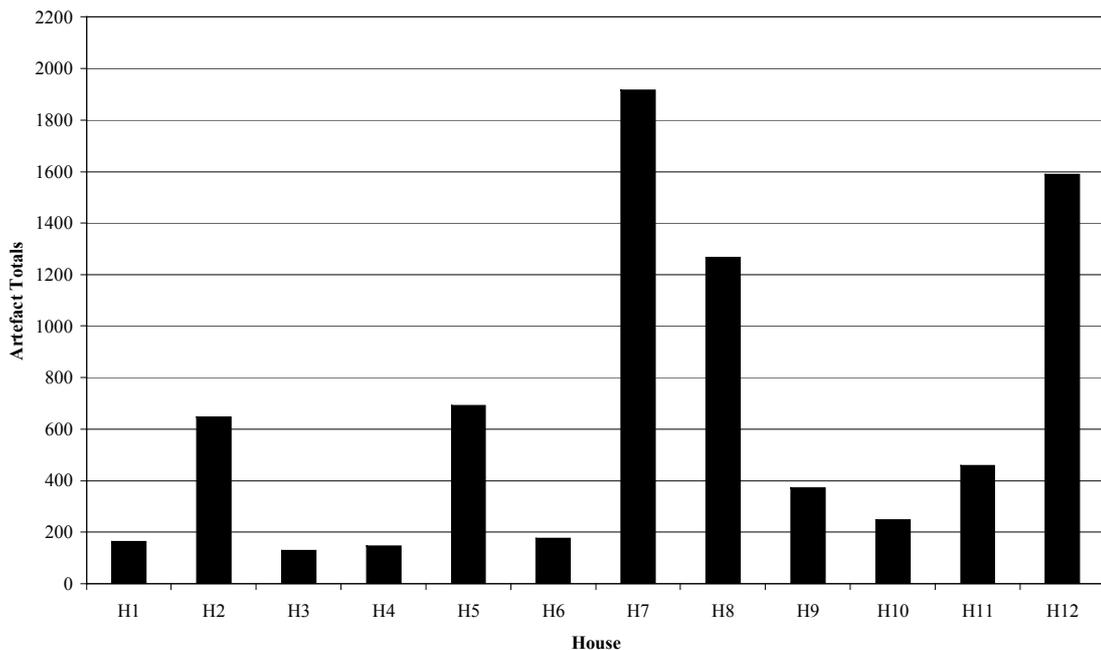


Figure 6.1: Artefact Totals by House

Such general patterns are also observable in *figures 6.3 and 6.4*, through the relative peaks and troughs. By presenting the data in these two figures in the familiar column chart format, however, more detailed patterns are opaque with inter- and intra-category/sample associations having greater ambiguity, and are consequently more difficult to interpret. An innovative aspect of the analysis in this thesis is that data and results are presented in forms that are felt to be more visually intuitive. In doing this, repeated reference will be made to ‘house profiles’, or ‘artefact category profiles’, which are essentially a way to refer to the general character of a group of data in relation to the alternate variable, depicted using radial graphs. To introduce this, *figure 6.2* presents two sets of data discussed in Chapter Five, house area and assemblage totals. The profiles of both variables can be combined on a single chart

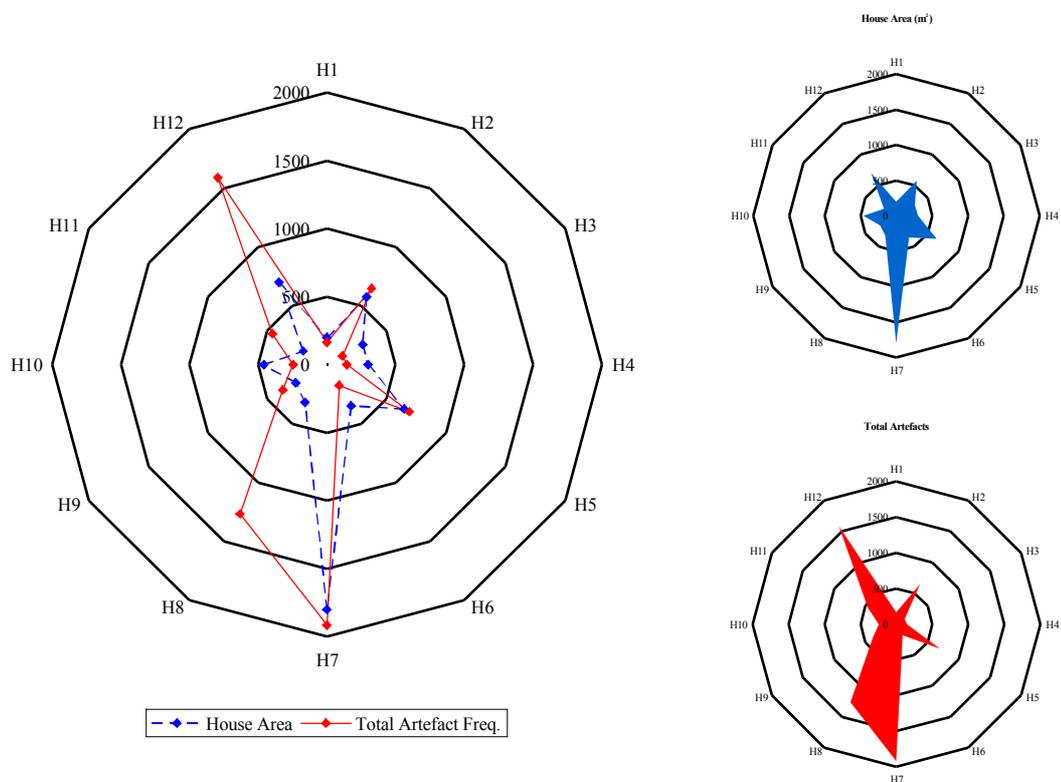


Figure 6.2: Assemblage Profile of Artefacts and House Areas

Table 6.1: House assemblages by Functional Category

(PAD - Objects of personal adornment or dress; TSP - Toilet, surgical, or pharmaceutical instruments; MWT - Objects used in the manufacture or working of textiles; HU - Household utensils & apparatus; HF - Household furniture; RP - Objects used for recreational purposes; WM - Objects employed in weighing and measuring; WC - Objects used for, or associated with, written communications; OT - Objects associated with transport; BS - Buildings and services; T - Tools; FF - Fasteners and fittings; AHA - Objects associated with agriculture, horticulture, and animal husbandry; ME - Military equipment; RBP - Objects associated with religious beliefs and practices; M - Miscellaneous; O - Organics; CV - Ceramic Vessels; OV - Other Vessels; C – Coins).

Functional Category	HOUSE												Total
	<i>House I 6,8-9</i>	<i>Casa dei Quadretti Teatrali</i>	<i>Casa di Stallius Eros</i>	<i>Casa del Sacerdos Amandus</i>	<i>Casa dell'Efebo</i>	<i>House I 7,19</i>	<i>Casa del Menandro</i>	<i>Casa del Fabbro</i>	<i>House I 10,8</i>	<i>Casa degli Amanti</i>	<i>Casa della Venere in Bikini</i>	<i>Casa di Julius Polybius</i>	
	1	2	3	4	5	6	7	8	9	10	11	12	
PAD	-	14	1	9	18	8	123	76	14	1	18	13	295
TSP	-	7	1	-	2	-	14	30	4	1	8	3	70
MWT	-	20	6	5	23	1	19	22	58	4	-	11	169
HU	16	14	3	4	53	5	126	54	22	18	10	60	385
HF	40	375	55	59	294	68	526	397	79	112	189	433	2627
RP	4	10	-	-	4	-	22	10	21	-	53	20	144
WM	-	14	-	2	13	1	11	22	3	11	3	15	95
WC	-	-	-	-	-	-	-	2	-	-	2	-	4
OT	-	-	-	-	-	-	59	11	-	-	1	6	77
BS	2	3	14	7	22	16	39	10	14	6	12	33	178
T	-	9	-	1	12	1	16	41	7	5	3	-	95
FF	12	25	20	1	21	24	118	164	23	12	5	237	662
AHA	-	7	-	-	14	1	36	10	3	4	-	2	77
ME	-	-	-	-	1	-	2	1	-	-	-	-	4
RBP	-	1	1	1	5	1	10	3	-	2	-	2	26
M	19	38	-	2	46	-	65	56	41	9	9	83	368
O	-	5	-	9	7	8	47	7	6	2	5	66	162
CV	63	40	5	32	91	21	212	90	54	33	14	327	982
OV	2	45	8	9	57	4	248	110	6	18	42	203	752
C	6	21	15	4	8	17	222	150	16	9	83	75	626
Total	164	648	129	145	691	176	1915	1266	371	247	457	1589	7798

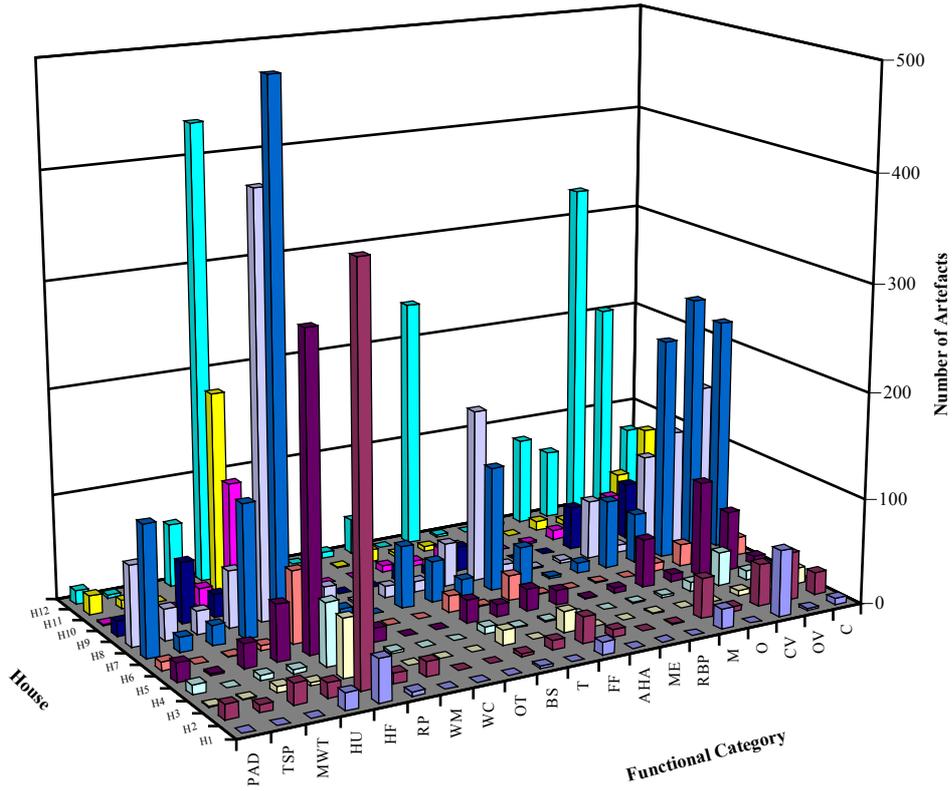


Figure 6.3: House assemblages by Functional Category – absolute values

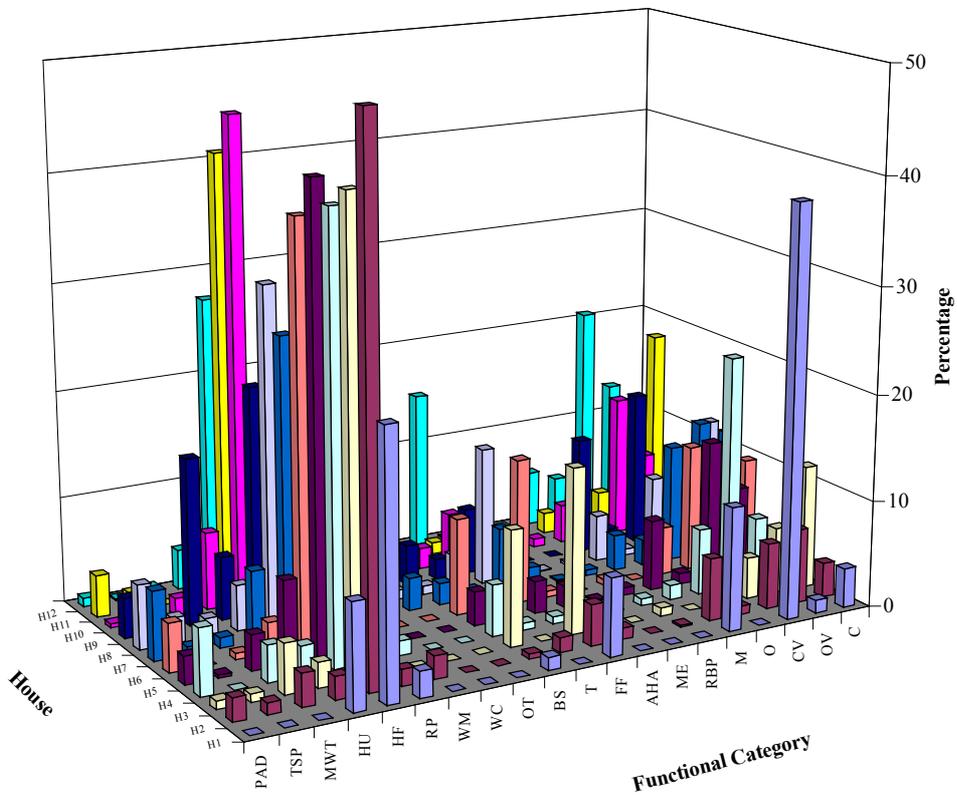


Figure 6.4: House assemblages by Functional Category – proportional values

allowing direct comparison. In doing this, trends are more clearly discernible than they would be in column graph or scatterplot form. The nature of the relationship between the two variables at an individual level becomes apparent in *figure 6.2*, such as House 12 for high values and Houses 6 and 9 for low values. The correspondence is especially noticeable, however, at the peaks of Houses 2, 5 and 7.

6.1.1: 'Non-Commodity' Functional Categories

Functional artefact categories presenting potential sources of distortion were discussed in Chapter Five and will be briefly addressed here. Correspondence Analysis was performed on the data with the categories of O (organics), M (miscellaneous), and BS (buildings and services) being excluded. Only one category was removed at a time, with the analysis being run at each intermediary stage. The final output after the removal of all three categories (*figure 6.5*) demonstrates negligible difference to when they are included. This illustrates the low impact of the functional categories of BS, O and M, justifying their removal for analysis (see *figure AppD.1 to compare*).

6.1.2: Correspondence Analysis of Functional Categories

Figure 6.5 displays the results of the Correspondence Analysis for *table 6.1*, with the relative positions of the variables with respect to one another being the important factor. This statistical technique produces an output consisting of two biplots for the

data variables: one of the row data and one of the column data. In this study, the biplots will be displayed as a single superimposed figure, rather than a pair of figures, as it is a format that allows quick reference. If the limitations of cross-referencing are recognised (see *section 4.3*), the danger of misreading the results is removed.

The numerical conditions of the axes for the biplots (simply referred to as the *x-* and *y- axes*) are not significant for interpreting the graphic. Initial row and column associations can be identified: those houses located close to each other on the biplot possess a stronger correspondence in artefact assemblages than those distantly positioned. Based on this analysis, the ‘character’ of House 10, for instance, bears closer similarity to House 5 than it does to House 11.

At first glance, the pattern most visible on this biplot is a large cluster around the centroid of both artefact category and house plots with outliers in the form of WC (objects used for, or associated with, written communications), OT (objects associated with transport), and MWT (objects used in the manufacture or working of textiles; which influences House 9, also an outlier; this relationship will be discussed below). In addition, House 11 is removed from the upper right cluster of the houses, with House 1 being a less extreme example – and arguably still a component of the main cluster.

The pattern of occurrence of the ME (military equipment) artefact category holds closer resemblance to that of PAD (personal adornment or dress) than to RP (recreational purposes). It is possible to correlate the house plots with those of artefact assemblage, and say that House 7 has associations with artefacts in the top left quadrant of the biplot, namely ME, C, PAD, AHA, and maybe TSP. It is also possible to state that House 7 has a closer correspondence to PAD than to RP (in the lower left

quadrant). It is, however, essential to consider the numerical statistical value of these observed patterns.

Although ME appears to have an association with House 7, caution is needed because the representation of this category is very low: there are only four occurrences, spread between three houses, H5, H7 and H8 (n = 1, 2 and 1, respectively). This is represented in *table 6.2a* through the mass, which for ME is 0.0005 and represents the lowest such value for any of the artefact categories¹². This means that the category has a very small representation in the data population and, consequently, an insignificant influence on the centroid and surrounding data points.

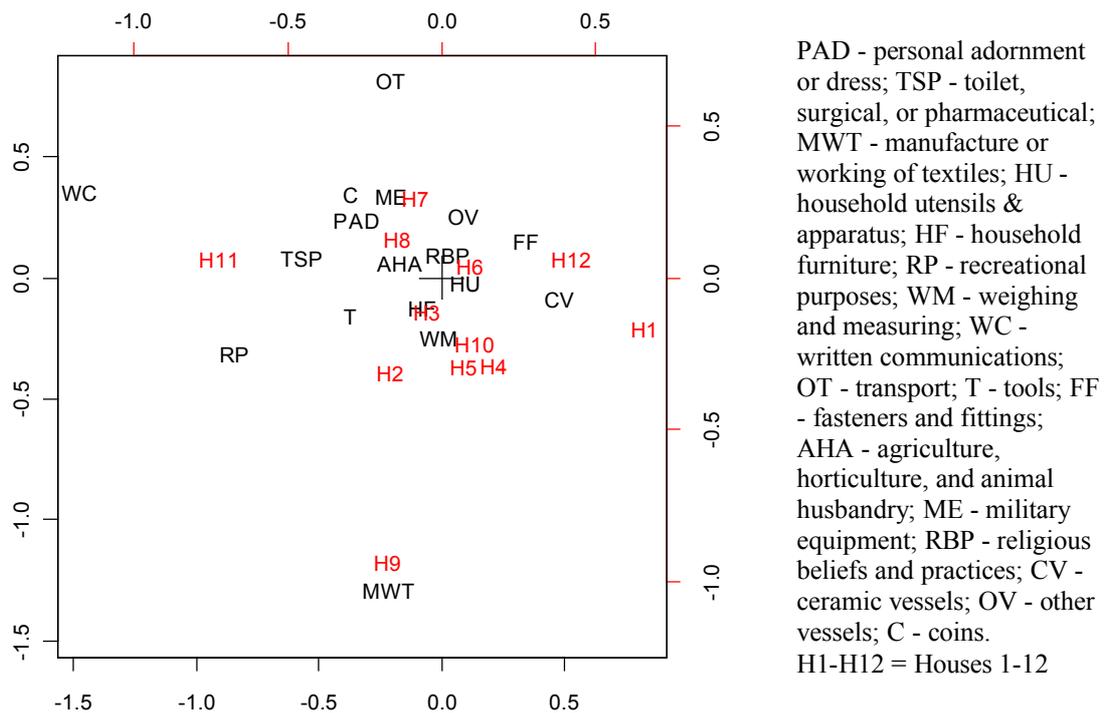


Figure 6.5: Correspondence Analysis biplot for Functional Categories after removal of O (organics), M (miscellaneous), and BS (buildings and services)

¹² When all of the mass values for the artefact categories are added together the total equals 1.0 (a mean mass value for the artefact population would be 0.05).

Table 6.2 (a) and (b): Mass and inertia values for the Functional Categories (a) and Houses (b)

Table 6.2 (a): Mass and inertia values for the Functional Categories (Row values)¹³. 'Mass' denotes the weighting for each variable (each value in the two-way frequency table, table 6.1, is divided by the sum of all entries). 'Inertia' is the mass multiplied by the squared distance to the centroid (Greenacre 1984, 35), thereby representing deviation from expected values.

	PAD	TSP	MWT	HU	HF	RP
Mass	0.04161	0.00987	0.02384	0.05430	0.37052	0.02031
Inertia	0.01550	0.00688	0.05698	0.00868	0.02879	0.04140

	WM	WC	OT	T	FF	AHA
Mass	0.01340	0.00056	0.01086	0.01340	0.09337	0.01086
Inertia	0.00606	0.00259	0.01645	0.01002	0.03168	0.00636

	ME	RBP	CV	OV	C
Mass	0.00056	0.00367	0.13851	0.10607	0.08829
Inertia	0.00062	0.00210	0.04266	0.01346	0.02837

Table 6.2 (b): Mass and inertia values for the Houses (Column values)

	H1	H2	H3	H4	H5	H6
Mass	0.02017	0.08491	0.01622	0.01791	0.08688	0.02144
Inertia	0.01974	0.02809	0.00568	0.00617	0.01891	0.00437

	H7	H8	H9	H10	H11	H12
Mass	0.24880	0.16827	0.04372	0.03244	0.06079	0.19845
Inertia	0.03709	0.02598	0.06094	0.00893	0.05561	0.04709

Its position with respect to House 7 can be explained by this being the strongest association it has; but as it has a low mass it does not have a significant 'pull' on House 5 (lower right quadrant), which has stronger associations elsewhere and therefore remains relatively distant from the ME point. In addition, ME also

¹³ Statistical tables from subsequent Correspondence Analysis outputs can be found in Appendix C.

possesses the smallest inertia value in the population, 0.0006, which, as a measure of variation in the data, is not surprising given that the category's representation is so low. In comparison, CV (ceramic vessels) has a much larger mass (0.126) and inertia (0.035, the third highest given the data range is minimum of 5, maximum of 327, refer to *table 6.1*).

As already mentioned, in terms of artefact categories, WC (written communications) and OT (transport) are most dissociated from any other plot point, either house or artefact. The closest house association for the outlier of WC is House 11. OT is strongly represented in House 7, Casa del Menandro (n = 59), which equates to 76.6 per cent of the category representation across the samples but only 3.08 per cent of the individual assemblage for House 7. For WC the pattern is a little less obvious, as it has a very low representation across the sample population with a total of only 4 occurrences, divided evenly between Houses 8 and 11 (and therefore all three are located in the top left quadrant). Consequently this category has a very small mass (0.001) and inertia (0.003) meaning that it has a negligible impact upon the overall distribution of the data in the biplot. Houses 8 and 11 share an association with WC but this correspondence is heavily diluted by the influences of other categories, therefore illustrating that it is necessary to take the overall character of the accumulated assemblage into account when identifying patterns in the statistical output.

The correlation between House 9 (House I 10, 8) and MWT (manufacture or working of textiles) can be explained by referring to *table 6.1*, which shows that this property has more than twice the number of MWT artefacts (n = 58) than any other household, representing 15.63 per cent of the House 9 assemblage. *Table 6.2a* also shows that because of this data distribution MWT has a larger mass (0.022) than the

other two outlier categories so far discussed (ME and WC). It therefore exerts a stronger pull on the centroid and has a large influence on the House 9 plot point. This relationship between MWT and House 9 is evidently atypical within this data population and will be returned to below.

The positioning of House 1 and its relative correspondence with CV (ceramic vessels) can also partly be explained by looking at *table 6.1*. Although the CV value for House 1 is not particularly high ($n = 63$), especially when compared to those of Houses 7 and 12 ($n = 212$ and 327 , respectively), the relative value of CV is the significant factor, representing 38.42 per cent of the total household assemblage – a proportional figure that significantly exceeds the equivalent value for the other houses in the population (House 7 CV = 11.07 per cent, House 12 CV = 20.58 per cent).

The other houses closely corresponding to CV can also be explained by looking at the tables of data: the strongest associations with this category are demonstrated by Houses 1, 4, 6 and 12, where $n = 63, 32, 21$ and 327 respectively. Aside from House 1, only the value for House 12 ($n = 327$) is immediately noticeable as probably being large enough to have a close correlation to CV. Once again, the proportional values of CV within these houses provide part of the answer; the rest of the explanation lies in the weighting of the remainder of these house assemblages. This can be demonstrated by House 7 (Casa del Menandro), with a CV frequency of 212 but the corresponding proportional value is only 11.07 per cent of the overall house assemblage. Therefore, it is not enough to consider a category by its artefactual count in isolation, as each category forms *part* of the ‘House Profile’ – that is, the house as represented by the overall composition of artefactual elements. It is this aspect that will be explored further through Correspondence Analysis.

6.1.3: House Size and Functional Categories

It is worth considering at this stage the factor of house size. *Figure 6.6* displays the same information as *figure 6.5* but with the houses labelled according to the area of the house (in m²), as opposed to number. It is now possible to identify trends in house size in relation to artefact categories and not just in terms of overall assemblage size. In addition to being labelled by area, the houses are also coloured according to Wallace-Hadrill's partitioning of the houses by size into quartiles (1994, 78-81; see also Allison 2004a; 2004b). Wallace-Hadrill (1994, 79-82) uses the density of rooms (total ground area divided by the number of rooms) to express the size of houses, also taking into account large open areas reflecting a lavish use of space. Quartile 3 (175-345m², with an average room density of 1:29) is described as representing the 'typical' Pompeian house, as well as a 'standard' size for most Greek houses (Wallace-Hadrill 1994, 82). Quartile 4 (350-3000m², with an average room density of 1:45) comprises the largest houses in the city, an attribute frequently taken as being synonymous with also being the richest houses.

In *figure 6.6* it is noticeable that on the periphery of the main cluster of points are the three smallest residences from the sample (200, 200, 265; Houses 1, 11 and 9, respectively). However, although they are separate from the main group, they are also very distant from one another on the biplot, indicating the largest divergence in assemblage character. This is significant because it suggests that the people in the smallest households reveal different consumption habits to those in the larger residences. Beyond this, however, there are no discernable patterns. There is nothing to suggest that corresponding sizes of houses demonstrated corresponding consumption behaviour when examined by functional categories in this manner. It is

noticeable that ‘mundane consumption’ appears to be more uniform and correlate common consumptive actions, as categories such as HU (household utensils) are located very close to the centroid.

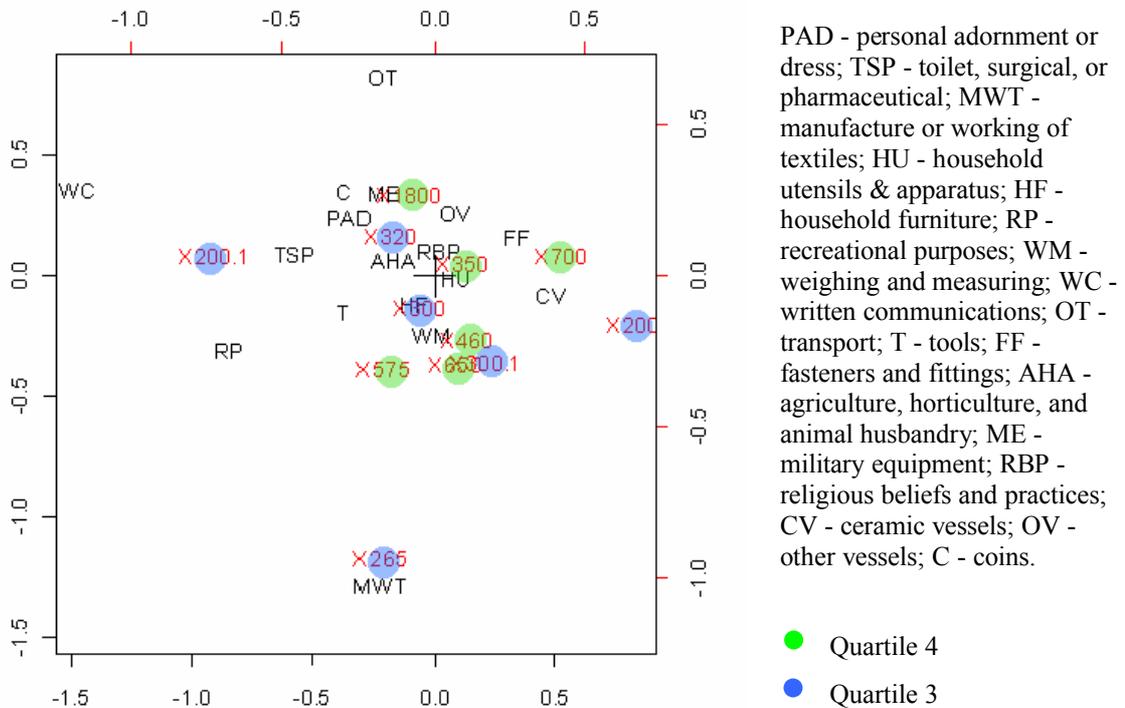


Figure 6.6: Correspondence Analysis biplot for Functional Categories with all data by house areas (in m^2). In the labelling, the prefix ‘X’ is irrelevant, and when there are two cases with the same area value, the notation is 200 and 200.1, for example.

6.2: State of Occupation as a Factor

The relationship observed between House 9 and the MWT category (manufacture or working of textiles) on the biplot can be better explored in relation to the state of occupation in 79 CE. Allison has previously discussed in detail the state of occupation of the houses, stating its importance as a variable (2004a; 2004b; 2007). Here, I examine this factor in relation to its impact upon the representation of

assemblage/consumption profiles. The dominant trend is for a greater number of artefacts to be present in the properties occupied at the time of the 79 CE eruption. This is displayed in *table 6.3* and illustrated in *figure 6.7*, which summarises the state of occupation for the houses in the data set, plotted by area and assemblage size.

The states of occupation/abandonment in relation to the Correspondence Analysis plot with O and M removed are illustrated in *figure 6.8*. The artefact category most expected to be associated with reduced occupation, BS (buildings and services), shows an association in the lower right quadrant with the two houses representing probable abandonment (Houses 3 and 4). It also shares a correspondence to several other houses with reduced occupation, namely Houses 5, 6 and 10, and possibly House 2 in the lower left quadrant, but significantly this category is most dissociated from the properties interpreted as fully occupied (Houses 7, 8, 9 and 11).

There are two hypotheses that can be put forward as interpretations of *figure 6.8* and the relative positions of the houses according to their state of occupation. Firstly, that the horizontal axis represents a division between occupied and abandoned properties, with House 9 being an outlier and excluded from the model. Secondly, that the lower right quadrant represents the lower levels of occupation state, while the remainder of the plot contains the upper two levels of occupation, apart from one or two outliers. This will be examined further below and in *figure 6.9*.

Although the absence of the category of BS can be useful in demonstrating full (or near-full) occupation, there are inherent dangers in assuming abandonment based upon its presence, as it could also indicate a reduced occupation status. Other factors should also be considered, where possible, when interpreting the state of occupation of a property; for example, the condition of the decoration and

Table 6.3: Summary of 79 CE state of occupation for houses in the sample population (following Allison's assignments (2004a; 2004b))

	House	Assemblage Size	State of Occupation (in 79 CE)
Upper 2 Levels of Occupation	H7	<i>Casa del Menandro</i>	Occupied
	H8	<i>Casa del Fabbro</i>	Occupied
	H9	<i>House I 10,8</i>	Occupied (commercial/industrial features installed)
	H11	<i>Casa della Venere in Bikini</i>	Occupied
	H12	<i>Casa di Julius Polybius</i>	Occupied
	H2	<i>Casa dei Quadretti Teatrali</i>	Partially occupied
	H6	<i>House I 7,19</i>	Partially occupied
	H10	<i>Casa degli Amanti</i>	Downgraded occupancy
Lower 2 Levels of Occupation	H1	<i>House I 6,8-9</i>	Largely unoccupied. Storage.
	H5	<i>Casa dell'Efebo</i>	Largely unoccupied. Storage. Owners left (minimal staff remaining?)
	H3	<i>Casa di Stallius Eros</i>	Abandoned
	H4	<i>Casa del Sacerdos Amandus</i>	Probably abandoned

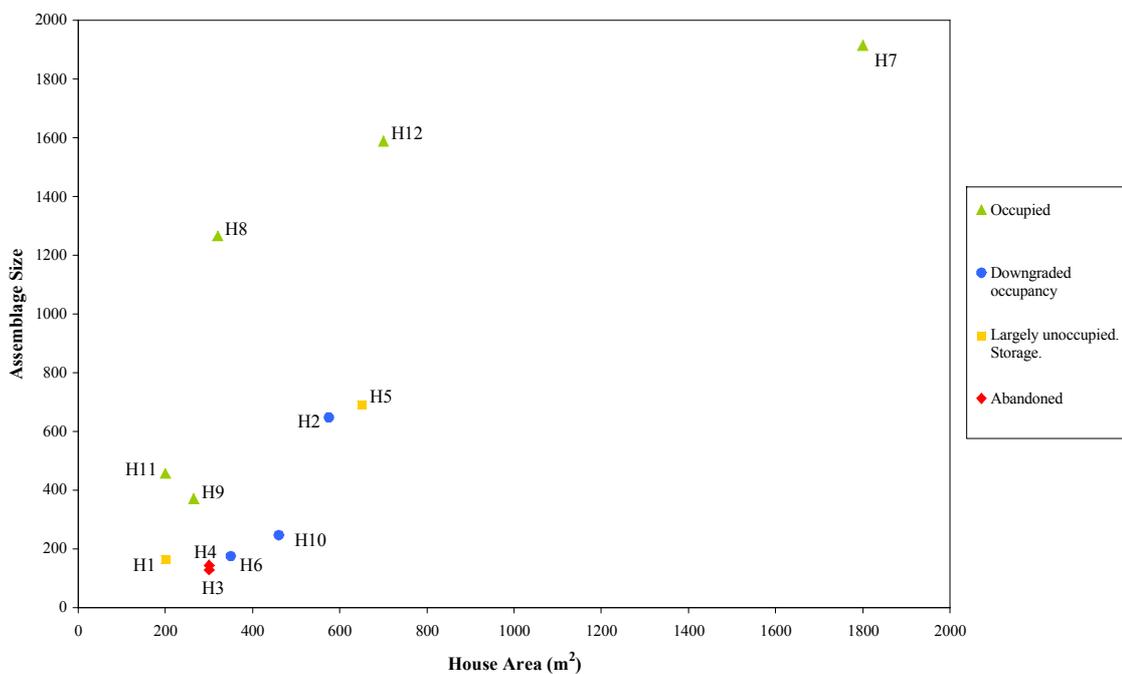


Figure 6.7: State of house occupation in 79 CE, by area and assemblage size

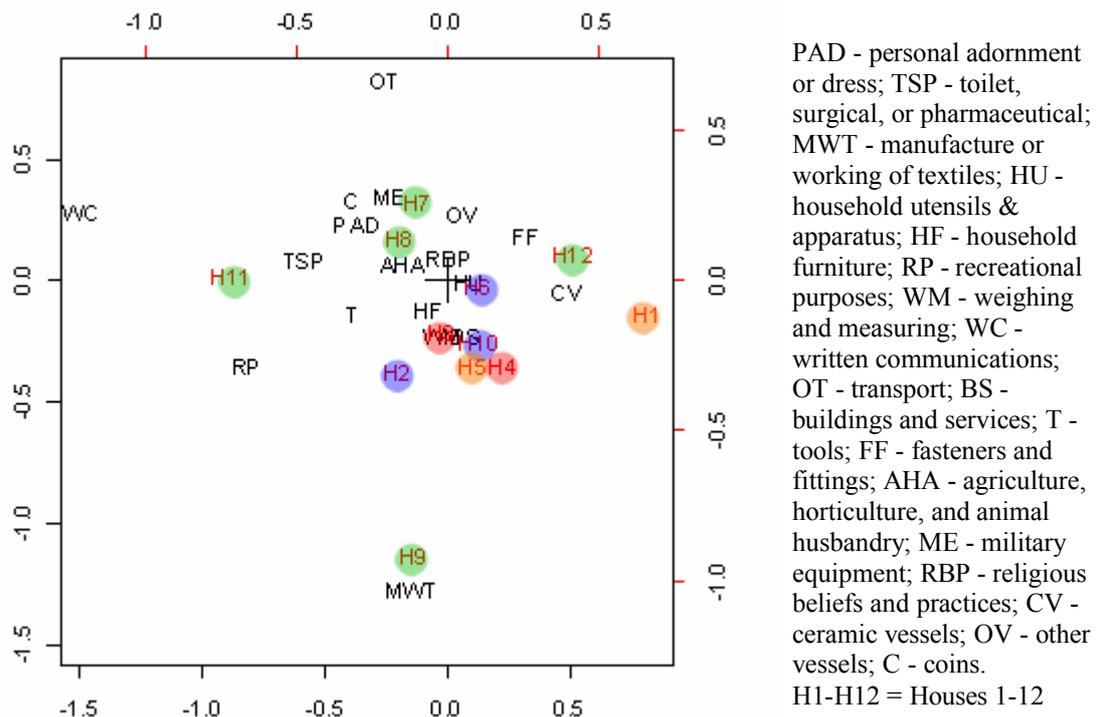


Figure 6.8: Correspondence Analysis biplot for Functional Categories (after removal of O and M) displaying the state of house occupation in 79 CE

architecture and any evidence for non-material culture factors such as evidence for scaffolding that may indicate repair or restoration. A tentative conclusion regarding BS as a signifier of non- or reduced occupation status within a household assemblage is, nonetheless, attractive.

House 9, which has been interpreted as occupied, (*table 6.3* and *figure 6.8*) forms an outlier in terms of general assemblage patterns as well as house size, but it is also well removed from the other ‘occupied’ houses (Houses 7, 8, 11, and 12; refer to *table 6.3*). It would appear that the category of MWT is significantly skewing the positioning of this house. To address the influence of this one category, the Correspondence Analysis was performed again but with MWT omitted from the data table (*figure 6.9*). As a result, House 9 is no longer located on the periphery in the far

south of the plot but has been centralised. By removing MWT from consideration, the central cluster in the biplot also becomes a little more dispersed, reflecting the influence MWT has on other plotted points. This revised analysis in *figure 6.9* can now be considered in terms of the two hypotheses presented above relating to *figure 6.8*: the first hypothesis has been weakened by the removal of MWT, with two fully occupied houses moving below the x-axis. However, the second hypothesis remains intact, thereby suggesting that an analysis in this format could be beneficial in verifying occupation status for households.

These data have been displayed in terms of both state of occupancy (*figure 6.9*) and house area (*figure 6.10*) to re-evaluate the earlier statements regarding potential patterns in the results. According to Allison (2004b), House 9 was occupied at the time of the eruption *but* modifications had been made to facilitate industrial/commercial activities. The significant association between House 9 and artefact category MWT in the context of the state of occupation would, on the face of it, seem to support this: removal of the artefacts associated with textile manufacturing reveals an artefact assemblage similar to Houses 3 and 6, unoccupied and partially occupied, respectively (*figure 6.9*). Therefore, the isolated position of House 9 can, perhaps, be explained because it is an exception to the 'occupied' category. But what do the data comprise? As can be seen from *table 6.4*, over 90 per cent of the objects are represented by weights associated with weaving. The question that consequently arises is one that recurs in archaeological studies of household artefacts (Allison 2004a and Ault 2005, for example): at what stage does the number of loom weights found in a domestic context constitute a shift from household textile manufacture to a commercial activity? There is no scholarly consensus. Allison (2004a, 148) reports that it is not possible to make a distinction between household or wider production

based on archaeological evidence of the type available for House 9. Ault reached similar conclusions in the data from Halieis in which, for the five Greek houses studied in detail, the yield of loom weights was between eight and twenty-five (Ault 2005, 78), with a further house yielding forty-three from a small area, interpreted as a single loom. Ault therefore concludes that the number of looms was dependent on the size of the jobs underway at the time. For House 9, while certainty is impossible, the unusual nature of the household assemblage, with respect to this Pompeii data population, does suggest that something atypical was occurring in relation to normal domestic textile working.

Table 6.4: MWT artefacts (manufacture or working of textiles) for House 9 (House I 10,8)

Artefact	Quantity	Material	Artefact Type
Needle	1	bronze	Needlework/net-making
Awl	1	bone	Needlework/net-making
Awl	2	bone	Needlework/net-making
Weight*	53	lead	Weaving implement
Weight*	1	ceramic	Weaving implement

*probably loom weights

6.2.1: An Additional Outlier

The artefact category of WC (written communications) is another artefact category that consistently appears as an outlier in the Correspondence Analysis outputs. In order to assess the influence of this grouping, it was removed from the data and Correspondence Analysis was performed once more¹⁴. The results for this exhibited little change in the geography of the biplot (*figure AppD.4*), demonstrating that WC has an insignificant impact on the overall plot distribution. This is not surprising considering the small size of the sample and the consequent low mass and inertia values (refer to *table 6.1*).

6.3: Consumption Profiles: Functional Categories

Coins are considered as an integral part of the household assemblages and have therefore been included in the preceding analysis. They do not, however, represent consumed goods but are a tool for navigating the field of consumption and “cannot be denied a place in the commodity chain” (Panagopoulou 2007, 330). As such, they have been excluded from the functional category profiles of primary goods consumed within the households. From these profiles patterns are identifiable and data requiring further investigation can be isolated. *Figures 6.11 and 12* display all twelve houses in these terms and complement the Correspondence Analysis biplots. Whereas the biplots compare the overall characteristics of the assemblages to identify how samples are associated to one another, consumption profiles are a visual extension of the

¹⁴ The category of MWT (manufacture or working of textiles) was returned to the data set prior to analysis, so as to change only one variable at a time and therefore assess the impact of WC (written communications) in comparison to MWT.

representation of categories for the houses that allow an additional relative comparison of composition. In other words, read in the same way as bar charts, they are a form of display that enables a view of component parts with immediate identification of patterns. For an example of an unusual peak, let us consider again House 9 and MWT (manufacture or working of textiles). The large peak for this category in the profile for House 9 represents the strong association noted above. Also noticeable is the relative absence of MWT in the other assemblage profiles.

The category of HF (household furniture) has high peaks throughout the population, so a relatively high mass value would be expected in the numerical statistics for Correspondence Analysis (it is 0.371, the highest of all the categories). This form of graphic is very useful in conjunction with the multivariate statistics because it highlights the large proportional HF component in the assemblages; a pattern that is not necessarily evident in the Correspondence Analysis biplots because HF has a consistent presence and is not 'dominated' by one house.

Another significant pattern is one of constant high proportions of CV (ceramic vessels). Along with the already mentioned HF this creates a characteristic profile, roughly equivalent to the '10:15' position on a clock face; a strong association with OV (other vessels) more closely resembles the '11:15' position, such as for House 11. This consistent theme suggests that it would be most fruitful to isolate these functional categories for subsequent analysis before any others are considered. Subsidiary patterns can also be identified, such as the recurrence of smaller peaks for FF (fastenings and fittings) most noticeable for Houses 6-10.

Consumption profiles by relative values could be misleading, as HF dominates the plots (at least 25 per cent for every house; in half of the population it is in excess of 40 per cent) and direct comparison in this form of category quantification could

potentially be erroneous. The same data, however, can be presented in absolute terms to offer verification of profile character and thus improve confidence levels in interpretations of the results. Furthermore, rigorous examination of the data can help reduce error margins that may be introduced by comparing dissimilar quantifications. For example, the frequency values for HF would be expected to be greater than those for CV because the latter is quantified, as best as possible, by complete vessels, whereas HF is a count of hinges and other such items, rather than the original number of items of furniture. As there is a consistent comparison, however, of *relative* values between the houses and the categories, the impact should be minimal, with error potential reduced further by conducting analysis in more depth for identified components.

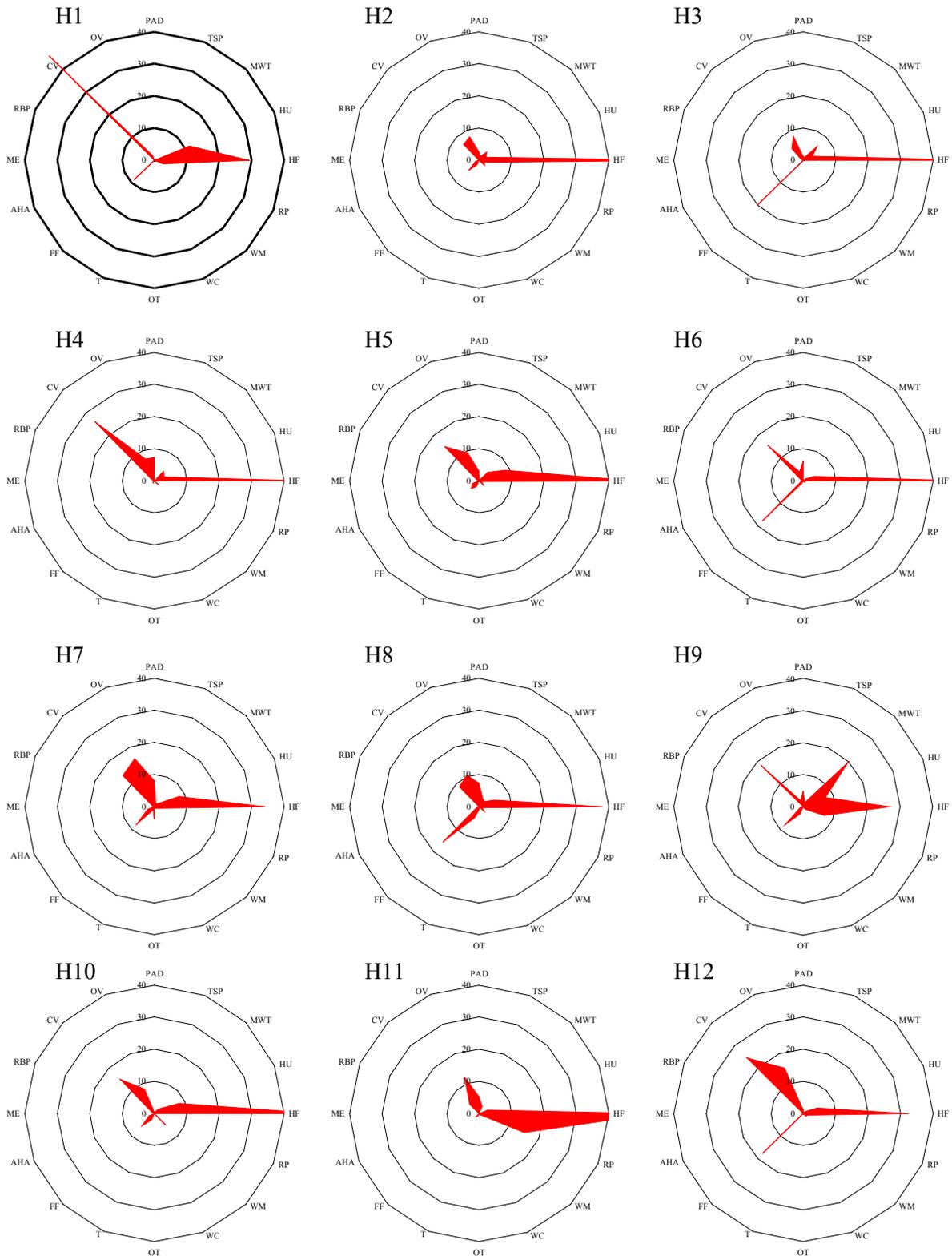


Figure 6.11: Consumption Profiles (by proportional values) – with Coins (C) omitted
 PAD - personal adornment or dress; TSP - toilet, surgical, or pharmaceutical; MWT - manufacture or working of textiles; HU - household utensils & apparatus; HF - household furniture; RP - recreational purposes; WM - weighing & measuring; WC - written communications; OT - transport; T - tools; FF - fasteners & fittings; AHA - agriculture, horticulture, & animal husbandry; ME - military equipment; RBP - religious beliefs & practices; CV - ceramic vessels; OV - other vessels.
 H1-H12 = Houses 1-12

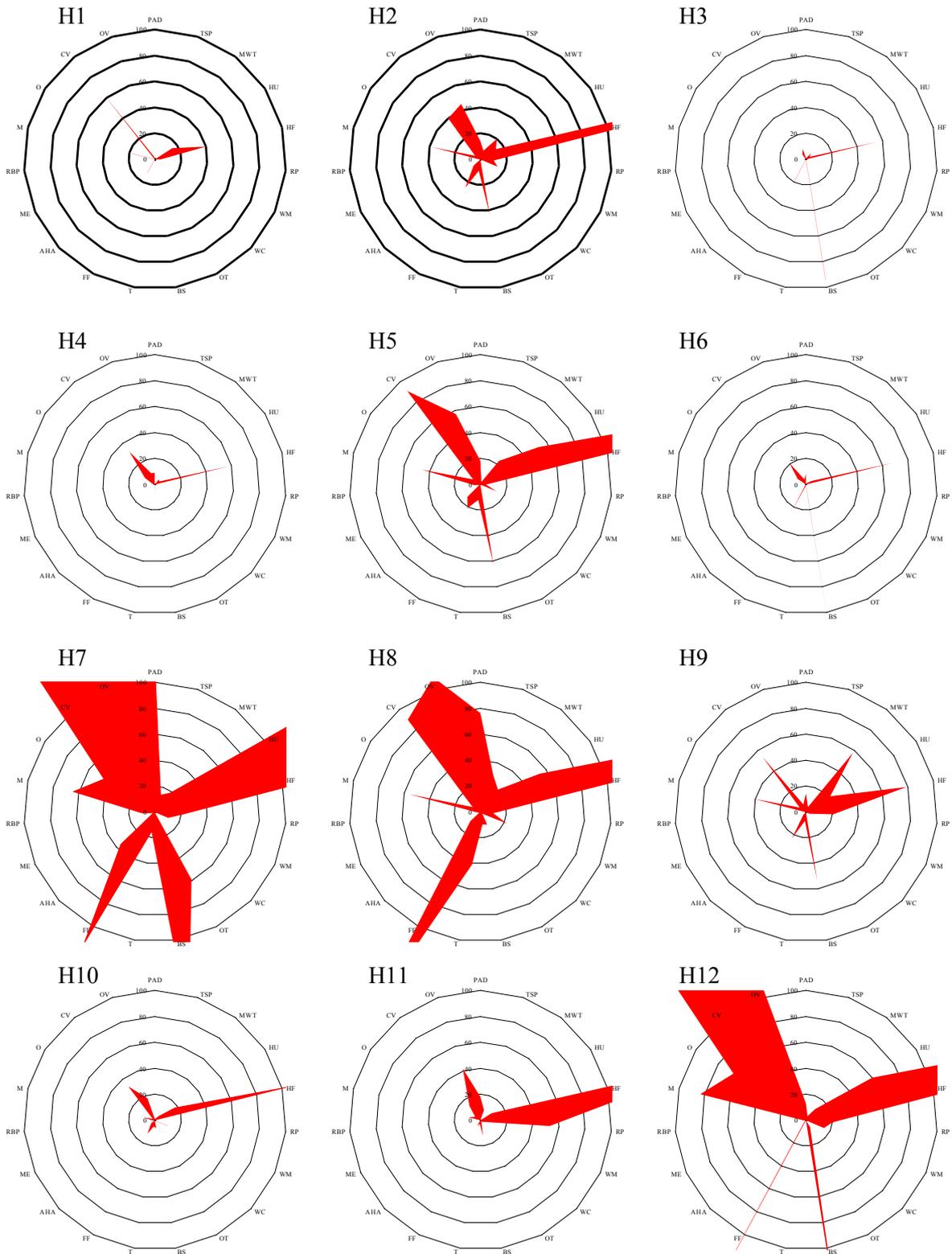


Figure 6.12: Consumption Profiles (by absolute values) – with Coins (C) omitted
 PAD - personal adornment or dress; TSP - toilet, surgical, or pharmaceutical; MWT - manufacture or working of textiles; HU - household utensils & apparatus; HF - household furniture; RP - recreational purposes; WM - weighing & measuring; WC - written communications; OT - transport; T - tools; FF - fasteners & fittings; AHA - agriculture, horticulture, & animal husbandry; ME - military equipment; RBP - religious beliefs & practices; CV - ceramic vessels; OV - other vessels.
 H1-H12 = Houses 1-12

6.4: Coins

Numismatists consider any grouping of three or more coins in a single location as a 'hoard'. The data for this research, however, were recorded in a way that counted individual coins, with large concentrations falling into the category of 'part of coin hoard' but quantified in terms of total number of coins present. This format will be followed here but the representation according to the number of hoards is included in *table 6.5* for reference.

In removing the coinage (C) from the data, the general effect is not as great as one might expect (*figure 6.13*). The points with low masses are influenced to the largest extent, such as MWT, RP, and WC, which have their outlying positions emphasised. This is because having low masses means they are susceptible to the movement of plot points with greater weighting. Prior to removal, C had a relatively large mass of 0.088, enough to affect the character of many of the assemblages (and relationships between artefact categories). Although no clear associations are visible, there are tantalising suggestions of relationships, such as between C and OV.

With regard to the houses, 3, 4 and 5 have all moved into the lower left quadrant, with House 2 moving to the upper left quadrant. This revised biplot now muddies the pattern that was discussed in the previous section regarding state of occupation and distribution of houses within the output; the suggested hypothesis for the lower right quadrant verifying low occupation status is now invalidated with the removal of the coins (and the hypothesis positing the x-axis as a dividing boundary remains a false interpretation).

The greatest significance from removing the coins from the analysis, however, is to be had from investigating the coin component isolated from the 'commodities', as

opposed to the commodities with the coins removed. In doing so, the coins are not dismissed from consideration but are taken into account alongside the commodities. Once patterns within the coin data have been investigated, the discussion can be turned to considering these items in their functional sense: as items for navigating consumption. In other words, what can be said of this facet of the data population in terms of purchasing power?

It would be expected that high occurrences of coins would indicate occupancy, as would other such portable and valuable items (jewellery, for example) that are present in this data set. *Figure 6.8* illustrates the close affinity between full occupancy and the coins category. This pattern not only persists in *figure 6.9*, when the category of MWT was removed, but is strengthened with the C (coins) and PAD (personal adornment and dress) points overlapping and moving further up the *y-axis* and increasing their correspondence with Houses 7 and 8. It should also be noted that on this same basis, coins (as part of the total assemblage) do not appear to have any association with the size of the house, though some patterns could be obscured by other assemblage constituents. If coin presence is considered on its own the picture appears a little clearer. *Figure 6.14* displays the relationship between coins and coin hoards for each assemblage, indicating that there is a positive correlation: a high occurrence of coins corresponds to a larger number of coin hoards, although this is a spurious correlation (this is not significant at the $p=0.05$ level). The r^2 value is low, however, indicating a high variation from the trendline ($r^2 = 0.19$).

Table 6.5: Occurrence of coins in the assemblages

House	Coins	Coin Hoard	Total	Number of Coin Hoards
1	6	0	6	0
2	14	7	21	1
3	15	0	15	0
4	4	0	4	0
5	8	0	8	0
6	5	12	17	3
7	50	172	222	11
8	18	132	150	13
9	16	0	16	0
10	9	0	9	0
11	8	75	83	15
12	14	61	75	5
Total	167	459	626	48

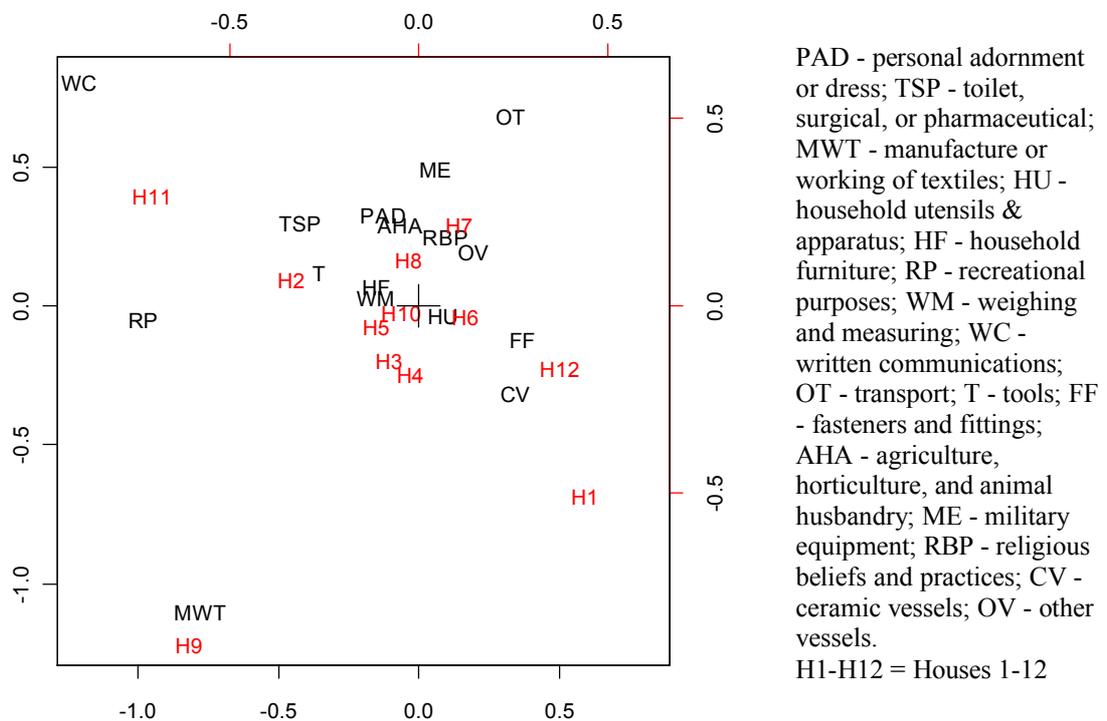


Figure 6.13: Correspondence Analysis plot of functional categories with C (Coins) removed.

Figure 6.15 illustrates these samples in relation to house area and suggests a strong positive correlation for the number of single coins but a very weak positive correlation for the number of coin hoards to size of house (respective r^2 values are: 0.77 (significant at $p=0.01$) and 0.08 (not significant at $p=0.05$)). However, before we conclude that the size of the house is very much a factor in determining the number of coins in an assemblage, there is an important caveat. It is clear that in *figure 6.15* the house with the largest area (1800m²; House 7) has a much greater number of coins than the other samples, and consequently has a strong effect on the projected trend line. If this one assemblage is removed from the analysis a different pattern is revealed: this time the r^2 value for coins is dramatically reduced to 0.03, and that for coin hoards becomes 0.05, but with the trendline in a negative orientation. It is therefore possible that House 7 represents an outlier and skews the real pattern (or lack of one). This is substantiated by the fact that at $p=0.05$ the relationship is not significant once the outlier is removed, and therefore two other factors have to be considered. Firstly, it is, perhaps, not so surprising that the assemblage for Casa del Menandro (House 7) contained more coins than the other properties when the recovery strategy in the excavations of this property is taken into account: as it was the subject of more recent excavations, methods were thorough with greater attention to all classes of artefacts (Ling 1997). Secondly, this house has been interpreted as having been fully occupied at the time of the 79 CE eruption. It might be expected that houses in a state of abandonment would have fewer coins because such items had been removed when the last residents fled the city; however, part of the variance could also be a result of some occupants fleeing with portable wealth, while others did not. *Figure 6.16* displays the occurrence of coins and coin hoards in each assemblage. The houses that have been interpreted as fully occupied are indicated and interestingly

represent those assemblages with the greater amount of coinage, as well as a greater number of hoards (*table 6.5*).

Overall, as suggested by the Correspondence Analysis results above, the size of the house does not appear to be a causal factor in the number of coins present. The status of occupation is, however, a factor that does demonstrate an influence on the presence of coins.

A further way to investigate the portability factor of coins is to consider locational associations; in other words, were the coins recovered in association with human remains, potentially indicating failed attempts at removal from the premises, or were they recovered from within furniture, indicating storage? *Table 6.6* and *figure 6.17* display the divisions of recovery location. Those coins with no recorded association during recovery are considered as generally from within the house and form the category of ‘other’.

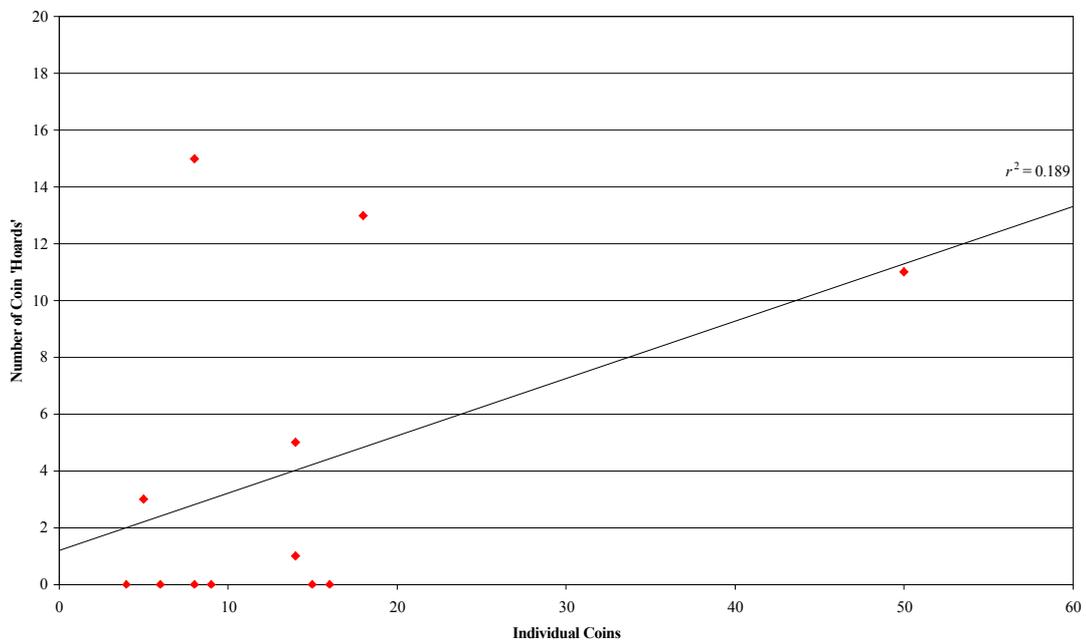


Figure 6.14: Comparison of occurrence of coins and coin hoards

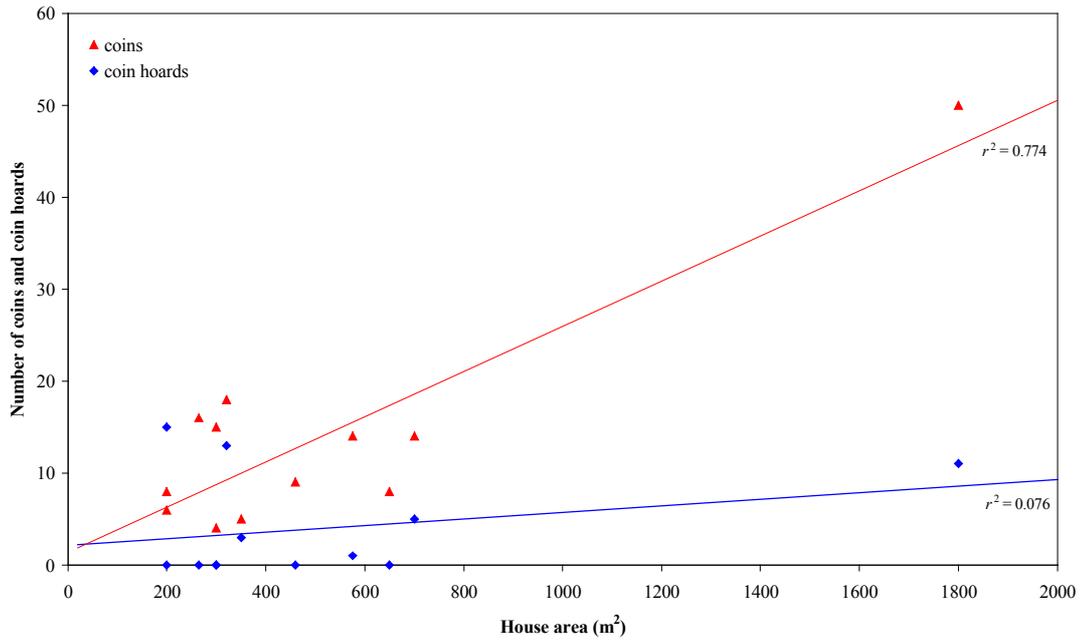


Figure 6.15: Occurrence of coins and coin hoards in relation to house size

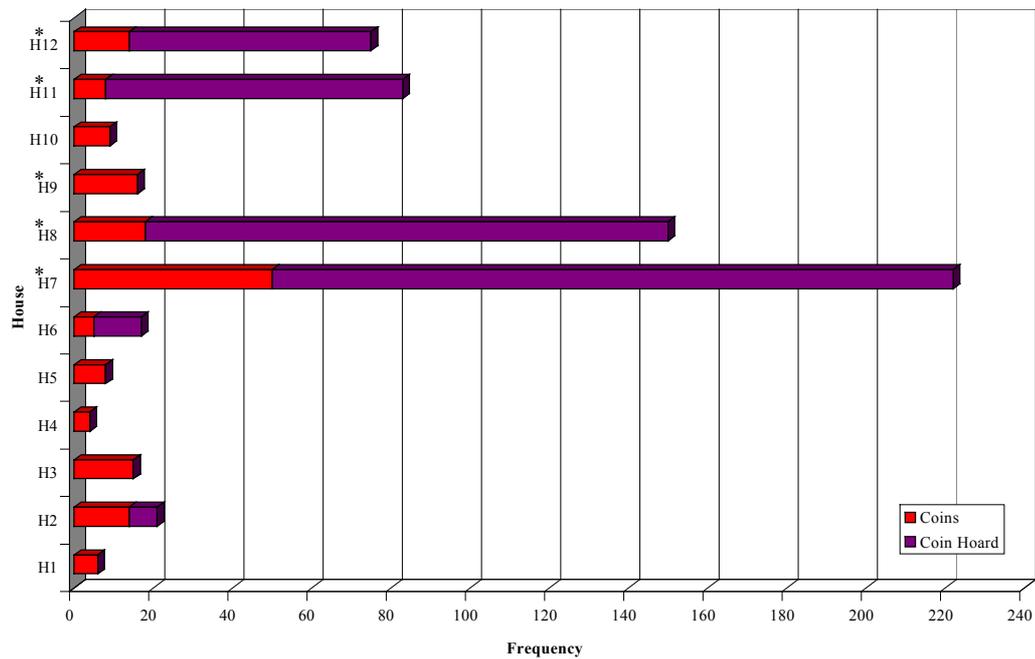


Figure 6.16: Coin occurrence in assemblages, total count (* indicates houses interpreted as fully occupied in 79 CE.)

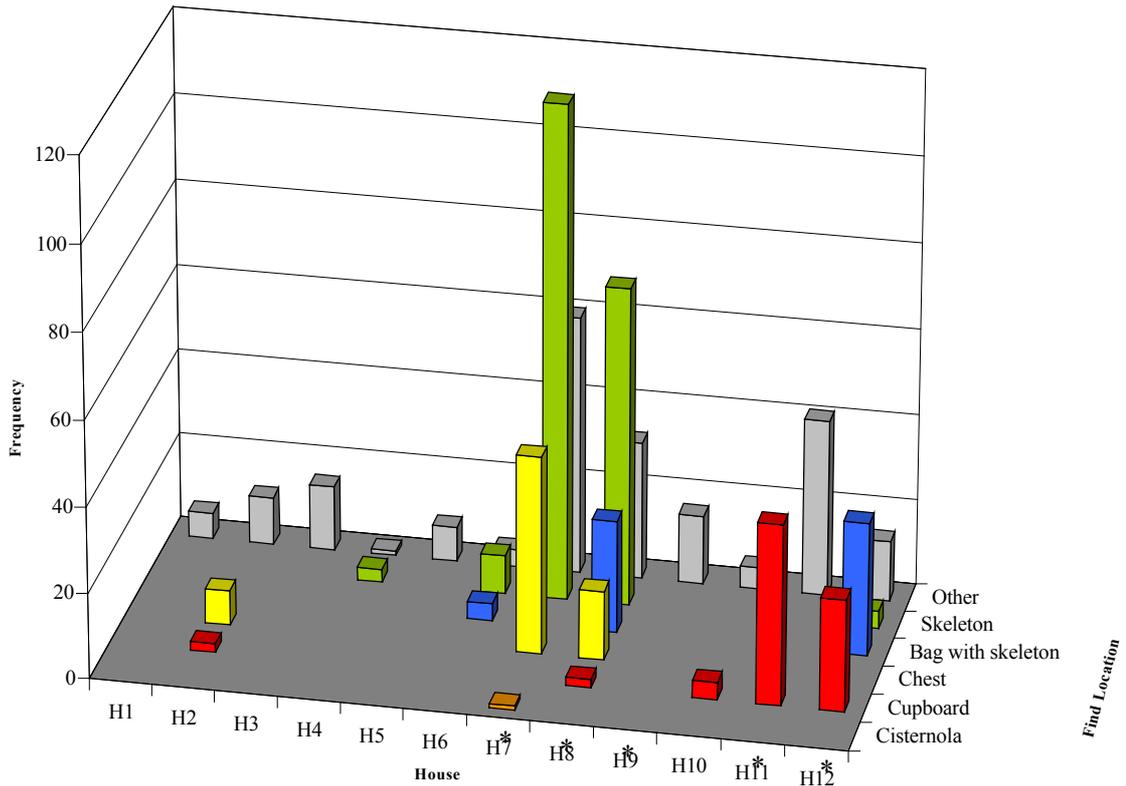


Figure 6.17: Find locations for coins (* indicates houses interpreted as fully occupied in 79 CE.)

Table 6.6: Locational and storage/hoarding associations with coins

House	<u>Locational Association of Coins</u>						Total
	Cisternola	Cupboard	Chest	Bag with skeleton	Skeleton	Other*	
H1						6	6
H2			2	8		11	21
H3						15	15
H4					3	1	4
H5						8	8
H6				4	9	4	17
<i>H7</i>	<i>1</i>		<i>46</i>		<i>115</i>	<i>60</i>	<i>222</i>
<i>H8</i>			<i>2</i>	<i>16</i>	<i>26</i>	<i>74</i>	<i>150</i>
<i>H9</i>						<i>16</i>	<i>16</i>
H10			4			5	9
<i>H11</i>			<i>42</i>			<i>41</i>	<i>83</i>
<i>H12</i>			<i>26</i>		<i>31</i>	<i>4</i>	<i>75</i>
Total	1	76	70	61	205	213	626

Italicised entries indicate houses interpreted as fully occupied in 79 CE

* Found generally within house

It is immediately apparent that not only do the highest numbers of coins come from occupied houses, but these houses are the ones from which a substantial number were recovered associated with furniture (23 per cent, n = 146). When it is considered that House 2 was partially occupied, the upper two levels of occupation status represent 100 per cent of the coins found within furniture. Additionally, the portability of this category of artefact is reinforced when the proportion of coins found directly associated with skeletons is considered: 42.5 per cent (n = 266), indicating the significance of this factor in explaining the lack of coins in some assemblages, especially those interpreted as abandoned, or partially abandoned. With portable material culture such as coins it is always possible, however, that occupants removed such items when they left resulting in lower frequency representation. Although this factor cannot be quantifiably accounted for, it can be acknowledged in data discussion, allowing opportunity for alternative interpretation subject to improved data.

When the data are tabulated in this way, House 11 yields a pattern that suggests the residents left the property without attempting to retrieve stored/hoarded coins, as approximately 50 per cent of the items were recovered from cupboards and none were associated with skeletal remains. An alternative interpretation is that the residents could only carry a finite amount during their escape and that they took the most valuable items, such as gold coins, consequently leaving the less valuable bronze coins behind. To address this, coinage from the houses is displayed according to material in *figure 6.18*.

The vast majority of silver and gold coins came from houses that have been interpreted as fully occupied at the time of the eruption. When it is considered that Houses 2 and 10 fall into the category of reduced occupation, it is evident that all of

the silver and gold coins were recovered from properties within the top two levels of occupation status. The case for House 11 having been abandoned without recovery of stored coinage is stronger when studied in these terms. Furthermore, it is striking how there is a similarity between the character of the coin assemblages for the occupied houses (indicated in *figure 6.18*), and not just in terms of material: all of the coin hoards are from these houses (also refer to *table 6.5*).

When a profile of assemblages by coin material is created (*figure 6.19*) the pattern of coinage material and state of occupation is once again reflected. The majority of the houses in the top two levels of occupation are located outside of the bronze 100 per cent corner (the exceptions being House 9, fully occupied, and House 6, partially occupied). All of the lower two occupation status properties

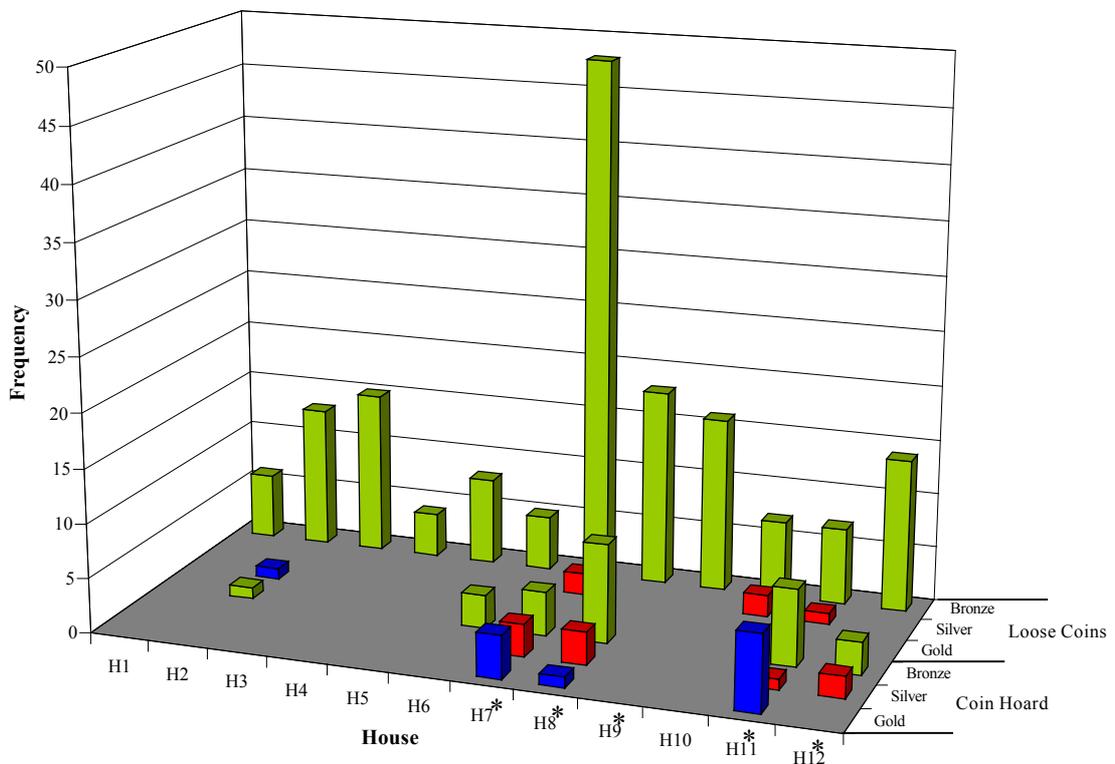


Figure 6.18: Coins and coin hoards by material (indicates houses interpreted as fully occupied in 79 CE.)*

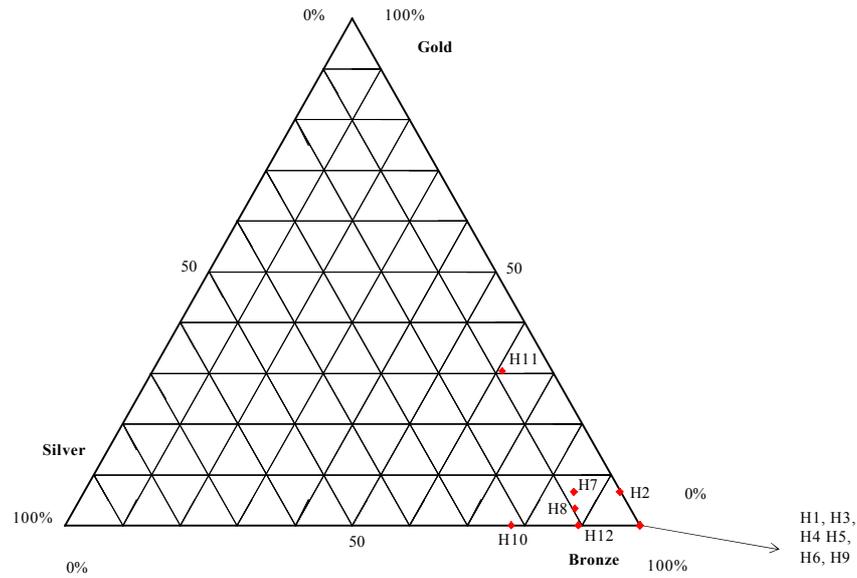


Figure 6.19: Profile of coins by material

possess only bronze coins. Therefore, this data suggests that gold and silver coinage, as well as coin hoards, is indicative of largely occupied houses at the time of the 79 CE eruption. There are always going to be exceptions to such situations, such as Houses 6 and 9, which might reflect the fact that the more valuable portable items were removed by the fleeing occupants.

These profiles of coin material concur with Duncan-Jones who states (based on a sample of 66 hoards) that private possession of coinage in Pompeii was typically in two or three metals (1994, 69). This supports the assertion that the caches represented here are not savings- but circulation hoards, as the former is often represented by single types of larger denominations (Duncan-Jones 1994, 67-70). Fifty-two (82 per cent) had a mixture of at least two metals, with gold and silver in 24 per cent, silver and bronze in 26 per cent, and gold, silver, and bronze in 32 per cent of cases (Breglia 1950; Duncan-Jones 1994; for further discussion of coinage from the

Vesuvian cities refer to Andreau 2008 and Canessa 1909). It is not unusual for coin caches found with human remains elsewhere in the ancient world to be of mixed denomination, as this was almost always representative of money in circulation.

6.4.1: Purchasing Power

As has previously been discussed by scholars such as Duncan-Jones (1994), coin hoards can be seen as cross-sections of private coin ownership and can be categorised as ‘circulation-’ or ‘savings’ hoards. The caches of coins in my population sample are, like the majority of cases elsewhere in the Roman Empire, representative of circulation hoards because they do not fulfil the parameters for being those of savings (cf. Duncan-Jones 1994, 67; Reece 1979, 61). Therefore, as objects for negotiating consumption practices it is important to consider the purchasing power that is represented. To do this, the coinage in these houses must be translated into terms of face-value, where possible. Although there is a shortage of necessary information for many items in the sample population, especially indication of denominations present, it is possible to initially take two examples of coin hoards from furniture to examine this facet more closely. *Tables 6.7* and *6.8* summarise the monetary contents of a chest from House 7 (Casa del Menandro) and of a cupboard from House 11 (Casa della Venere in Bikini). If the face-values of the silver and gold coins are totalled, assuming that all of the former are *denarii* and the latter *aurei*, they can be converted

into *sestercii*¹⁵ (HS) or asses and their purchasing power can be ascertained using wheat equivalent values.

Following Hopkins' calculations (2002 [1995], 198-99) of a minimum subsistence requirement of 250kg wheat equivalent per person per year and farm gate prices of 3 *sestertii*¹⁶ per *modius*¹⁷ of wheat, it can be ascertained that the purchasing power of these two coin hoard examples are as follows: HS 756 in the cupboard from House 11 would be 6.6 years' worth of wheat equivalent for one person, and HS 1432 in the chest from House 7 would be 12.5 years' worth of wheat equivalent for one person.

Considering coins with skeletons as part of the household assemblages can be a little tenuous, as the remains could represent individuals other than the actual occupants, such as looters or passers-by on the street. Skeleton #8 from House 4 (associated with three 'medium-sized' Domitian coins) is an example of this having been recorded as found 7m - 9.5m from the entrance to the property (Allison 2004b). Such data, however, are not meaningless. For example, statements can still be made about the value of coins being carried by a person, whether or not they themselves were the occupants of the houses, they were still consumers on some level. As such, *table 6.9* considers three skeletons from three different houses that were found with coinage. The examples being used are ones that have sufficient information to calculate purchasing power.

The coinage associated with skeleton #1 from House 7 had a face-value of HS 560, giving a wheat equivalent of 4.9 years for one person. This is potentially

¹⁵ 1 gold *aureus* = 25 silver *denarii*. 1 *denarius* = 16 copper *asses*. 1 orichalum *sestertius* = 4 *asses* (Reece 1979, 35; Sear 1970, 11; Sutherland 1987, xiii).

¹⁶ Duncan-Jones (1982, 50-51) calculates that HS 4 per *modius* "may be representative of normal conditions in Italy" but has since been amended after renewed interpretation of the *artaba:modius ratio* (Hopkins 2002 [1995], n13, 199). Therefore Hopkins' figure of HS 3 is used here.

¹⁷ 1 *modius* = 6.55kg. Therefore, it cost HS 450 per tonne of wheat (Hopkins 2002 [1995], 198-199).

indicative of an individual removing the highest denominations from the house first – whether primary- or secondary ownership (theft, for example) is reflected. The coinage with skeleton #2 from House 12 had a face-value of HS 92, giving a wheat equivalent of 0.8 years for one person. Skeleton #1 from House 8 yielded a cache with a face-value of HS 104 for the silver coins, giving a wheat equivalent for one person of 0.9 years. As 48 of the coins in this example (64.9 per cent by number, *not* value) were of bronze and without information as to denominations they cannot be securely attached to this calculation. As a result, the purchasing power of this cache has been undervalued by up to a third (this maximum undervaluation assumes that all the coins were *sestertii*, which is unlikely considering the records indicate a mixture of ‘large’ and ‘medium-sized’ coins). It is important to note that these examples are almost certainly not representative of ‘everyday’ coinage that was carried around but of retrieved valuables. Andreato (2008, 211) states that the Herculaneum ‘fugitives’ found on the shore-side were more likely to have such items: one or two bronze/silver coins and a few pieces of jewellery (also see Rocco 2003, 60-62).

Table 6.7: Summary of monetary contents of a chest from House 7

HOUSE 7				
Chest				
Bronze	Silver	Gold	Total value in <i>sestercii</i>	Total value in <i>asses</i>
0	33	13	1432	5728

Material	Number of Coins	Notes
Silver	25	<i>denarius</i> . Republican
	8	<i>denarius</i> . Imperial
Gold	5	Nero
	8	Vespasian

Table 6.8: Summary of monetary contents of a cupboard from House 11

HOUSE 11 Cupboard				
Bronze	Silver	Gold	Total value* in <i>sestercii</i>	Total value* in <i>asses</i>
21	14	7	756	3024

Material	Number of Coins	Notes
Bronze	6	Nero and Claudius, large.
	2	Vespasian, large.
	1	Galba, large.
	2	<i>as</i> , Republican.
	6	Claudius, medium-sized.
	4	Illegible, medium-sized.
Silver	14	
Gold	1	Vespasian. weight 7.2g
	1	Vespasian 'COS VIII'. weight 7.2g
	1	Possibly reads: Vespasian 'COS VIII'. weight 7.2g
	1	Nero. weight 7.2g
	1	Nero. weight 7.2g
	1	Nero. weight 7.2g
	1	Nero. weight 7.2g

* Totals exclude bronze coins as there is no indication of their denomination. brass is not differentiated from bronze in the excavation records. This difference was important to the Romans as brass (or orichalcum) was considered, by weight, to be worth twice the value of bronze (Harl 1996, 56-57).

Figure 6.20 displays the face-value totals for each coin component of the household assemblages. By considering just the gold and silver coins, the purchasing power is underestimated. Therefore, if the (improbable) assumption is made that each bronze coin is a *sestertius*, the *maximum* purchasing power for each house can be estimated, as indicated on the graph. With the bronze coinage taken into account, the face-value totals are, in all cases, increased by less than 1 year's worth wheat equivalent (House 8 has the largest value increase at 0.93). The mean purchasing power of the population sample via the bronze coinage is a lowly 0.27 years' wheat equivalent,

which increases to a value of 0.52 years when just the fully occupied houses are considered.

Obviously, this does not represent the full purchasing power of the household during the phases of occupation, as other commodities would also have to be taken into account, such as silverware and some bronze items. For example, Andraeu (2008, 215) refers to the house of [Marcus] Epidius Primus (I.viii.14), as being ‘normal’ yielding “nine silver vessels, some denarii, and some sestertii”. The distinction between coinage and valuable objects is thus an important one, especially if it is acknowledged that coin hoards are not a reflection of the reality of everyday life in terms of what we would refer to as disposable income (see Andraeu 2008; *contra* Breglia 1950).

It is important to emphasise purchasing power when thinking about coinage, as the size of a hoard is (usually) not the significant factor; rather, it is the material, and consequently face-value, that dictates economic influence (compare *figures 6.19* and *6.20*). For example, although a cache of 400 ‘coins’ may seem a significantly large sum considered in these numerical terms, if it comprised 400 brass *sestertii* it amounts to a value that can be reduced down to just four gold *aurei*. Furthermore, when put in the context of known prices for commodities, this is just 3.5 years’ wheat equivalent for one person at the minimum subsistence level. Alternatively, this represents just over half of the amount paid to a legionary in the early first century CE, which equated to approximately HS 900 per year or the equivalent of 10 *asses* (HS 2.5) per day (Tacitus, *Ann.* 1.17.4; Scheidel n.d., 93). Of course, the pay structure was more complicated than this, as a soldier would have had roughly half of this amount deducted for living costs and equipment, not to mention he would have been fortunate to receive the remainder of the ‘wage’ as money in hand.

Table 6.9: Summary of coinage associated with three skeletons. (a) artefact details; (b) hoard summary.

(a)

House	Skeleton	Material	Number of Coins	Notes
7	#1	silver	90	Republican. Domitian, Vespasian. Location: skeleton's legs.
7	#1	gold	1	Vespasian or Titus. Location: skeleton's legs.
7	#1	gold	1	Nero. Location: skeleton's legs.
8	#1	bronze	48	Large and medium-sized coins present. Location: On skeleton's pelvis, in box.
8	#1	silver	26	Republican. Small. Location: On skeleton's pelvis, in box.
12	#2	silver	23	Location: Under skeleton, in bag.

(b)

House	Skeleton	Bronze	Silver	Gold	Total* in <i>sestercii</i>	Total* in <i>asses</i>
7	#1	0	90	2	560	2240
8	#1	48	26	0	104	416
12	#2	0	23	0	92	368

* Totals exclude bronze coins as there is no indication of their denomination in the records.

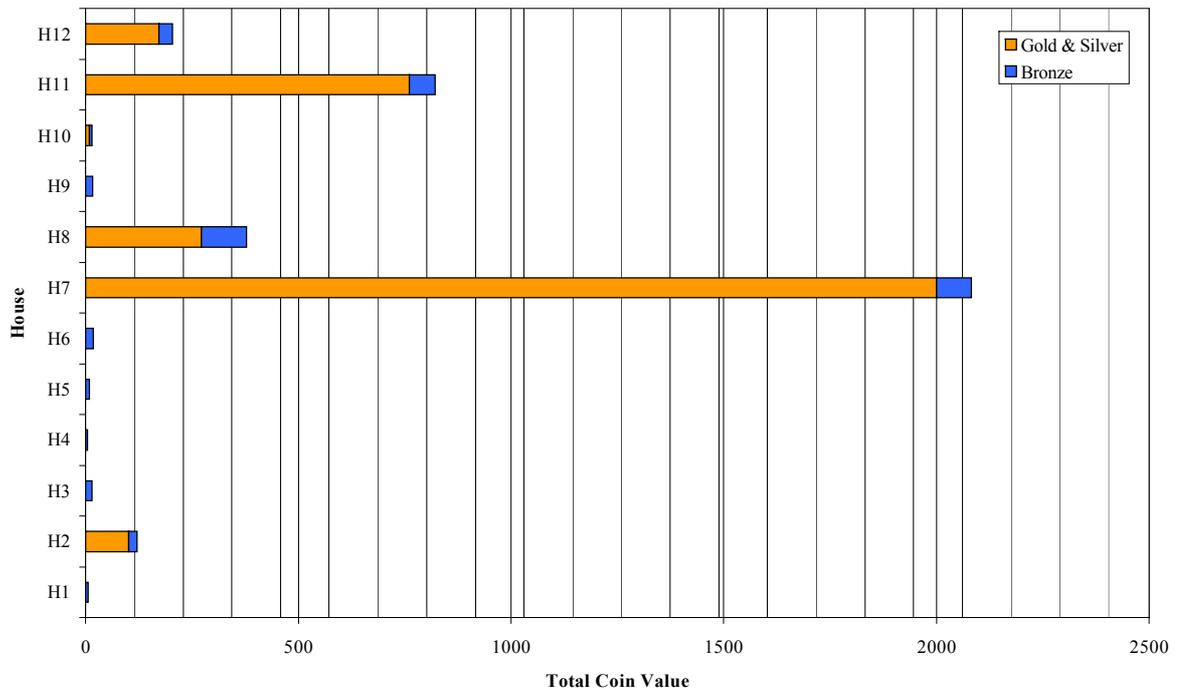


Figure 6.20: Total coinage value. Dotted lines indicate each year's worth wheat equivalent per person.

6.5: Concluding Remarks on Functional Categories

This chapter has provided a base level of analysis for the Pompeian household assemblage data, using divisions of functional categories, which will be built on in subsequent chapters. The data were analysed in terms of absolute frequency and proportional occurrence in the assemblages. Correspondence Analysis was used to identify predominant trends in overall assemblages of consumer durables (see *sections 6.1 and 6.2*). Subsequently, by investigating the data in these relatively broad categories using systematic and sequential analysis, basic patterns have been identified. The novel concept of consumption profiles was introduced (*section 6.3*) to create a graphical display that provides a flexible format with which to visualise quantitative patterns in artefact assemblages, enabling direct comparison of the characteristics and trends. This allows attention to be focused on the more significant artefact classes, such as CV (ceramic vessels) and OV (other vessels), both of which are examined in terms of both artefact type and vessel form in the following chapter.

Coins (*section 6.4*) have been shown to be a useful analytical element in the study of consumption because, although they do not represent consumed goods, they do permit investigation of purchasing power, which can be translated into annual wheat equivalent values. This is not a definitive measurement of accumulated wealth (and therefore cannot be used to construct household wealth profiles), but it does give some indication of the levels of disposable income that were present in these Pompeian houses at the time of the volcanic eruption.

Attention has also been paid to variables such as house size and state of occupation in 79 CE. The latter has been shown to represent a significant factor that will be explored further in Chapter Seven (which focuses on the analysis of ceramic

and other vessels) and Chapter Eight (which analyses the household assemblages in terms of various scales of materialism introduced in Part I). The findings from this multi-pronged approach will be brought together as part of the final discussion in Chapter Nine, which argues for the benefits of a consumption-oriented approach to studying the ancient world.

CHAPTER SEVEN:

VESSEL RESULTS

7.1: Ceramic Vessels

Up to this point ceramic vessels have been considered in the terms of an aggregate functional category as part of the overall household assemblages. Further analysis involves considering the constituent parts of the ceramic vessels category in terms of ‘artefact types’, as well as by ‘type function’¹⁸ and form. Similar detailed analysis will also be performed later in the chapter on the OV (other vessels) category, predominantly comprising metal and glass. Subsequently, analysis will be provided in terms of all of the vessels combined. Considering all vessel categories in a single analysis will avoid patterns being obscured as a result of modern division by material. For example, a dearth of ceramic cooking vessels could be balanced out by the presence of metal equivalents and considering vessel materials separately could disguise such situations.

Figure 7.1 displays the total number of ceramic vessel (CV) items for each household assemblage with associated occupation levels indicated. There are clearly a few houses that contain low artefact totals for this category of object, such as Houses 3, 6 and 11 (n = 5, 21 and 14, respectively). In fact, half of the sample population has forty or fewer objects categorised as CV. If this is viewed from another perspective, all but two of the houses studied have fewer than 100 items, thereby indicating that those with large quantities are potentially the atypical

¹⁸ This is a further division of artefacts used by Allison, in which the artefacts are grouped according to functional criteria, such as food-preparation vessels, storage furniture, cloth production.

assemblages (54.9 per cent of the entire CV assemblage is yielded by two houses, 7 and 12).

Figure 7.2 demonstrates that there is a strong positive correlation between house size and the number of items in this artefact category. The r^2 value (0.382), however, is not as strong as the graph might suggest, indicating variation away from the trendline; this is verified by the fact that the association is not statistically significant at the $p=0.05$ level. The reason for this is apparent: House 12 (Casa di Julius Polybius), which has a large artefact assemblage ($n = 327$) compared to the house area. When this assemblage is omitted from analysis, $r^2 = 0.775$ and is significant at the $p=0.01$ level, thereby demonstrating the impact of this outlier.

Introducing calculated values for the upper storeys would be an interesting consideration, although may not alter the current pattern, especially if relative upper storey coverage was very similar across the population. Investigating the relationship between assemblage and house size is a valid starting point but there are further considerations. For example, does a larger house mean more variation in ceramic material? This will be considered below.

State of occupation is the second factor that needs to be considered. It would be expected that pottery would have a much higher representation for occupied houses, with fewer for those that were apparently abandoned. Taking some houses as examples, this would seem to be the case: Houses 7 and 12, both occupied, totalled 212 and 327 objects, whereas House 3 (abandoned) yielded just 5. If the range of data for the occupied houses is considered, however, there is a very high level of variation visible: the lowest being 14 (House 11), and the highest value being 327 (House 12). Therefore, the number of ceramic vessels is not, on its own, a secure enough indicator for occupation status. Even basing statements of abandonment on low numbers of

ceramic material is contentious, as three houses yielded smaller quantities than House 4 (unoccupied; see *table 7.1* and *figure 7.1*) with one further house yielding only one object more (House 10).

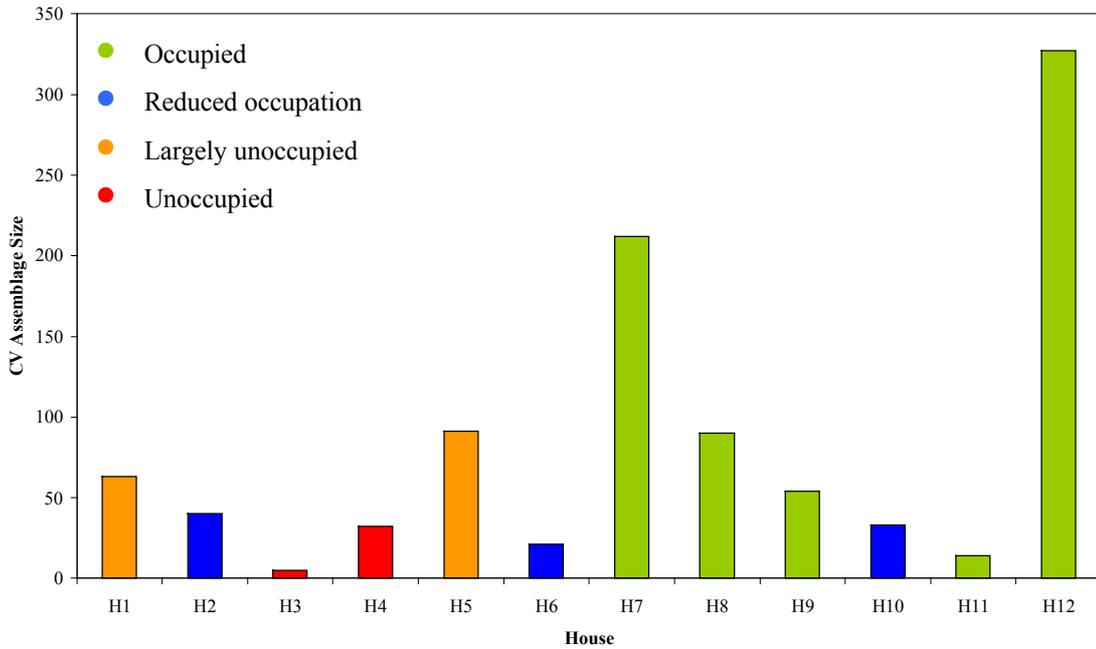


Figure 7.1: Size of ceramic vessel (CV) assemblages according to house (level of 79 CE occupation by colour)

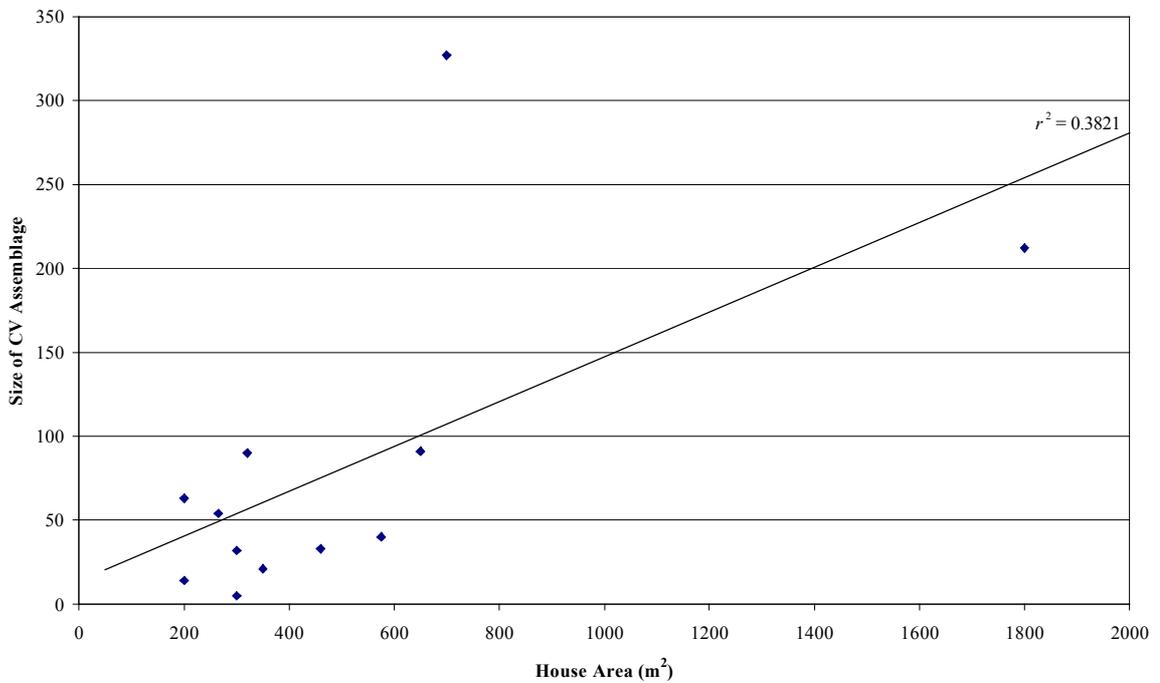


Figure 7.2: Size of ceramic vessel (CV) assemblage in relation to house area

7.1.1: Ceramic vessel artefact types

This section considers ceramic vessels by artefact type; with form and ‘typefunction’ being discussed later in the chapter. *Table 7.1* displays the division of the functional category of ceramic vessels into artefact types and is summarised in *figures 7.3* and *7.4*. There are a total of twenty-one artefact types across the population, although some of these categories have a very low representation (such as pottery pan or bottle, which both have only a single occurrence), while others constitute a bracket for uncertain or miscellaneous objects, such as unidentified pottery vessel (UPV), pottery vessel lid (PVL), and pottery vessel base (PVB).

The tabulated data reveal significant differences between household assemblages, which appear to be the result of factors beyond depositional and post-depositional processes. It appears that there was not a ‘standard’ ceramic assemblage in Pompeian houses, which is one of the reasons why this data population is so suitable for application to this study. This chapter will explore possible explanations of variation in terms of aspects such as house size and state of occupation. It is striking how low the occurrence of fine ware ‘tableware’ is in the data population (refer to *table 7.1* and *figure 7.3*); this is another factor that will be examined in more depth in the course of the chapter, including through the examination of the occurrence of similar-functioning vessels of alternative material (such as glass).

Amphorae are the most abundant type in the population, with 58 per cent of these (n = 191) being from the two dominant ceramic assemblages, Houses 7 and 12. Not only are amphorae very abundant but they are represented in every household in the sample population. However, due to the fact that such vessels are for storage and

Table 7.1: Components of functional category CV (ceramic vessels)

Artefact Type	Abbr.	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	Total
Pottery amphora fragment/lid	PAFL		1					1			2		1	5
Pottery amphora/ amphoretta/ hydria	PAAH	28	3	3	15	27	15	97	16	11	9	10	94	328
Pottery beaker/ small vase	PBV	1	8			13	1	5	28	2	3		21	82
Pottery bottle	PBt				1									1
Pottery cooking pot	PCP							2					2	4
Pottery cup/ small bowl	PCB	1	3		5			6	4			1	12	32
Pottery dolium*	PD	29					1			1			4	35
Pottery jar/ vase	PJV	1	6		3	9	1	42	6	22	1		70	161
Pottery jug	PJ	1	5		1	2		11	10	2	10		4	46
Pottery large bowl	PIBw		2			3		4	1	1			14	25
Pottery pan	PPn												1	1
Pottery plastic vase	PPV											1		1
Pottery plate/ dish/tray	PPD		4		2	3	1	19		1			52	82
Pottery pot	PPt	2	6		3	11	2	2	4	2	3	1		36
Pottery vessel base	PVB								3	1			22	26
Pottery vessel lid	PVL				1	21		12	9	4	2		19	68
Small pottery jar/small amphoretta	SPJ		1	1	1	2				1			5	11
<i>terra sigillata</i> bowl/cup	TSB		1	1				7	2	3	2	1	2	19
<i>terra sigillata</i> fragment	TSF							3		1	1			5
<i>terra sigillata</i> plate/dish	TSP							1	7	2			2	12
Unidentified pottery vessel	UPV												2	2
Total		63	40	5	32	91	21	212	90	54	33	14	327	982

* Although dolia are classed as ceramic vessels here, they can also be categorised as furniture, as presented by Allison (2004b) in the online database for this material.

transport, they tell us little about the consumption of goods without knowing more about their contents. Unfortunately, in the majority of cases the excavation documentation for this data population does not indicate the class of amphorae present, which limits statements about the sources of amphorae and related trade networks. It should be remembered, however, that even were this information

available it would not necessarily indicate the prime use of such vessels. Following Peña (2008, ch.4), ‘prime use’ relates to the “use of a previously unused vessel for the application or applications for which it was acquired”. Subsequently, amphorae could have been re-used in various formats and not just that of storage and possible subsequent trade. In fact, the term ‘re-use’ is a simplistic one and requires clarification; Peña (2008) proposes that it is different to recycling (“the use of a vessel, or a part of a vessel, as a raw material in a manufacturing process” (2008, 250)) and should be divided into the three following parts: Type A, that which involves an application similar to the vessel’s prime use without physical modification; Type B, that involving an application different to the vessel’s prime-use without any physical modification; and Type C, re-use involving an application different to the vessel’s prime-use and requiring physical modification.

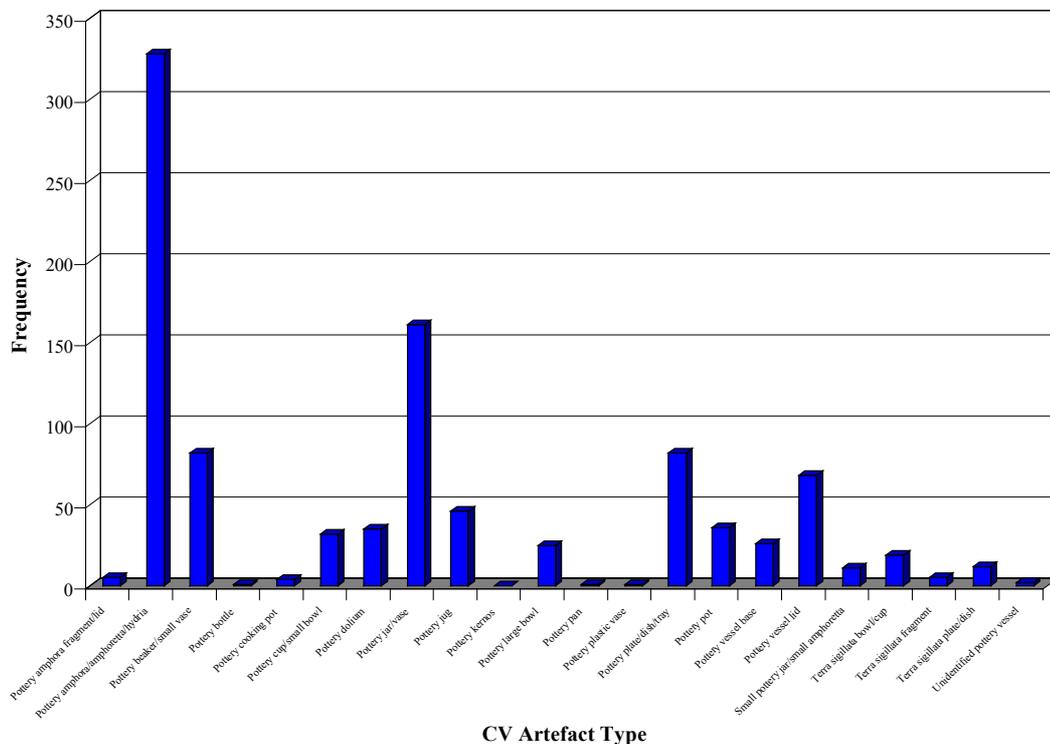


Figure 7.3: Ceramic vessel occurrence by artefact type

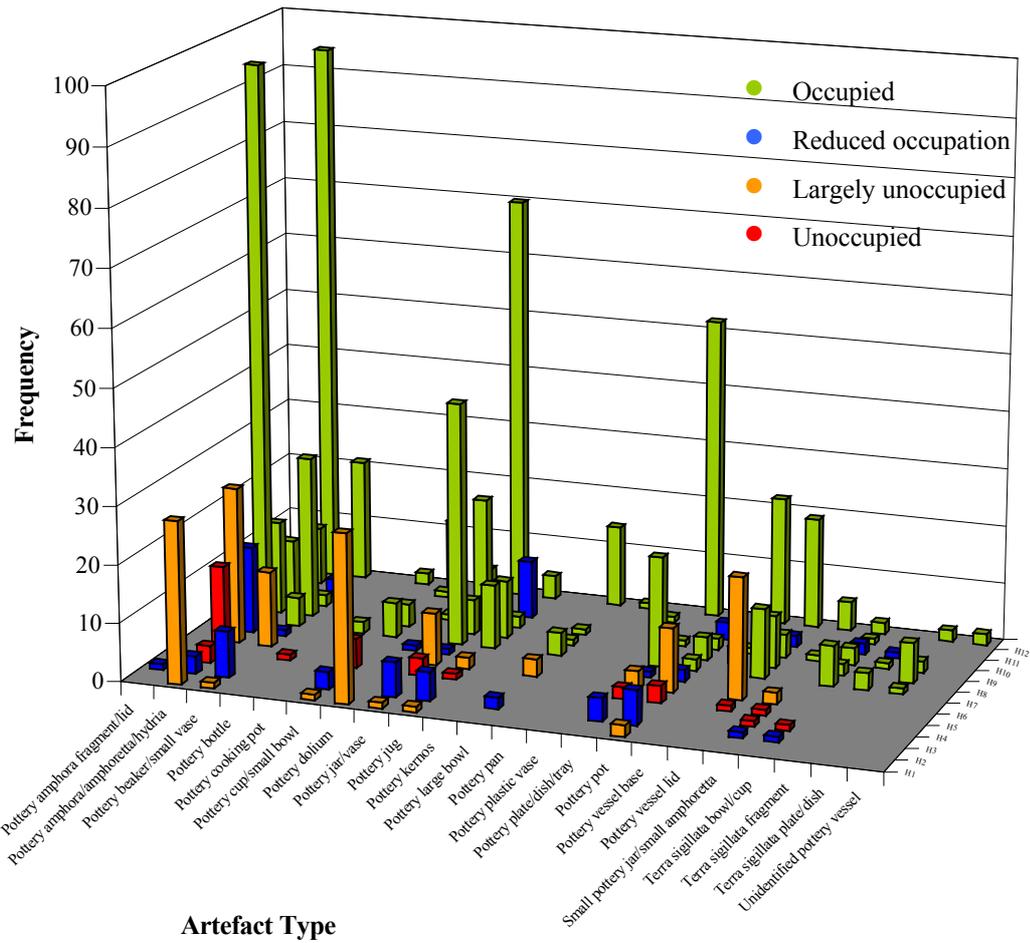


Figure 7.4: Ceramic vessel artefact types according to house and state of occupation

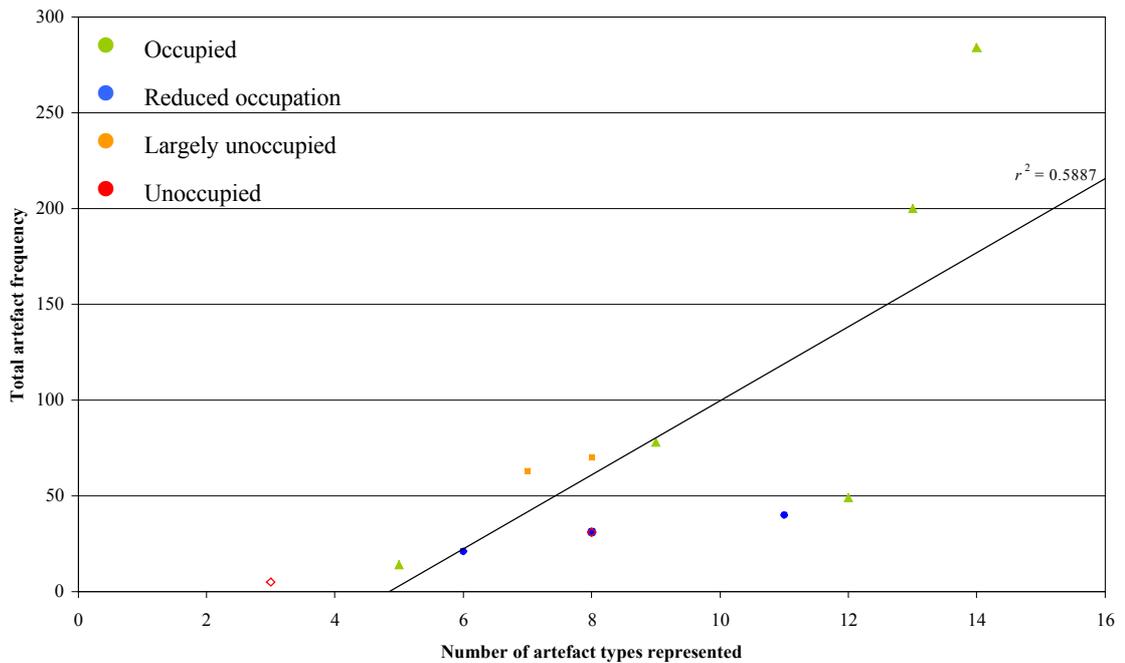


Figure 7.5: Variation in ceramic vessel types relating to assemblage size

This could, of course, also be the case for other vessel types, although amphorae present the most abundant and commonly adapted of these. The relationship between house area and ceramic assemblage size discussed above does not take into account assemblage variation. This can be done by considering the number of pottery types that are present in each household, which relates to the ranking of goods and the identification of ‘core’ and ‘fringe’ objects (*section 7.1.4*).

The first question to address is whether a higher number of ceramic vessels in an assemblage is associated with greater variation in terms of artefact type. *Figure 7.5* displays the data in these terms, indicating that there is a strong positive trend between these variables, with the data not demonstrating a large divergence from the trendline ($r^2 = 0.589$; significant at the $p=0.05$ level). When the same principle is applied in relation to house area (*figure 7.6*), the positive trend is less convincing. The data do not demonstrate a strong reflection of the trendline, with an r^2 value of 0.381, which requires caution in any subsequent interpretations – especially as the association is not significant at $p=0.05$. Without House 7 (area = 1800m²) in the analysis the positive trend would be weaker still, though with a stronger r^2 value indicating greater adherence to the trend.

Let us examine next whether there are any obvious associations between ceramic vessel artefact type and occupation status. Are vessels such as small bowls, for example, characteristic of occupied houses? Although *figure 7.4* gives some indication of associations, they are not clear; in order to answer this question satisfactorily, it is necessary to perform Correspondence Analysis on the data. Prior to its application several categories were removed because they have marginal totals

of 1 (see *table 7.1*). These categories comprise pottery bottle (PBt), pottery pan (PPn), and pottery plastic vase (PPV).

It is evident in *figure AppD.5* that the category of PD (pottery dolium) significantly skews the ceramic vessel data due to its strong association with House 1, causing both to become outliers in the far right of the biplot. Although the pottery dolium category does not have a large mass (0.036; PAAH (pottery amphora/amphoretta/hydria) is the highest with a value of 0.335) it does possess a large inertia (0.349, compared to 0.053 for PAAH). This is due to the fact that dolia are infrequent other than in House 1, where there are 29 recorded items (constituting over 50 per cent of that house's assemblage). Due to the presence of PD, other patterns are not particularly evident at this stage. When the same analysis is performed with this dominant category omitted the resultant biplot is dramatically altered (*figure 7.7*). The difference is obvious: no longer is there a cluster of artefact types and houses in the lower left quadrant of the biplot; rather, the elements have been spread out across the full area.

House 5 reveals a relative lack of association with artefact types, apart from PVL (pottery vessel lid), rather than a definite artefact type. In the upper right quadrant, Houses 1, 3, 4, 7 and 11 all exhibit a correspondence suggesting similar ceramic assemblages in terms of artefact type, best explained by PAAH. Interestingly, *figure 7.8* illustrates that this cluster contains houses from all four of the designated states of occupation, and will therefore require further investigation by considering non-amphorae ceramic vessel types.

House 10 in the upper left quadrant displays an affinity with storage vessels: pots, jars, and amphorae. There is a cluster of artefact types in the lower right quadrant, around Houses 9 and 12 (indicating diverse assemblages), with two jar/vase

categories (PJV, pottery jar/vase, and SPJ, small pottery jar/small amphoretta) located between the two properties. These two houses also possess an interesting divergence in character: House 12 appears to be associated with PPD (pottery plate/dish/tray) and PIBw (pottery large bowl), whereas House 9 is located close to the ‘average’ assemblage (at the centroid), at which PCB (pottery cup/small bowl) can be found. This trend is suggestive of House 12 being more closely related to serving vessels, whereas House 9 pertains to drinking vessels or individual dining vessels. However, this requires further examination because the pattern is currently very tentative and it is unclear whether the trends are spurious or not (partly due to the proximity to the centroid). This line of investigation will be continued below and later in the chapter in various guises, such as rank and form analyses.

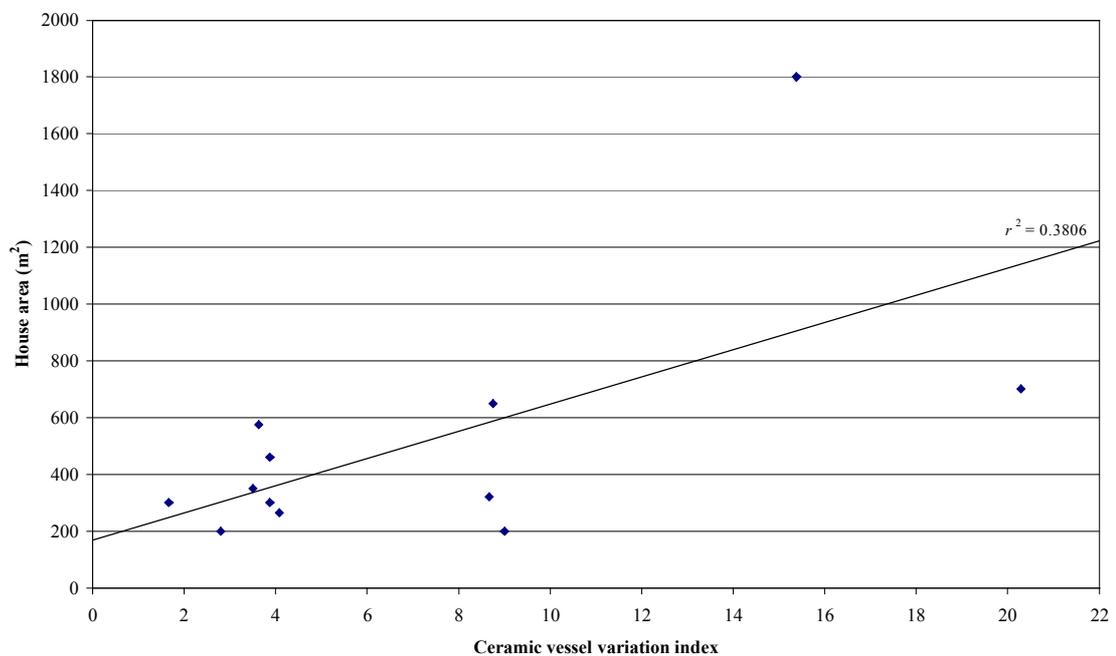


Figure 7.6: Variation in ceramic vessel types relating to house size

Introducing the variable of area (*figure 7.8*), does not make the situation any clearer. At first glance it is possible that this variable could offer an explanation for House 11 being clustered with Houses 1, 3 and 6, as it covers a small area, only 200m², and the primary occupants could therefore have had similar consumption requirements in terms of ceramic vessels as those of houses that were evidently in lesser states of occupation in 79 CE. If this line of reasoning is followed, however, it would be expected that House 9 would also be in that region of the biplot.

Following up the association of House 12 with serving vessels and House 9 with drinking vessels, House 12 has a much larger area (700m²) than House 9 (265m²) and it could be that the former required a greater number of serving vessels (such as platters, trays, large bowls) than the latter because of its size. However, equating house size with relative predominance of these particular artefact types, though appealing, is not persuasive. For example, House 7, the largest of the houses at 1800m² seemingly has a closer association with PCB and House 9 than it does for House 12 and PIBw. The category of PAAH (pottery amphora/amphoretta/hydria) is, however, clearly exerting a strong pull on the position of House 7. Performing the analysis again but without amphorae artefacts (the highest weighted class) is one way to test this further.

The effect of removing amphorae from the Correspondence Analysis of the ceramic vessel artefact types is shown in *figure 7.9* and still demonstrates the association between House 12 and artefact types PPD and PIBw; it has, in fact, strengthened (not being located in the upper right quadrant). By omitting PAAH and PAFL from analysis the statistical weighting of the artefact types has changed, as the proportional values have altered (the inertia values have also changed, although not by very much). This revised biplot indicates that the correspondence between PJV and

SPJ, and House 9 remains, as does that of House 9 and PCB. The general trends in this region of the output have strengthened overall, as Houses 4 and 7 are now also demonstrating a close association with these variables. This suggests that there is a connection between these artefact types and representation in the household assemblages, especially once the over-riding influence of amphorae is removed.

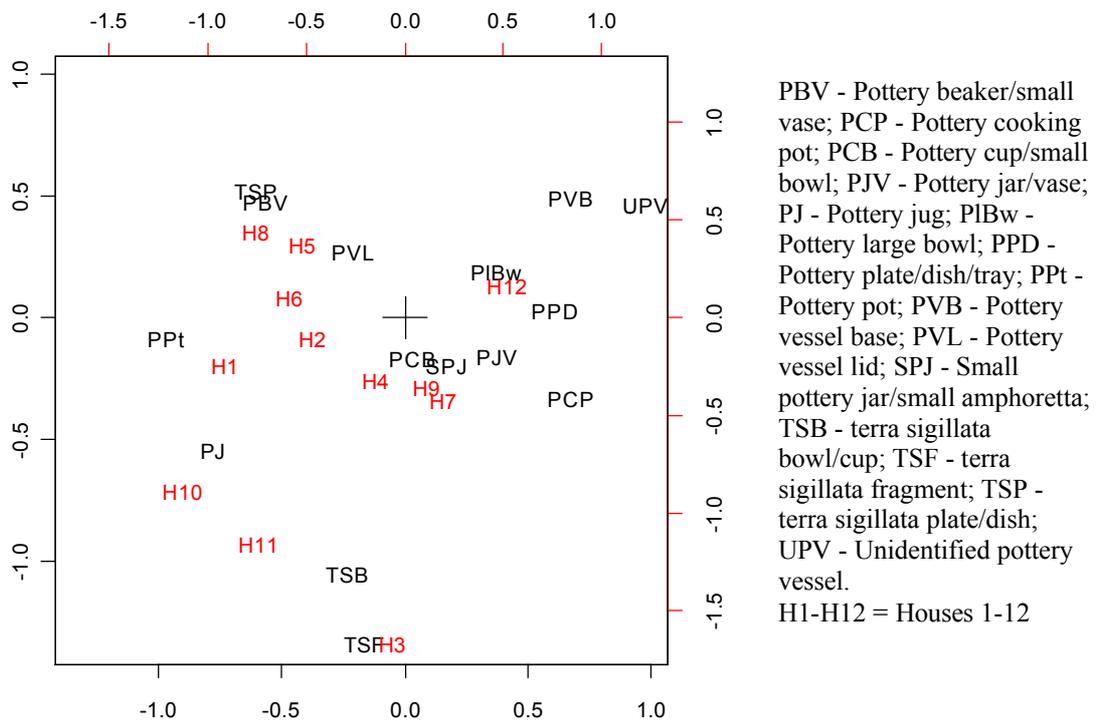


Figure 7.9: Correspondence Analysis biplot for CV (ceramic vessel) artefact type component categories with PD (pottery dolium), PAAH (pottery amphora/amphoretta/hydria), and PAFL (pottery amphora fragment/lid) excluded

This can be investigated further by isolating the artefact types concerned and seeing if they demonstrate a correlation. Figure 7.10 displays this, with jars/vases (PBV, PJV and SPJ) plotted against dishes/plates (PPD and TSP). According to this graph, not only is there a clear positive correlation, but the variation from the trendline is very

small (the correlation to this pattern is 0.911; significant at the $p=0.01$ level). Therefore, it can be surmised that households possessing a large number of jars/vases will also possess a greater number of dishes/plates than a household that has few jars/vases.

To test if this pattern of positive correlation between artefact types is being overstated, the association between the amphorae types of PAFL and PAAH have been compared to the occurrence of cups/bowls. The results of this, shown in *figure 7.11*, appear to illustrate a similar pattern ($r^2 = 0.782$, significant at the $p=0.01$ level). It should, however, be noted that there is a significant gap in the data for mid-frequency values; if the two potentially distorting samples to the extreme right of the graph with high frequencies are temporarily omitted from the analysis, a very different picture emerges (*figure 7.12*). There is now virtually no correlation between the two variables, and the correlation value shows a very high divergence from the trendline ($r^2 = 0.020$ and the correlation is now not significant at the $p=0.05$ level).

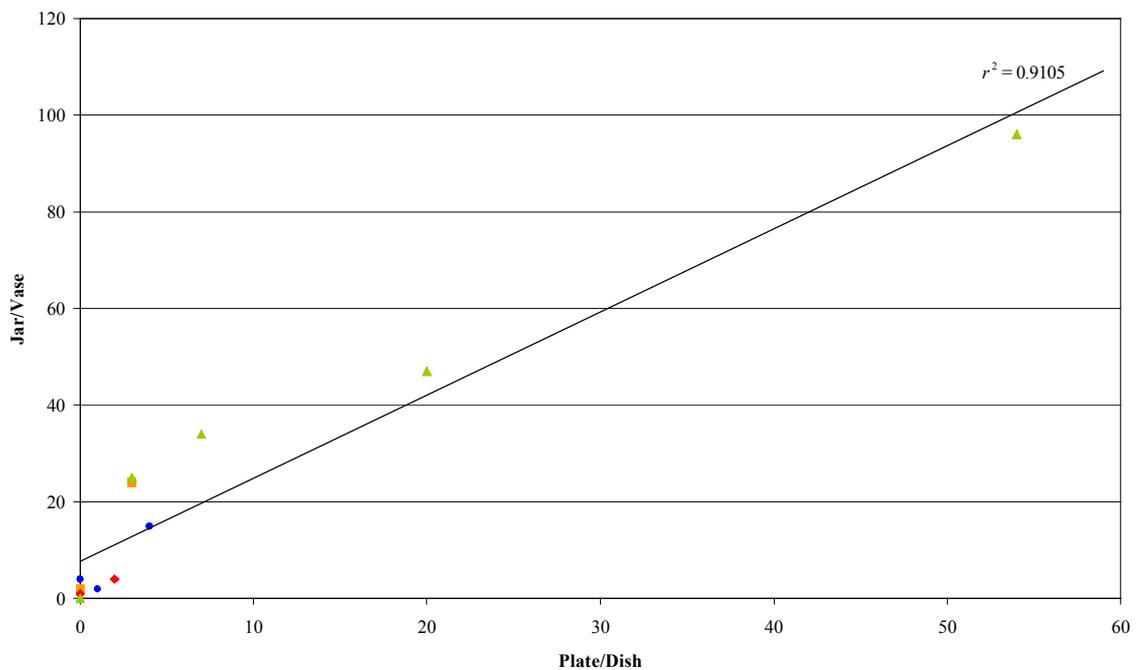


Figure 7.10: Correlation between jar/vase and plate/dish occurrence

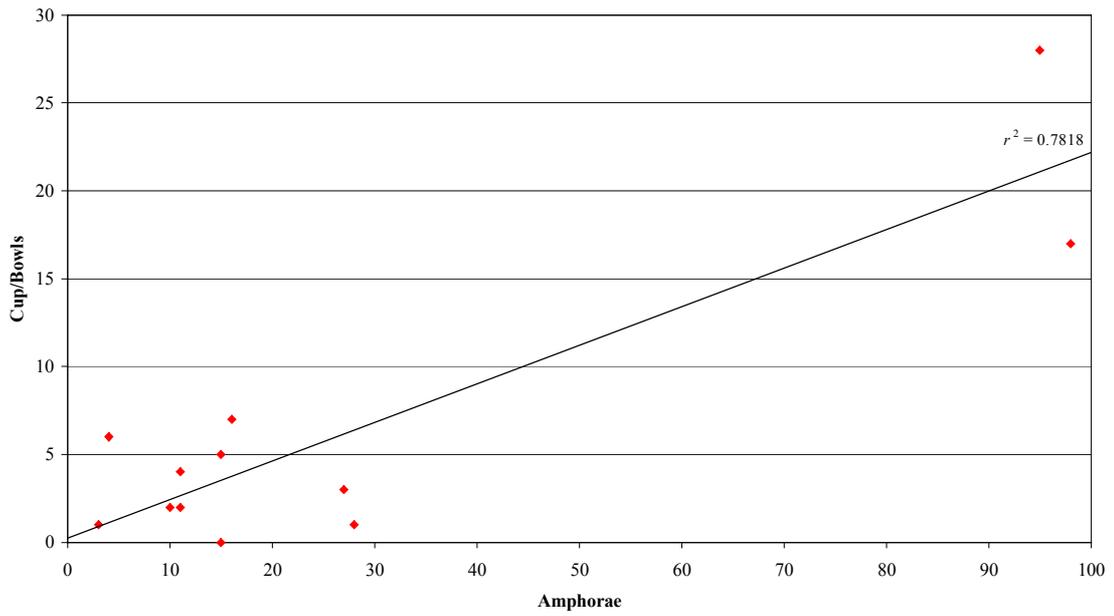


Figure 7.11: Correlation between amphorae and cup/bowl occurrence (all houses)

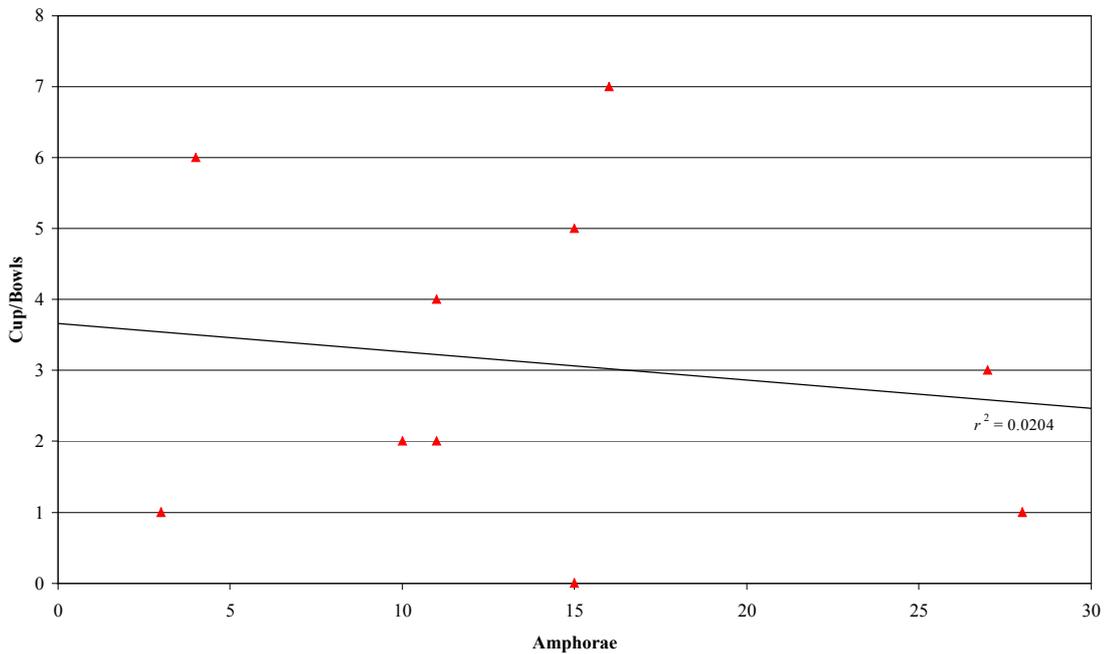


Figure 7.12: Correlation between amphorae and cup/bowl occurrence (House 7 and House 12 omitted)

Therefore, although there might appear to be a correlation, it is demonstrably unreliable. If figure 7.10 is reconsidered, it is evident that omission of the high value

on the right of the graph would not change the overall correlation, as occurs in *figures 7.11 and 7.12*.

7.1.2: Ceramic Vessel Form

The next stage is to consider how vessel *form* is represented across the population sample and if it complements the results of the artefact type analysis, or elucidates any obscured associations. This will primarily involve the same data used in the Correspondence Analysis for *figures 7.7 and 7.8* but with several amendments: (i) the removal of groups that are not directly related to classes of form, such as TSF (*terra sigillata* fragment), UPV (unidentified pottery vessel), PVL (pottery vessel lid), and PVB (pottery vessel base); and (ii) the addition of ceramic lamps (CL), which fall within the Functional Category of ‘household utensils and apparatus’ (HU), as they represent lighting equipment.

The Correspondence Analysis biplot (*figure 7.13*) still highlights a cluster of Houses in the relative location of PAAH; the houses concerned are 1, 3, 6 and 11, with Houses 4 and 7 now closer in proximity. Some additional trends are also evident: one of which is a noticeable concentration of artefact categories in the lower left quadrant, principally comprising bowls and jars and corresponding to Houses 9 and 12. The biplot also indicates that forms such as bowls, jars, and dishes correspond to houses that fall into the upper two occupation levels (fully occupied and reduced occupation). Exceptions occur when a house contains a large amphora component in the assemblage as normally the category of PAAH (pottery

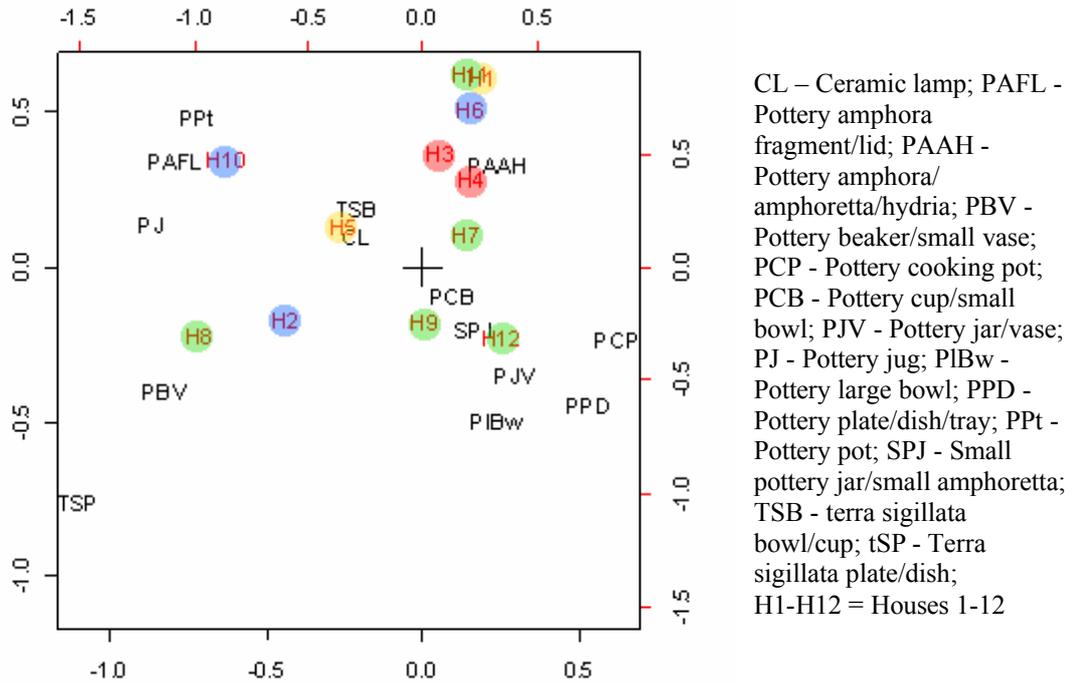


Figure 7.13: Correspondence Analysis biplot for the form of ceramic vessels according to artefact type, excluding PD (pottery dolium) but including CL

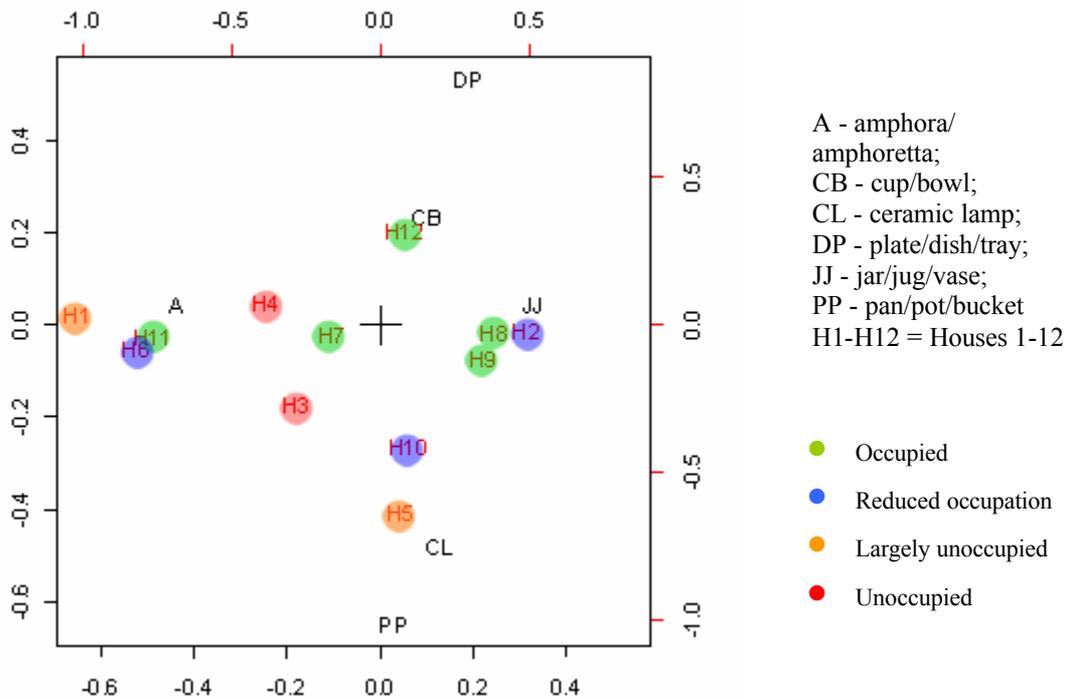


Figure 7.14: Correspondence Analysis biplot for ceramic vessel forms (including ceramic lamps, CL), with state of occupation indicated

amphora/amphoretta/hydria) seems to signify reduced occupancy through the presence of storage, a fact reinforced by the association encountered above with PD (pottery dolia) and House 1, which also falls in the largely unoccupied division.

One question that arises from the results of *figure 7.13* is: how are these correspondences reflected by form alone, rather than form depicted through artefact types? *Figure 7.14* illustrates this with the types grouped by represented forms, in which pottery dolia and pottery bottles (n = 1) have been excluded. This format of data organisation supports the results of the preceding artefact type Correspondence Analysis, in which cups/bowls are associated with House 12, and jars/jugs appear to be associated with House 9. The amphorae correlation also continues, as is expected, but dish/plate/tray is shown as an outlier to all of the houses. This form category is, however, most closely associated with cups/bowls, reinforcing the serving vessel correspondences. The strong pull of CL (ceramic lamps) can also be observed in this analysis, maintaining an association with Houses 5 and 10.

The overall pattern when examining ceramic form by the level of occupation in 79 CE (*figure 7.14*) verifies the pattern demonstrated by the artefact types (*figure 7.13*). The apparent correspondence between occupied houses and serving vessels is strengthened. The previous exceptions to the pattern recur here also, in that this pattern is disrupted when there is a strong amphorae component to the assemblage. This is the case with Houses 6 and 11, although these properties have small CV samples, which could explain their seemingly atypical character.

The correlation between occupation level and size of CV assemblage is apparent in *figure 7.17* with houses of greater occupation levels generally yielding more vessels, with the exception of House 11. This property has, however, regularly demonstrated patterns in this ceramic vessel analysis and discussion that seem largely

atypical of its occupation category, which are more than likely a result of its small sample size. Furthermore, as with the radial graphs of consumption profiles by ceramic vessel form (*figures 7.15 and 7.16*) the strong associations are visible, such as those of amphorae and jugs/jars. When an apparently uncommon profile is exhibited in *figure 7.15*, it can be compared to those in *figure 7.16*, to assess the possibility that sample size may be a contributing factor. For example, the profile for House 3 (in *figure 7.15*) is different to all of the others but can be seen (in *figure 7.16*) to be questionable due to the low frequency of ceramic vessels.

Two dominant patterns illustrated by the consumption profiles that stand up to scrutiny by both proportional and absolute frequencies are: i) the predominance of the categories in the vicinity of the ‘three o’clock’ position (PCB, PJV, and PJ); and ii) the ‘twelve o’clock’ position (PBV). These are also represented in *figure 7.17*.

In terms of portraying consumer identity, the ceramic vessels in these assemblages do not distinguish any households from one another. Further discussion on this theme will become possible in the latter part of this chapter through the examination of non-ceramic vessels.

Several comments, however, can be made at this stage about mundane consumption within this urban setting. Ceramic lamps were near-ubiquitous, representing utilitarian objects that fulfilled a specific task and were consumer durables. Their presence in relatively high numbers also indicates that these items were inexpensive and not difficult to acquire. Other vessels suggest a different situation. For example, plates/dishes demonstrate lower occurrences across the data population, especially in the houses that have been interpreted as largely unoccupied or abandoned.

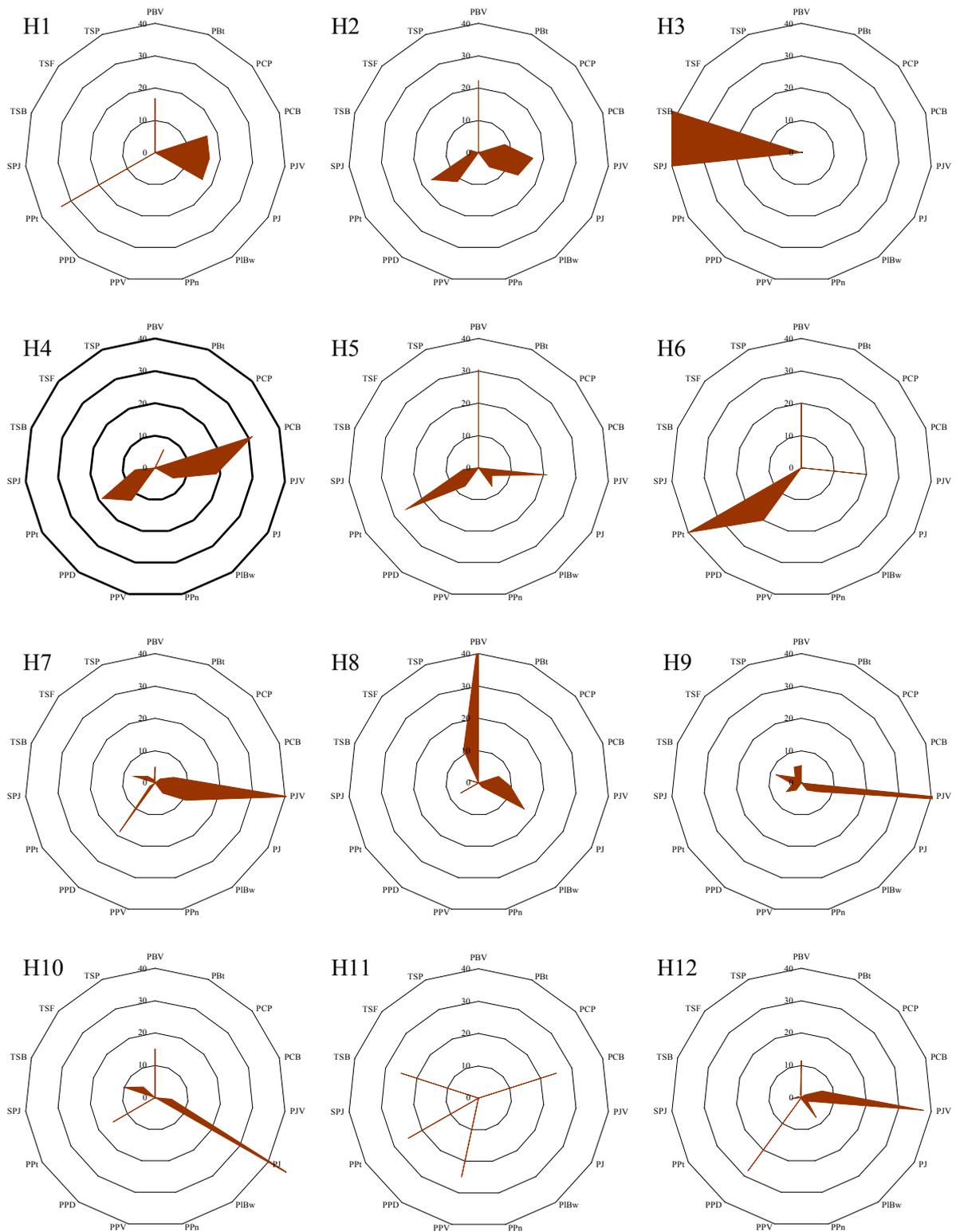


Figure 7.15: Consumption profiles of CV artefact types (proportional values); amphorae and dolia omitted.

PBV - Pottery beaker/small vase; PCP - Pottery cooking pot; PCB - Pottery cup/small bowl; PJV - Pottery jar/vase; PJ - Pottery jug; PIBw - Pottery large bowl; PPn - Pottery pan; PPV - Pottery plastic vase; PPD - Pottery plate/dish/tray; PPt - Pottery pot; SPJ - Small pottery jar/small amphoretta; TSB - terra sigillata bowl/cup; TSF - terra sigillata fragment; TSP - terra sigillata plate/dish
H1-H12 = Houses 1-12

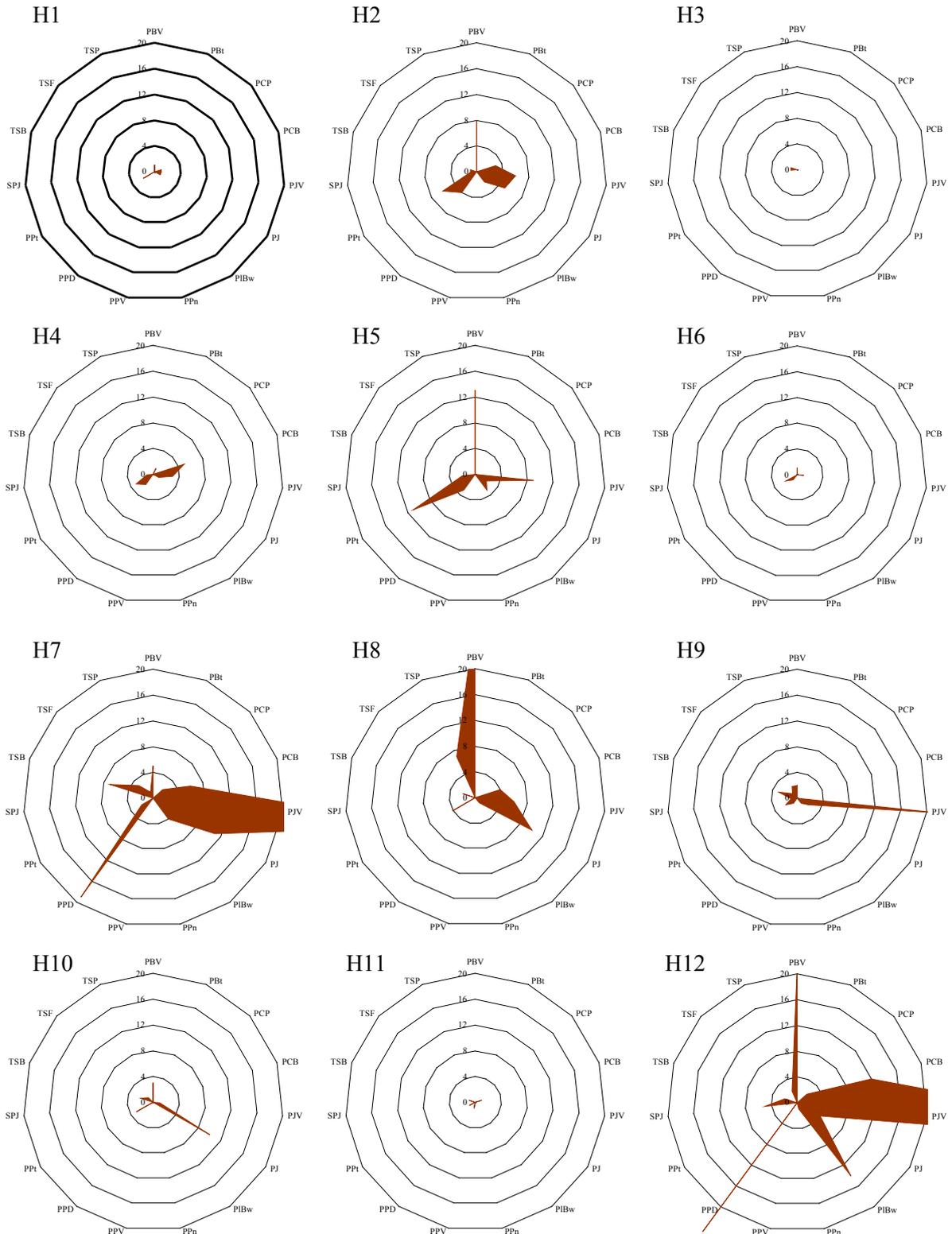


Figure 7.16: Consumption profiles of CV artefact types (absolute values); amphorae and dolia omitted.

PBV - Pottery beaker/small vase; PCP - Pottery cooking pot; PCB - Pottery cup/small bowl; PJV - Pottery jar/vase; PJ - Pottery jug; PIBw - Pottery large bowl; PPn - Pottery pan; PPV - Pottery plastic vase; PPD - Pottery plate/dish/tray; PPt - Pottery pot; SPJ - Small pottery jar/small amphorett; TSB - terra sigillata bowl/cup; TSF - terra sigillata fragment; TSP - terra sigillata plate/dish
H1-H12 = Houses 1-12

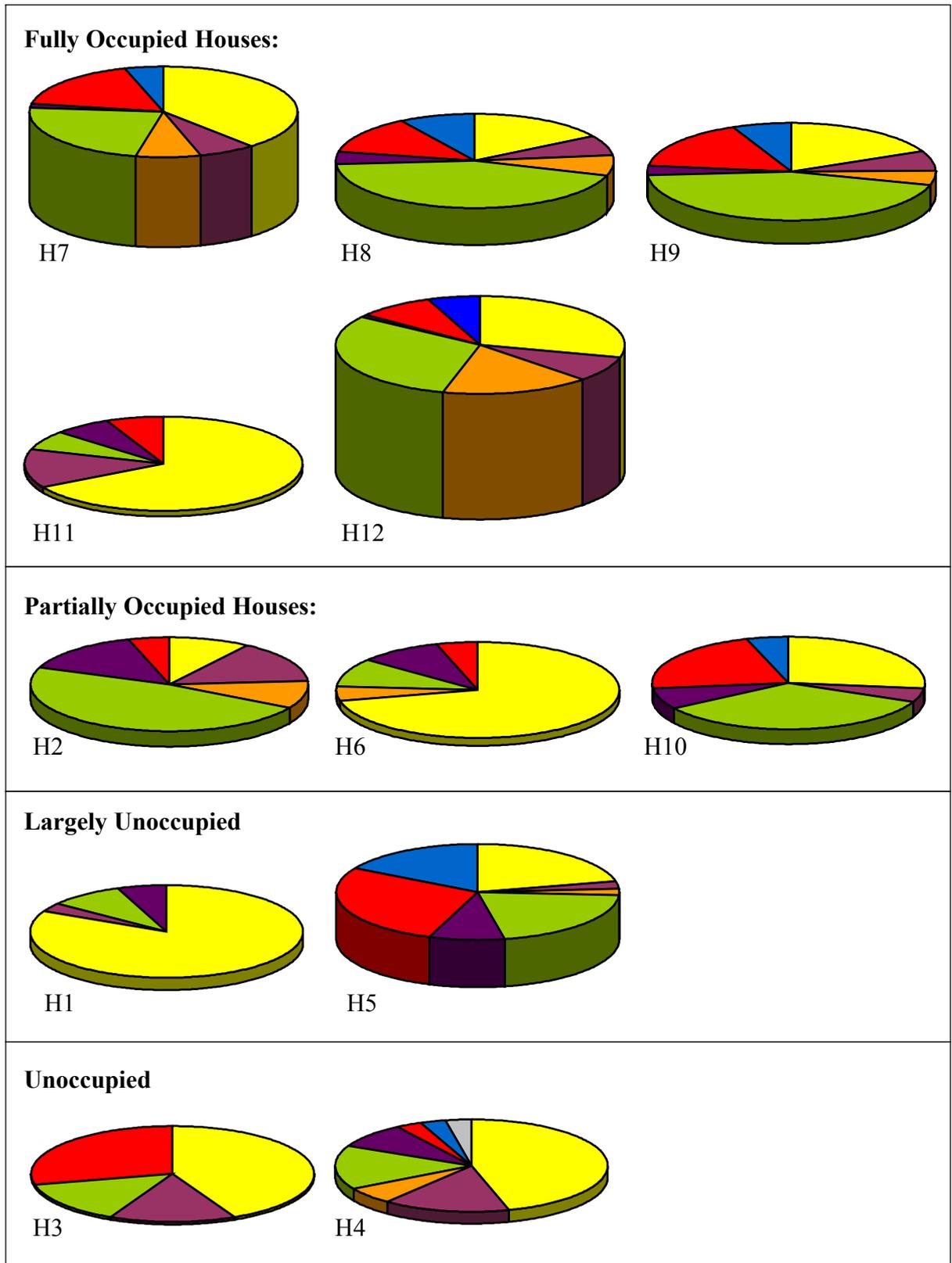


Figure 7.17: Ceramic assemblage profiles of ceramic forms (height of chart indicates size of assemblage)

7.1.3 Ceramic Vessels by Typefunction

A further division with which to investigate the ceramic assemblages is that of typefunction, a form of categorisation used by Allison (1999; 2004a; 2004b), in which the artefacts are grouped according to functional criteria. For ceramic vessels these comprise the following divisions: food-preparation, storage and transport, serving/table, garden/courtyard apparatus, and diverse vessel function (refer to *table 7.2* and *figure 7.18*). The last is a broad and ambiguous ‘catch-all’ category that is necessary to reflect the multifunctional nature of many vessels, and thus is considerable in size.

The category of FPV (food preparation vessels) is particularly intriguing in the data considered in this study, as it has very sparse representation: there is a total of only five items in the entirety of the data population, all of which come from two fully occupied houses. Unfortunately, the amount of data is too small for convincing arguments. It could, however, be argued that the reason for the low frequency of FPV is one of removal of necessary goods when households left the city (before or at the time of the eruption). This will be investigated further in the analysis of other material vessels (OV) below.

Figure 7.18 reveals a fairly high degree of consistency in the relative proportion of serving/table vessels (SGT) in the assemblages. This should be considered in tandem with *figure 7.19*, which shows the absolute frequencies, rather than relative frequencies. For example, House 3 appears approximately to correspond to the pattern displayed by several other houses (such as House 9) but only yielded a total of five items. The data from the houses forming the ‘upper two levels’ of occupation status all have similar proportions of SGT; this suggests a relatively

consistent consumption orientation regarding this category of vessel. Houses 6, 10 and 11 have low sample numbers, which is likely to explain why they are on the low side of this trend.

The pattern that emerges when the variable of house size is taken into account with respect to SGT (*figure 7.20*), is one reflected through most of the levels of occupation status: a larger house has a greater number of serving/table vessels. Without the presence of the data point with a very high number of SGT (House 12) at the top of *figure 7.20*, the correlation to the predominant trend would be much stronger (and would become significant at the $p=0.05$ level), suggesting that this is a strong and valid pattern of association.

Table 7.2: Ceramic Vessels by Type Function

House	Type function					Total
	Diverse vessel function	Food preparation vessels	Garden/courtyard apparatus	Serving/table vessels	Storage & transport vessels	
	DVF	FPV	GCA	SGT	ST	
H1	5				58	63
H2	25			5	10	40
H3	1			1	3	5
H4	11			2	19	32
H5	52			3	36	91
H6	3			1	17	21
H7	40	2		30	140	212
H8	59			9	22	90
H9	13			7	34	54
H10	18			3	12	33
H11	2		1	1	10	14
H12	99	3		56	169	327
<i>Total</i>	328	5	1	118	530	982

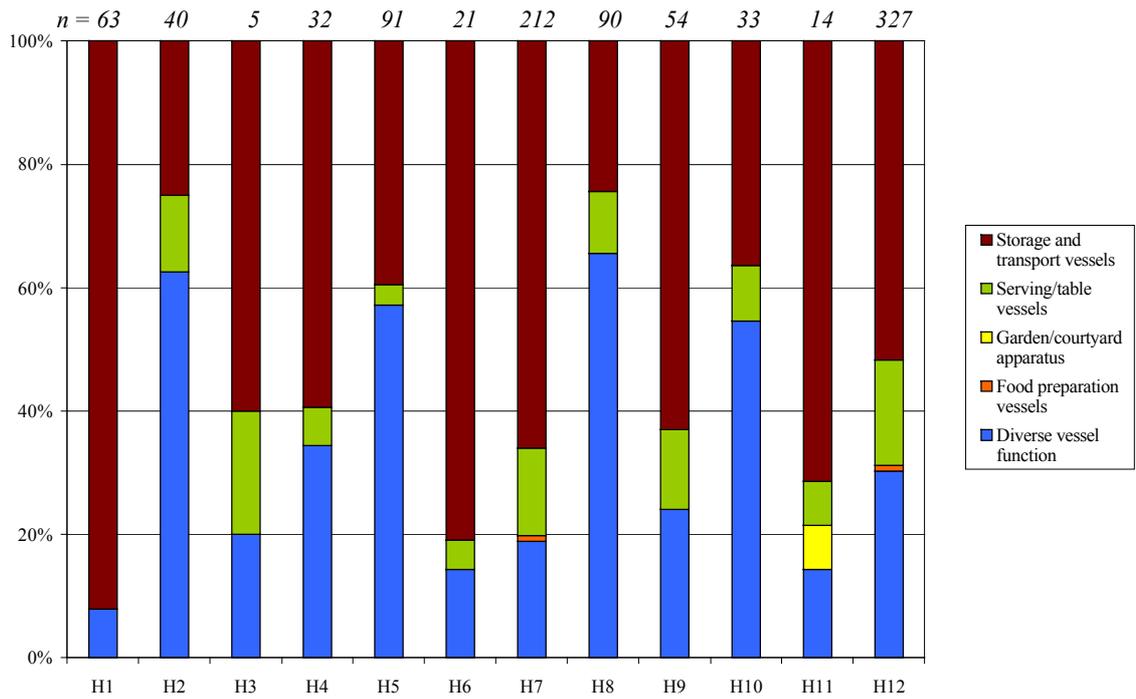


Figure 7.18: Proportion of ceramic vessels for each house by type function

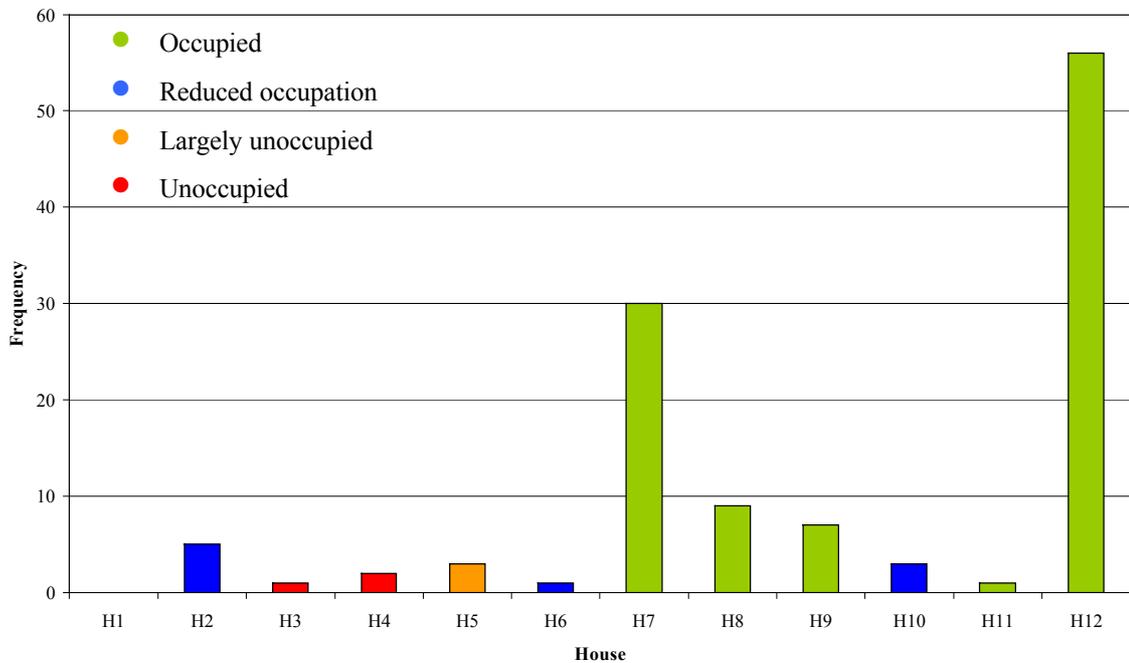


Figure 7.19: Occurrence of ceramic serving/table vessels by house, with state of occupation indicated

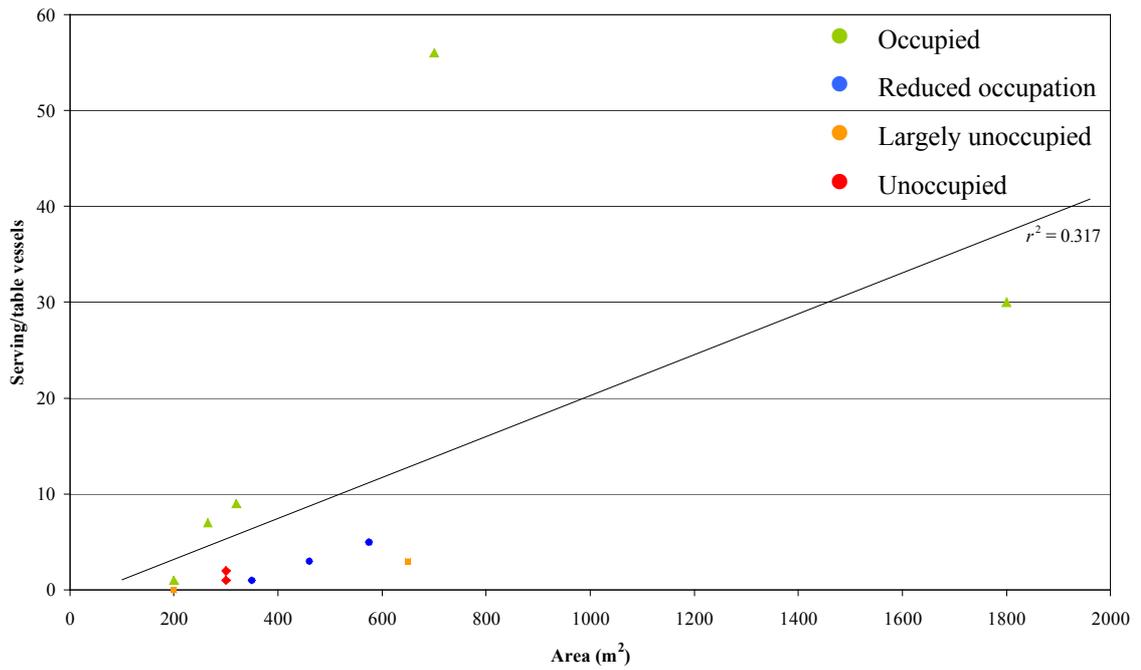


Figure 7.20: correlation between ceramic serving/table vessels and house area, with state of occupation indicated

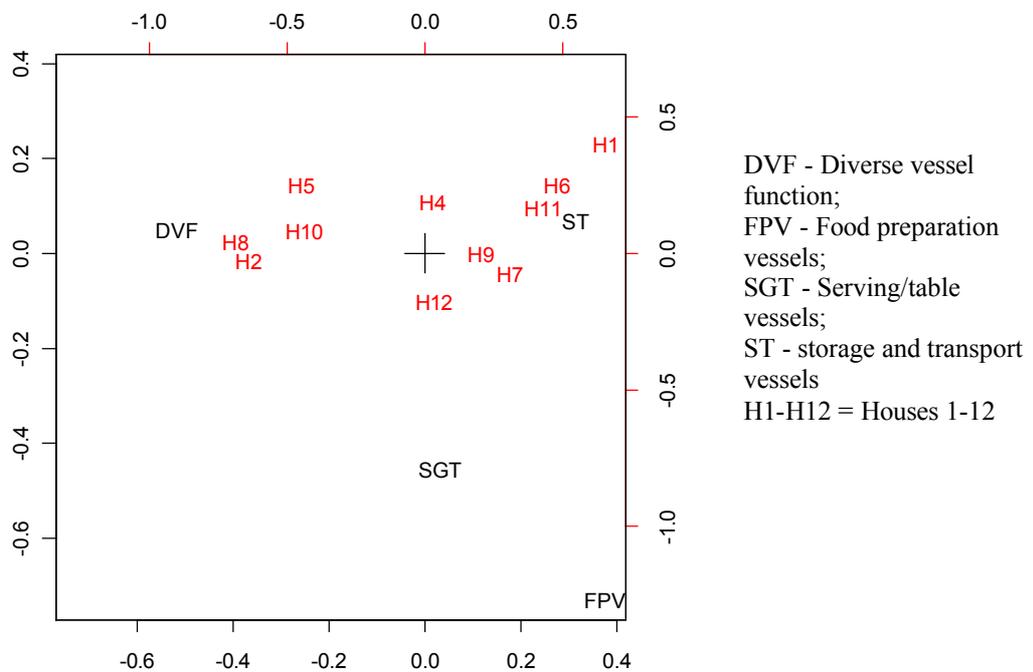


Figure 7.21: Correspondence Analysis biplot of ceramic vessels by type function. Garden/courtyard apparatus is omitted ($n = 1$).

Finally, regarding storage/transport vessels, in Allison's interpretation of occupation status (2004a; 2004b), House 1 (House I 6, 8-9) is considered as largely unoccupied and generally used for storage purposes. The ceramic vessel component of the assemblage does seem to reflect this based on the fact that 90.5 per cent comprises dolia and amphorae (refer to *table 7.2* and *figures 7.17* and *7.18*). House 5 has been interpreted in the same way but does not reflect the large proportion of storage vessels yielded by House 1; there is greater variation in the ceramic assemblage for House 5, although there is a low frequency of serving vessels. The biplots from the foregoing analyses (*figures 7.7, 7.13* and *7.21*) also demonstrate this dissimilarity in ceramic character between these two houses. Therefore, this form can be demonstrative of reduced occupation represented through increased storage, such as is the case for House 1, but when there is greater variance in ceramic types it is not enough on its own. This can also be reflected in ranking the ceramic artefacts according to occurrence in the data population.

7.1.4: Ceramic Vessel Ranking

Although the mass values formulated in the Correspondence Analyses represent the weighting of each artefact type within the data set, and can thus provide a rank according to artefact frequency, they do not allow for a ranking of goods by occurrence across the household populations. In other words, the data is not weighted by representation within the houses; therefore, an artefact type such as pottery dolium (PD), may have a high occurrence due to a high presence in one house but this pattern is not recurrent across the population. It is thus necessary to introduce a weighted

ranking of goods to identify which types are prevalent both in number and occurrence across the data set (*table 7.3*; for more detail see *table AppD.1*. For explanation of the process of weighted ranking see *section 5.5.1*).

When all of the ceramic vessel artefact types are taken into account (see *tables AppD.1 and AppD.2*), the category already identified as being dominant tops the list: PAAH (pottery amphora/ amphoretta/hydria) with a weighted value of 328. Pottery dolium (PD) had a high occurrence in the raw data but appears in just four houses (mostly in House 1) and thus would only rank eleventh in the full weighted list with a value of 11.67. This illustrates that it is not as core to the assemblages as might first appear, thus further validating its exclusion in earlier Correspondence Analyses as a distorting factor.

If the amphorae, dolia, and unidentified vessel categories are removed, the resultant ranking becomes clearer (*table 7.3*). The top of the list is now dominated by jars and vases, with bowls clustering as mid-range goods. The dominant character to the upper part of the rankings is one of multifunctional vessels, in particular those that can represent serving/table vessels. This highlights the dual-edged nature of the typefunction DVF (diverse vessel function): there is an inherent ambiguity and range of components but the category also reflects the need to not pigeon-hole items by ascribing a single-function – especially if that label is a modern interpretation.

Pottery vessel lid (PVL) is fourth in the rankings, indicating it was a fairly ‘core’ good. This is explained, however, by the fact it is a generic and ambiguous artefact category, that may represent elements from cooking pots, jars, or even cups in the assemblage (cf. Peña and McCallum 2009b, 183). It is also possible that some of the lids were from additional vessels that were removed from the properties when they

Table 7.3: Weighted ranking of non-amphora ceramic vessel artefact types (pottery dolium and unidentified ceramic vessel are also omitted – see table AppD.2 for full ranked list)

Weighted Rank	Ceramic Vessel Artefact Type	Weighted Value
1	Pottery jar/vase	134.17
2	Pottery beaker/small vase	61.5
3	Pottery plate/dish/tray	47.83
4	Pottery vessel lid	39.67
5	Pottery jug	34.5
6	Pottery pot	30
7	Pottery cup/small bowl	18.67
8	<i>terra sigillata</i> bowl/cup	12.67
9	Pottery large bowl	12.5
10	Pottery vessel base	6.5
11	Small pottery jar/small amphoretta	5.5
12	<i>terra sigillata</i> plate/dish	4
13	<i>terra sigillata</i> fragment	1.25
14	Pottery cooking pot	0.67
=15	Pottery bottle	0.08
=15	Pottery pan	0.08
=15	Pottery plastic vase	0.08

were abandoned; the lids were non-essential components of vessels that would have been extra bulk to carry for those leaving the city.

The *terra sigillata* items are, in general terms, mid-range goods, despite having unexpectedly low presence in the sample population. It should be noted, however, that the *terra sigillata* categories are isolated ‘types’ of vessel, whereas other categories are a mixture of classes. For example, amphorae are not divided into constituent types but fall under the ‘umbrella’ term.

An artefact type that does have a very low occurrence, represented in the rankings, is that of pottery cooking pot (PCP). In order to investigate this, it will be necessary to assess the food preparation vessels within the category of ‘other vessels’ (OV).

When we reconsider the ranking of this data in terms of just the upper two levels of occupation status ('occupied' and 'reduced occupation'), the amended list (*table AppD.3*) does not differ as greatly as might be expected. This is primarily a reflection of the low artefact counts in several of the 'lower occupation' houses. The most noticeable changes are the absence of 'pottery bottle', and 'pottery dolium' dropping to fifteenth in the rankings, making it much more of a peripheral item; this is due to the removal of House 1, which has 29 dolia listed in the assemblage records.

Bearing in mind that the overall pattern has not varied much from that of the aggregate house rankings, the following question is raised: how do the ranked artefact types for each individual house compare to that of the cumulative pattern so far discussed? It has already been established that House 1 had an abnormal quantity of pottery dolia (PD), highlighted by the rankings for that assemblage, but are similar trends visible elsewhere in the population sample? *Table 7.4* lists the weighted rankings for all twelve houses and once again demonstrates the predominance of storage/transport vessels. These will be discussed further, below.

Table 7.4: Weighted rankings for ceramic vessel artefact types by individual house

House 1		House 6	
dolium	29	amphora/amphoretta/hydria	15
amphora/amphoretta/hydria	28	pot	2
pot	2	beaker/small vase	1
beaker/small vase	1	dolium	1
cup/small bowl	1	jar/vase	1
jar/vase	1	plate/dish/tray	1
jug	1		
House 2		House 7	
beaker/small vase	8	amphora/amphoretta/hydria	97
jar/vase	6	jar/vase	42
pot	6	plate/dish/tray	19
jug	5	vessel lid	12
plate/dish/tray	4	jug	11
amphora/amphoretta/hydria	3	<i>terra sigillata</i> bowl/cup	7
cup/small bowl	3	cup/small bowl	6
large bowl	2	beaker/small vase	5
amphora fragment/lid	1	large bowl	4
small jar/small amphoretta	1	<i>terra sigillata</i> fragment	3
<i>terra sigillata</i> bowl/cup	1	cooking pot	2
		pot	2
		amphora fragment/lid	1
		<i>terra sigillata</i> plate/dish	1
House 3		House 8	
amphora/amphoretta/hydria	3	beaker/small vase	28
small jar/small amphoretta	1	amphora/amphoretta/hydria	16
<i>terra sigillata</i> bowl/cup	1	jug	10
		vessel lid	9
		<i>terra sigillata</i> plate/dish	7
		jar/vase	6
		cup/small bowl	4
		pot	4
		vessel base	3
		<i>terra sigillata</i> bowl/cup	2
		large bowl	1
House 4		House 9	
amphora/amphoretta/hydria	15	jar/vase	22
cup/small bowl	5	amphora/amphoretta/hydria	11
jar/vase	3	vessel lid	4
pot	3	<i>terra sigillata</i> bowl/cup	3
plate/dish/tray	2	beaker/small vase	2
bottle	1	jug	2
jug	1	pot	2
vessel lid	1	<i>terra sigillata</i> plate/dish	2
small jar/small amphoretta	1	dolium	1
		large bowl	1
		plate/dish/tray	1
		vessel base	1
		small jar/small amphoretta	1
		<i>terra sigillata</i> fragment	1
House 5			
amphora/amphoretta/hydria	27		
vessel lid	21		
beaker/small vase	13		
pot	11		
jar/vase	9		
large bowl	3		
plate/dish/tray	3		
jug	2		
small jar/small amphoretta	2		

House 10	
jug	10
amphora/amphoretta/hydria	9
beaker/small vase	3
pot	3
amphora fragment/lid	2
vessel lid	2
<i>terra sigillata</i> bowl/cup	2
jar/vase	1
<i>terra sigillata</i> fragment	1

House 11	
amphora/amphoretta/hydria	10
cup/small bowl	1
plastic vase	1
pot	1
<i>terra sigillata</i> bowl/cup	1

House 12	
amphora/amphoretta/hydria	94
jar/vase	70
plate/dish/tray	52
vessel base	22
beaker/small vase	21
vessel lid	19
large bowl	14
cup/small bowl	12
small jar/small amphoretta	5
dolium	4
jug	4
cooking pot	2
<i>terra sigillata</i> bowl/cup	2
<i>terra sigillata</i> plate/dish	2
unidentified vessel	2
amphora fragment/lid	1
Pan	1

7.1.5: Discussion

The majority of general-use pottery was inexpensive and used for a variety of functions (cf. Peña 2007a). Martial (9.59.22) recorded in the late first century CE that two cheap cups cost 1 *as* (Scheidel n.d., 32), correlating with a graffito (CIL 4.5380) from a house in Pompeii, IX.7.25, which noted the price of a cooking pot/jar (*pultarius*) was 1 *as*, with a plate (*patella*) and a lamp (*inltyinium*¹⁹) being of equivalent prices (Pena and McCallum 2009b, 181). Therefore, it would have not been a significant purchase for any of these households to replace a broken ceramic vessel, or invest in additional items, especially when the purchasing power of the coinage found in some of the houses is considered (see *section 6.3.1*).

If ceramic lamps (CL) are included in the rankings of the ceramic vessels, their strong presence is demonstrated with a weighted value of 133.83. This would put them second in the rankings of *table 7.3*. If this is considered in contextual terms by comparison to Herculaneum, environ-behavioural actions can be surmised. The eruption, which started late in the morning on 24th August, appears not to have had such an impact on Herculaneum until the evening, therefore giving the inhabitants of Herculaneum more chance to escape with valuables and portable goods. This has been validated by the recovery of possessions associated with many of the skeletons in the arcades at the beach of the town. Furthermore, lamps were found by many individuals indicating evacuation was in low light, whether due to the time of day or the obscuration of the sun by volcanic ash and debris (Rocco 2003, 60). At Pompeii, however, there was less warning for the inhabitants who would have had less time to

¹⁹ Peña and McCallum note that this has in the past been interpreted as to mean either a lamp or a 'wooden wine bucket' (2009b, 181 n.95)

recover important objects; something they would have done during the day, before darkness fell. In addition to this, the pumice fall over Pompeii may have required those fleeing the city to use their hands to shield their heads, rather than carry items such as lamps.

The position of ceramic lamps at third in the overall weighted rankings is due to their large number in the sample population ($n = 146$) as well as their widespread occurrence (eleven of the twelve houses), and therefore reflects their character as 'core' goods. Allison, however, notes that while they are abundant objects, the occurrence of lamps "barely allow[s]... for one lamp per room" (2007, 390).

The abundance of ceramic lamps is also reflected by the individual rankings if this artefact type is included, with them occupying a top three position for eight houses (Houses 3, 5, 6, 7, 8, 9, 10 and 11). Such a pattern can be explained by two predominant factors: (i) there was a functional necessity for such consumer durables, objects that were low in cost and with a probable short use-life (Allison 2007, 390; Peña and McCallum 2009b, 189); and (ii) the fact that the majority of Pompeian inhabitants would most likely have fled during daylight, consequently potentially demoting the importance of carrying lamps that was later to be held by the Herculaneum fugitives.

Peña and McCallum (2009b, 189) state that the recovery of ten or more lamps in a house has not been unusual in Pompeii, and that it was probably not uncommon for households, as well as workshops and other such properties, to have possessed at least such quantities at any one time. An interesting insight noted by Peña and McCallum (2009b, 189, n.165) into the consumption of such objects comes from the *Edictum de Pretiis* (15.99) which indicates the sale of lamps in lots of ten at a maximum price of four *denarii communes*.

The creation of ranked lists of objects is useful for identifying core and fringe goods but these are not identified by frequency alone, hence the weighting process. Traditional ranking procedures, however, do not satisfactorily address questions of value; they offer a measure of materialism and can identify inexpensive or easily available objects but it may not have been necessary to possess more than one or two of the same core goods. This would consequently mean that such items would not be high up the ranked list, even if present across the sample population. An example of a potential low-frequency core good is the artefact type of pottery cooking pot (PCP).

7.1.5.1 Average Ceramic Consumption Profiles

Using the individual household consumption profiles from *section 7.1.2* it is possible to create a profile of mean non-amphora ceramic consumption. *Figure 7.22* illustrates the similarity between the upper and lower levels of occupation status: the overall pattern is the same, although most notably the proportional profiles (*b*) are generally ‘inflated’ versions of the absolute profiles (*a*). This is because there is additional emphasis given to PJ and PPt; the houses that were largely unoccupied in 79 CE also exhibit strong proportional representations of SPJ (small pottery jar/small amphoretta). In absolute terms, however, this is shown to be a minimal number of artefacts.

In *section 7.1.2* two predominant patterns were identified in the ceramic consumption profiles: peaks at the ‘three o’clock’ and ‘twelve o’clock’ positions. In the mean profiles these trends remain, although several additional patterns are now more evident and can be commented upon here. Most apparent is a third peak at the

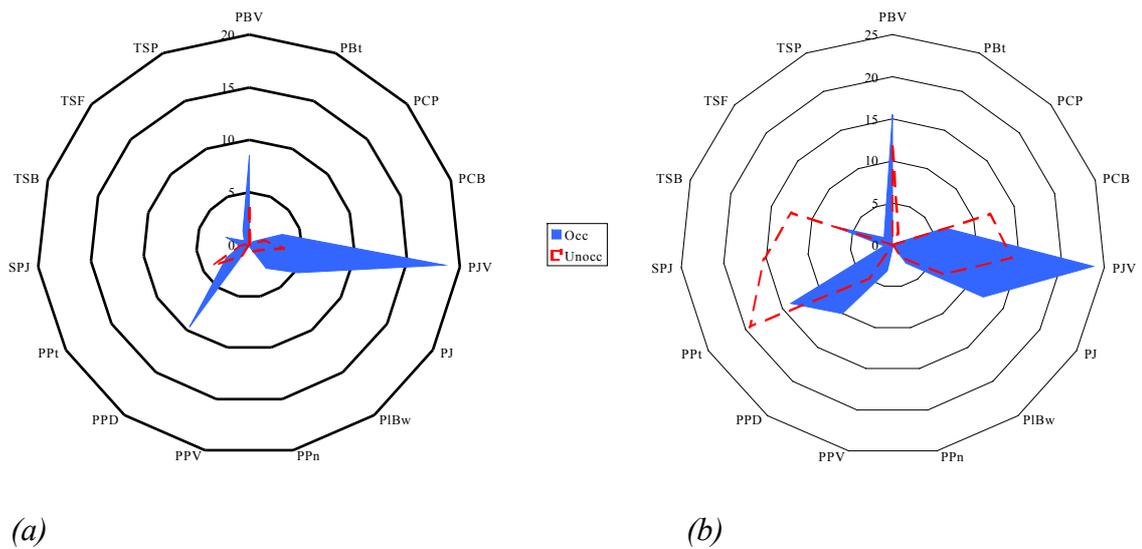


Figure 7.22: Average non-amphora ceramic consumption profile divided by upper and lower states of occupation in (a) absolute terms and (b) as a proportional representation.

‘seven o’clock–eight o’clock’ position. At an individual household level, comparison to the mean profile demonstrates that few houses reliably reflect this characteristic three-pronged absolute profile (for example, Houses 2 and 12; *figure 7.16*). There are numerous examples, however, of variants at differing intensities. For instance, House 7 exhibits a weak peak at the ‘twelve o’clock’ position (PBV) but strong peaks at the other two positions (PJV and PPD); and House 8 exhibits a weak peak at the ‘eight o’clock’ position (PPt) but strong peaks at the other two positions (PBV and PJ). House 3 is most different to the average; explained by its very low assemblage size more than its perceived state of occupation.

Additional trends in the mean profiles are evident in *figure 7.22b*, in which the categories of SPJ and TSB also exhibit high proportional occurrences – although it can be seen from *figure 7.22a* that the ‘true’ frequencies of these artefacts are very low. It is, therefore, necessary to consider both forms of profile to gauge the

reliability of the trends; acknowledging absolute values helps to verify the authenticity of proportional patterns.

Interestingly, House 5 (largely unoccupied, and used for storage) yields one of the assemblages which most strongly reflects the average profile for occupied houses. This suggests that, by itself, non-amphora pottery is not a reliable indicator of occupation status. The low assemblage sizes for the unoccupied houses provide little effect on the overall profile for the data population, which closely resembles that exhibited for the occupied houses in *figure 7.22*.

By presenting the ceramic assemblages in this profile format it is possible to directly compare consumption patterns (visually and quantitatively), and identify an ‘average pottery orientation’ for the current data population. This can subsequently be compared to other houses in Pompeii and beyond in future studies. The fact that ceramic vessels represent inexpensive ubiquitous commodities that form a central vein in mundane consumption means that they constitute an excellent form of data for studying ancient consumer behaviour. By supplementing this with analysis of vessels of alternative materials, especially glass and bronze, consumptive habits can be considered in greater depth, as well as addressing behaviour closer to the ‘luxurious’ end of commodity acquisition and use. In the following section non-ceramic vessels will be examined, followed by an overall comparative analysis of vessels of all materials.

7.2: 'Other' Vessels

This section will consider non-ceramic vessels, subjecting the assemblages to analyses similar to those in the preceding sections. *Figure 7.23* illustrates the correlation between OV (other vessels) and house size, with the equivalent comparison for CV included. Both categories present a very similar overall pattern but with OV possessing a stronger r^2 value, indicating less variance from the trendline; the correlation for CV (as discussed in *section 7.1*) is not significant at the $p=0.05$ level, but it is significant for the correlation between OV and house size at $p=0.05$. This similarity in correlation between OV and CV is represented in *figure 7.24*, which indicates that a house yielding a large number of ceramic vessels is likely to yield correspondingly high numbers of 'other' vessels ($r^2 = 0.781$, which is significant at the $p=0.01$ level). The *proportional* values for the two functional categories, however, do not correlate in the same way (*figure 7.25*).

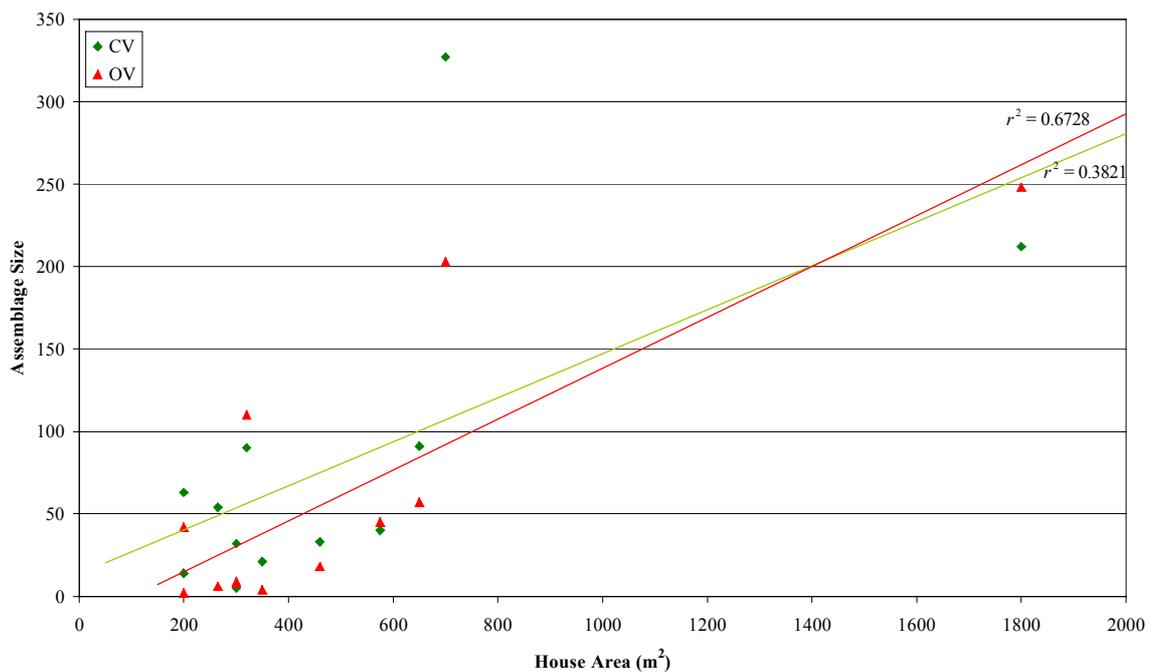


Figure 7.23: Size of OV assemblages (other vessels) by house area

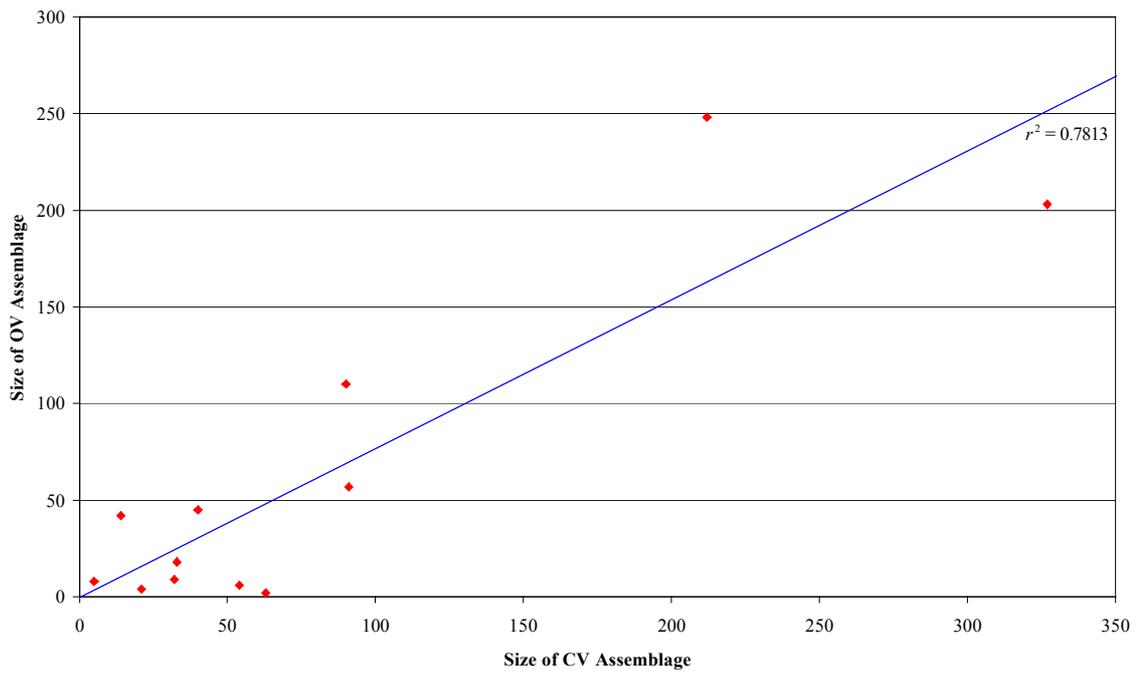


Figure 7.24: Correlation of OV (other vessels) to CV (ceramic vessels)

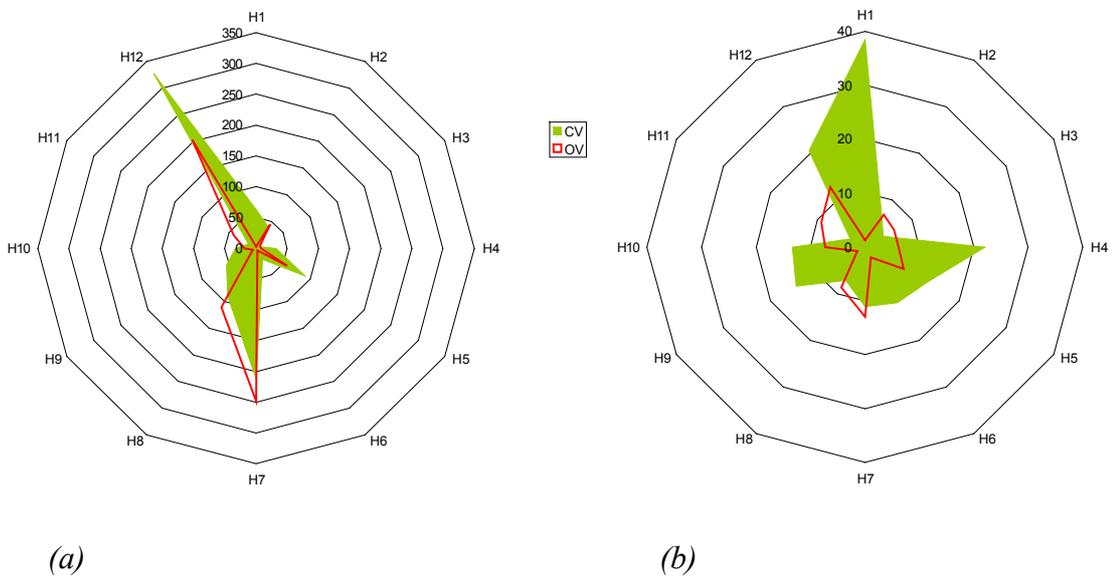


Figure 7.25: Consumption profiles of ceramic vessels (CV) and 'other' vessels (OV). (a) absolute frequency; (b) proportional frequency.

Table 7.5 displays the division of the functional category of ‘other vessels’ into artefact types and is summarised in *figures 7.26* and *7.27*. There are a total of 38 types across the population, comprising 10 glass, 24 metal (of which 17 are bronze, 6 silver, and 1 lead), and two marble types and one of each of stone and wood. As well as a few artefact types with low representation, there are some umbrella categories for uncertain or miscellaneous objects, such as unidentified glass vessel/lid/fragment (UGV). This artefact type is consequently the most abundant ($n = 136$), with 79.4 per cent of occurrences coming from two houses (Houses 7 and 12).

The two unoccupied properties yield low frequency totals for the category of other vessels (OV), with eight objects for House 3, and nine for House 4. House 1 (largely unoccupied) also has a very low OV representation ($n = 2$). House 5 does not share this trend, however, yielding a total of 57 items comprising a variety of artefact types and materials, including silver. The character of the OV assemblage of House 5 consequently resembles that of House 2 in *figure 7.27* but the two plots are adrift from one another in overall vessel assemblage character in *figure 7.28* because of the proportional differences in CV. The key point to be drawn from the ternary diagram is that many of the house plot points spread considerably outside of the ceramic corner; a factor also reflected in the absolute values for OV occurrence: an aggregate number of more than 250 glass vessels and over 200 metal vessels are present in the data population, and partly explains the low occurrence of fineware vessels. This illustrates the significance of considering vessels of alternative materials when examining artefact assemblages.

In order to investigate the variation in artefact type it was necessary to discount several categories because they are not true types of vessel: UGV (unidentified glass vessel/lid/fragment), BL (bronze lid, which only has a single item

in the sample population), and SVF (silver vessel fragment, which is only present in House 7). A higher number of OV items in an assemblage is shown to indicate greater variation in the number of artefact types represented (*figure 7.29*). The assemblages in this study display a relatively strong adherence to this correlation, with an r^2 value of 0.690 (significant at the $p=0.05$ level). As for the correlation with house area (*figure 7.23*), OV demonstrates less divergence from the trendline than CV does.

When the state of occupation is brought into consideration, a clear trend emerges. The proportional occurrence for the upper two tiers of this variable is 86.4 per cent for bronze vessels and 87.5 per cent for glass vessels. Even when the factor is taken into account that there are more houses in the population sample represented by the upper levels of occupation, the bias toward these levels of occupation yielding greater numbers of glass and bronze artefacts is undeniable, with the exception of House 9.

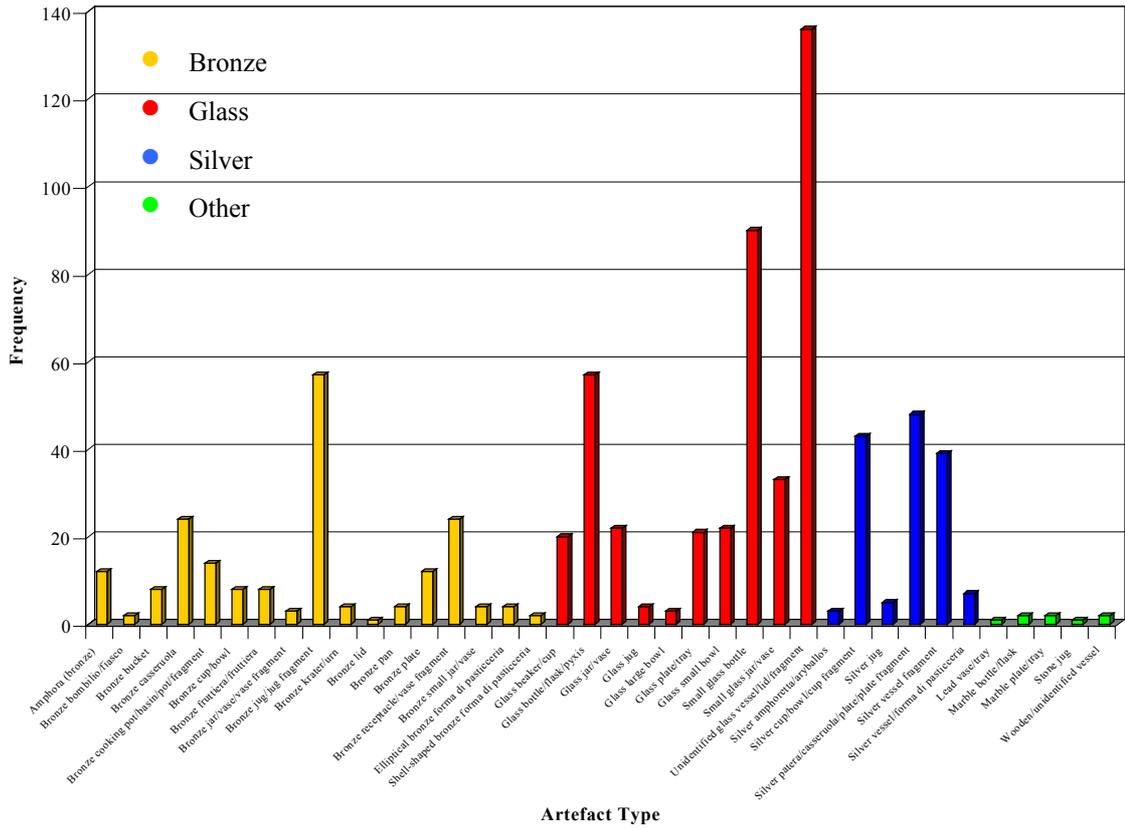


Figure 7.26: Overall OV (other vessel) occurrence in sample population by artefact type

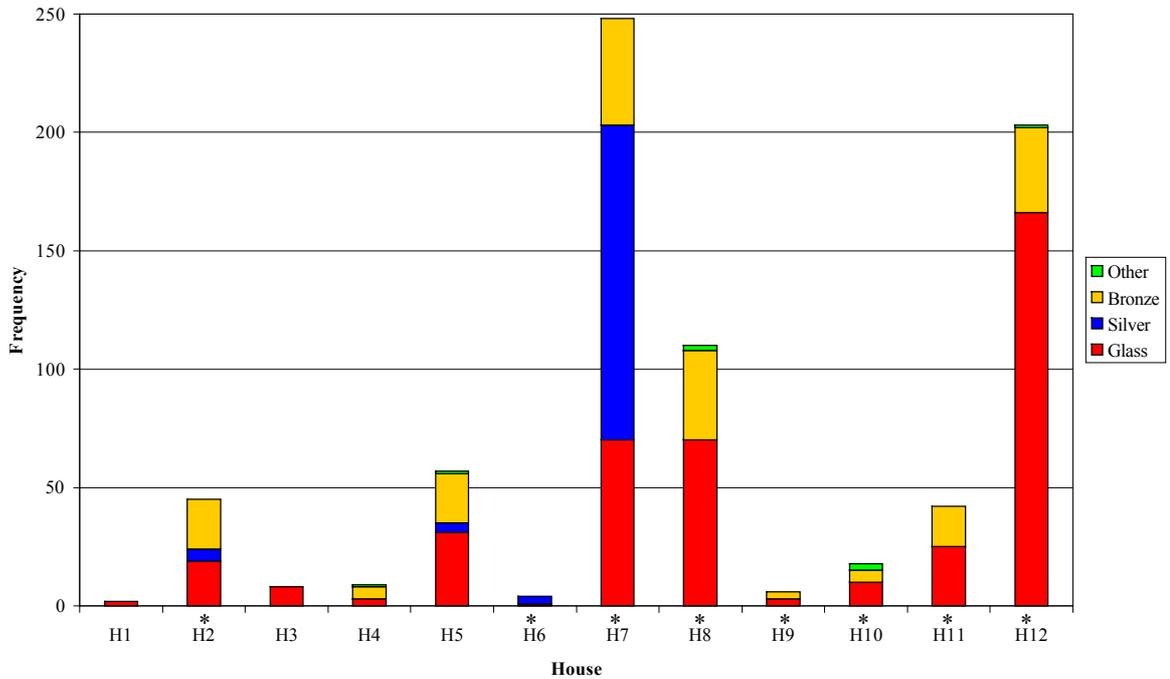


Figure 7.27: Other Vessel (OV) occurrence in assemblages by material, with upper two levels of occupation status indicated (*)

Table 7.5: Components of Functional Category 'OV' (other vessels)

Artefact Type	Abbr.	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	Total
Glass beaker/cup	GBC			1		4		3	5			3	4	20
Glass bottle/flask/pyxis	GBF		2		2			7	22	2	7	5	10	57
Glass jar/vase	GJV		6			1		7	1		1		6	22
Glass jug	GJ							1				1	2	4
Glass large bowl	GLB					1			2					3
Glass plate/tray	GPT					6					1		14	21
Glass small bowl	GSB		1			1		3	1				16	22
Small glass bottle	SGB	1	8	7	1	6	1	16	17	1	1	11	20	90
Small glass jar/vase	SGJ	1	2			2		3	4			5	16	33
Unidentified glass vessel/lid/fragment	UGV					10		30	18				78	136
Amphora (bronze)	Abz				1	2		3	2				4	12
Bronze bombilio/fiasco	BBF					1			1					2
Bronze bucket	BB							5			1	1	1	8
Bronze casseruola	BC		2			4		10	5	1		2		24
Bronze cooking pot/basin/pot/fragment	BCPB				1	1		4	2	1		3	2	14
Bronze cup/Bowl	BCP		2			2			3			1		8
Bronze fruttiera	BFF					4		3	1					8
Bronze jar/vase/vase fragment	BJV		1			1		1						3
Bronze jug /jug fragment	BJJ		4		2			13	15		3	6	14	57
Bronze krater /urn	BKU					2							2	4
Bronze lid	BL								1					1
Bronze pan	BrP		1		1	1		1						4
Bronze plate	BrPI		2			1		1	1	1		2	4	12
Bronze receptacle/vase fragment	BrRV		8			1		3	4			1	7	24
Bronze small jar/vase	BSJV		1			1			2					4
Elliptical bronze forma di pasticceria	EBF							1	1		1	1		4
Shell-shaped bronze forma di pasticceria	SSBF												2	2
Silver amphoretta/aryballos	SAA							3						3
Silver cup/bowl/cup fragment	SCB						1	42						43
Silver jug	SJ							5						5

Artefact Type	Abbr.	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	Total
Silver patera/ casseruola/plate/ plate fragment	SPC		5			4	2	37						48
Silver vessel fragment	SVF							39						39
Silver vessel/ forma di pasticceria	SVFp							7						7
Lead vase/tray	LVT					1								1
Marble bottle/ flask	MBF								1		1			2
Marble plate/tray	MPT										1		1	2
Stone jug	StJ				1									1
Wooden/ unidentified vessel	WUV								1		1			2
<i>Total</i>		<i>2</i>	<i>45</i>	<i>8</i>	<i>9</i>	<i>57</i>	<i>4</i>	<i>248</i>	<i>110</i>	<i>6</i>	<i>18</i>	<i>42</i>	<i>203</i>	<i>752</i>

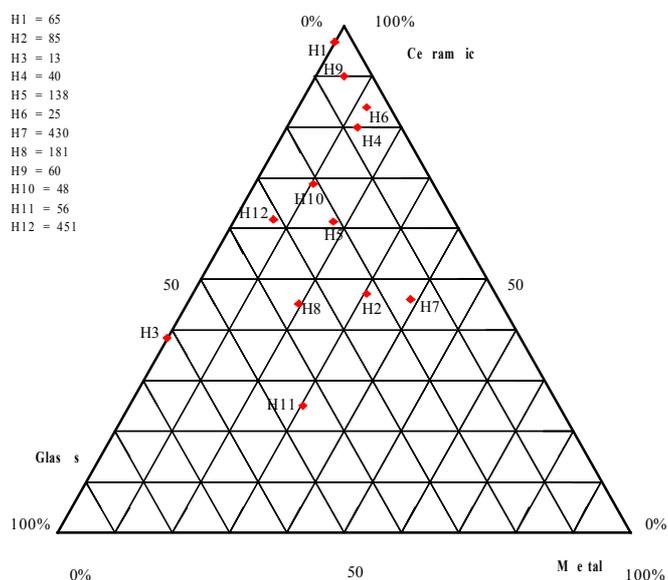


Figure 7.28: Comparison of character of vessel assemblages by material

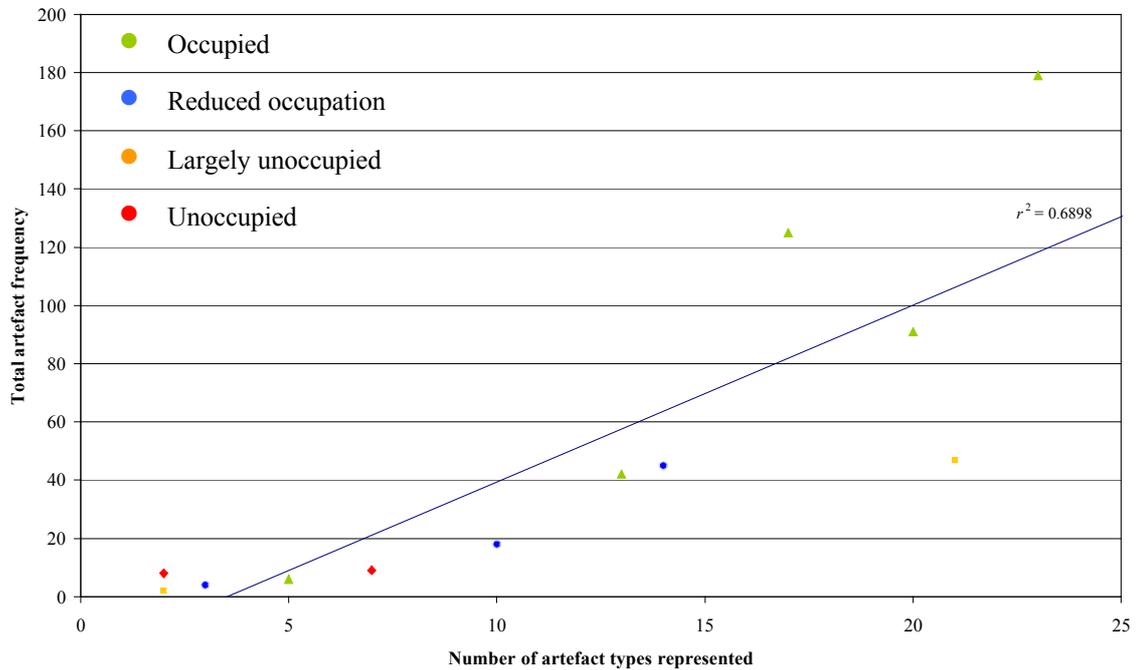


Figure 7.29: OV (other vessels) artefact type variation

7.2.1: Glass Vessels

The Correspondence Analysis biplot for the glass vessels excluding the UGV category (unidentified glass vessel) is displayed in *figure 7.30*, with the biplot including UGV in Appendix D (*figure AppD.6*). UGV is a category that exerts a relatively significant influence on the data correspondences, obscuring relationships (this is due to it possessing the largest mass, 0.333). For example, in the upper left quadrant, House 7 moves closer to House 3 when UGV is excluded, revealing a previously obscured association with SGB (small glass bottle), also shared by House 11.

Houses 4 and 9 occupy the same position in the biplot, as they both yielded very small glass assemblages ($n = 3$) with the same compositional elements (see *table*

7.5). Any interpretation based on this should therefore be hesitant due to the low values. Overall, there are few clear correspondence patterns in the data, apart from the identification of two outliers: GLB (glass large bowl), although this has a low frequency value of three; and GPT (glass plate/tray), which is overall more abundant ($n = 21$) than GLB but also restricted in terms of distribution across the population. House 12 represents 66.7 per cent of GPT ($n = 14$), with House 5 accounting for the majority of the remaining items (28.6 per cent, $n = 6$), hence the positioning of points in the lower right quadrant. As large glass vessels would not be expected to be among primary possessions removed by refugees, it seems likely that they were generally not consumed in large numbers in these Pompeian houses.

When house size is considered in conjunction with these data, no pattern is evident. Introducing the variable of level of occupation to the Correspondence Analysis biplot (*figure 7.30*) does not help with interpretive explanations. Even if Houses 1 ($n = 2$), 4 and 9 ($n = 3$ for both) are discounted due to their low frequency values, there is no clear pattern evident, apart from perhaps a tendency for occupied houses to be in the lower left quadrant.

Partially occupied houses (2 and 10) are located on the periphery of the biplot but with no correspondence to one another. House 5 (largely unoccupied) has been interpreted as having had some rooms used as storage spaces for salvaged material (Allison 2004a; 2004b), which could explain the relatively large glass vessel component, particularly as it has the second highest number of GPT (glass plate/tray) in the sample population. It is possible that House 5 therefore has an 'atypical' vessel assemblage composition, especially for the represented level of occupation, indicated in *figure 7.30* by it being distantly located from House 3. This interpretation also helps to explain the presence of silver and bronze (and a relatively large ceramic

vessel component, n = 91) in the assemblage of a house that was largely abandoned at the time of the eruption.

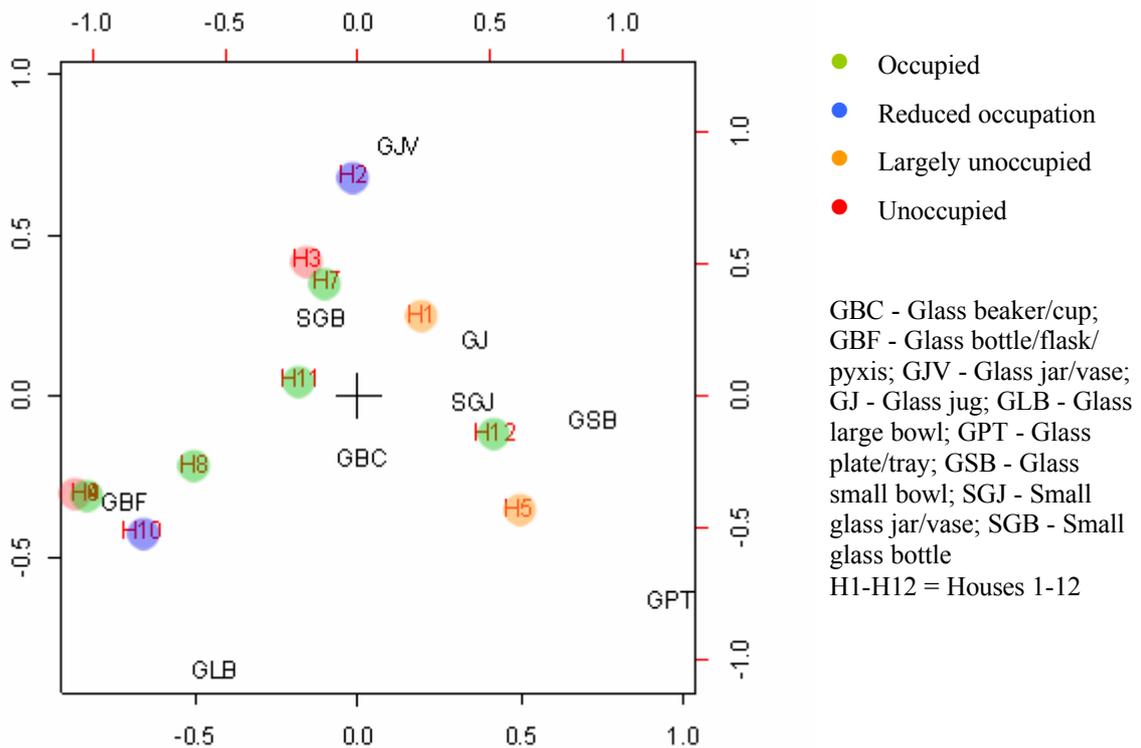


Figure 7.30: Correspondence Analysis for glass vessels by artefact type, with state of occupation in 79 CE indicated. UGV (unidentified glass vessel/lid/fragment) and House 6 omitted (n = 1).

Houses 7 and 8 (fully occupied) both have marginal totals of 70 but their assemblages appear different in composition, as the former demonstrates a close association with SGB (small glass bottle), while the latter shows greater correspondence to GBF (glass bottle/flask/pyxis). Both of these artefact groups, however, are similar in *form* despite being different *types*. It is consequently necessary to re-analyse these data in terms of overall form composition to see if such patterns are a result of modern classificatory divisions. Furthermore, this permits a direct comparison with the ceramic and bronze vessel data, which will be addressed below.

Figure 7.31 illustrates the glass vessel data according to form and demonstrates a clear pattern in relation to state of occupation. PIT (plate/tray) forms the predominant outlier, with the houses that represent the lower two levels of occupation (Houses 3 and 4, and 1 and 5) being peripheral elements to the main cluster situated around the centroid – the core of which is represented by the fully occupied houses (7, 8, 11 and 12). House 9 is separate to this pattern due to its low vessel frequency value.

The loose association represented in *figure 7.30* between House 5 and bowls/serving vessels is strengthened in *figure 7.31*, lending credence to the interpretation of the storage of salvaged items, as opposed to vessels left behind. Furthermore, although Houses 7 and 8 are in closer proximity when the glass vessels are represented by form, they are separated by the pull of JJV (jug/ jar /vase) for the former and BtF (bottle/flask) for the latter. When PIT (plate/tray) is removed from the analysis, a ternary diagram depicting glass profiles according to the three dominant forms can be constructed (*figure 7.32*). The houses that yielded low vessel quantities, labelled in parentheses, are notably located at the extreme margins of the diagram.

Table 7.6: Weighted ranking of all glass vessel artefact types. Unidentified glass vessel/lid/fragment (UGV) has been omitted from the list

Weighted Rank	Glass Vessel Artefact Type	Weighted Value
1	Small glass bottle	90
2	Glass bottle/flask/pyxis	38
3	Small glass jar/vase	19.25
4	Glass jar/vase	11
5	Glass beaker/cup	10
6	Glass small bowl	9.17
7	Glass plate/tray	5.25
8	Glass jug	1
9	Glass large bowl	0.5

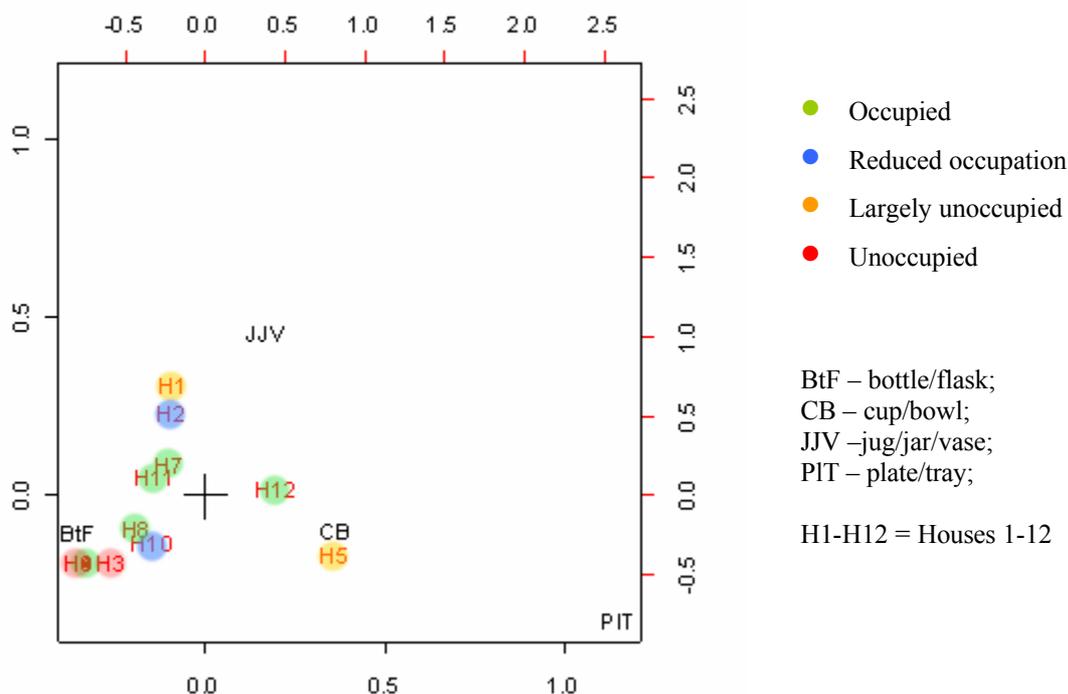


Figure 7.31: Correspondence Analysis for glass vessels by form. UGV (unidentified glass vessel/lid/fragment) and House 6 omitted.

The ‘atypical’ composition of the assemblage from House 5 is also reflected, demonstrating a greater association with cups and bowls than any other house (as seen in figure 7.31). The distance, and therefore dissimilarity, between the glass vessels from Houses 7 and 8 is also evident in this illustration, which is due to the bottle/flask variation.

The ranking of this component of the data population (tables 7.6 and AppD.4) emphasises the predominant use of glass vessels as storage containers, with bottles, jars, and vases forming the majority of this class of object (n = 202). This is reflected in the individual consumption profiles for glass vessels (figures 7.34 and 7.35), as well as being depicted in overall terms by the ternary diagram (figure 7.32). In the individual profiles SGB (small glass bottle) is shown to be the most recurrent artefact type, with GBF (glass bottle/flask/pyxis) also prevalent, creating the general ‘9.10’

clock face position evident for all of the occupied houses. House 12 displays this in a ‘swollen’ form, which is dominated by a more distinct ‘9.30’ profile shape.

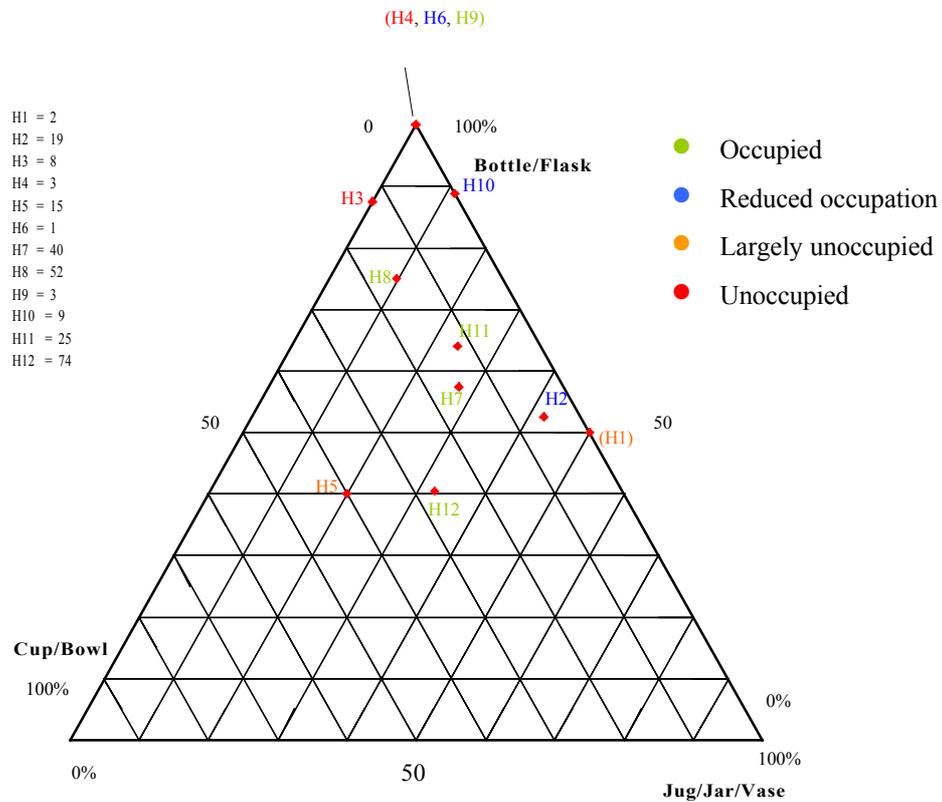


Figure 7.32: Cumulative consumption profile of three predominant glass vessel forms

With glass bottles and jars being near-ubiquitous vessel forms within the current data population, and therefore representing core goods, the trend noted by Stern (1999, 479) that glass was the preferred material for storage containers by the mid-first century seems to be reinforced here. Stern also states that glass jugs and decanters were a great Roman tradition, one that began before the middle of the first century (1999, 479). This, however, is not evident from the household assemblages in this study; there are only four occurrences of glass jugs, whereas there are 46 ceramic and 57 bronze examples (figure 7.33). One of the key advantages of glass – that it did not

affect the taste of wine (Stern 1999, 479) – did not seem to be a primary consideration for these Pompeian households, assuming that such vessels were used for the service of wine. It should also be noted that jugs were not just used for liquids that were to be ingested: they were also used for ablutions and washing the hands and/or feet of patrons visiting the house (Allison 2004a; 2007; Fleming 1997).

When the individual consumption profiles for glass vessels are compared to those of the mean (*figure 7.36*), it is clear that all of the occupied houses closely resemble the proportional profile, with a ‘9.10’ clock-face position. This reflects the dominance (also clear from the rankings in *table 7.6*) of two particular artefact types, which can be divided into clear consumer orientations:

- Household/utility ware: SGB (small glass bottle)
- Tableware: GBF (glass bottle/flask/pyxis)

The mean proportional profile for the unoccupied houses also exhibits this pattern, although there is a stronger trend towards SGB. Furthermore, there is greater differentiation between the individual profiles for the unoccupied houses (*figure 7.34*). In absolute terms, the mean glass vessel profile exhibits a much more varied pattern, with no one or two artefact types proving dominant. The unoccupied houses yield a mean profile too small to provide distinct patterns, despite the relatively large glass assemblage from House 5 (*figures 7.34 and 7.35*).

Assuming that glass vessels were not removed from the houses by the occupants prior to the eruption, this data set suggests that they were not highly consumed items, with the exception of small storage vessels. There is still the possibility of post-abandonment looting, a factor that is difficult to account for in quantitative analysis.

There are two factors that could help to explain this trend: cost and availability of goods. Stern (1999, 461-2) suggests that it may have been common practice to sell glass in an objective way that reflected production costs and functional utilitarianism: by weight, in an analogous way to pottery containers sold by capacity – although it seems that luxury and decorated glass was sold per piece.

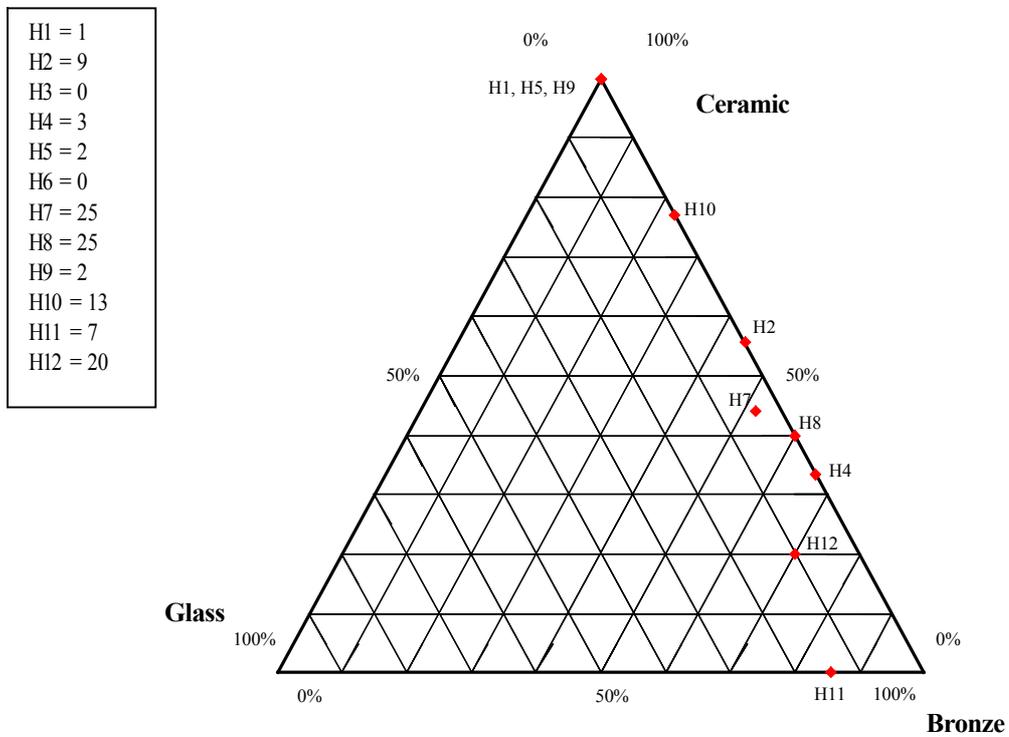


Figure 7.33: Jugs by material.

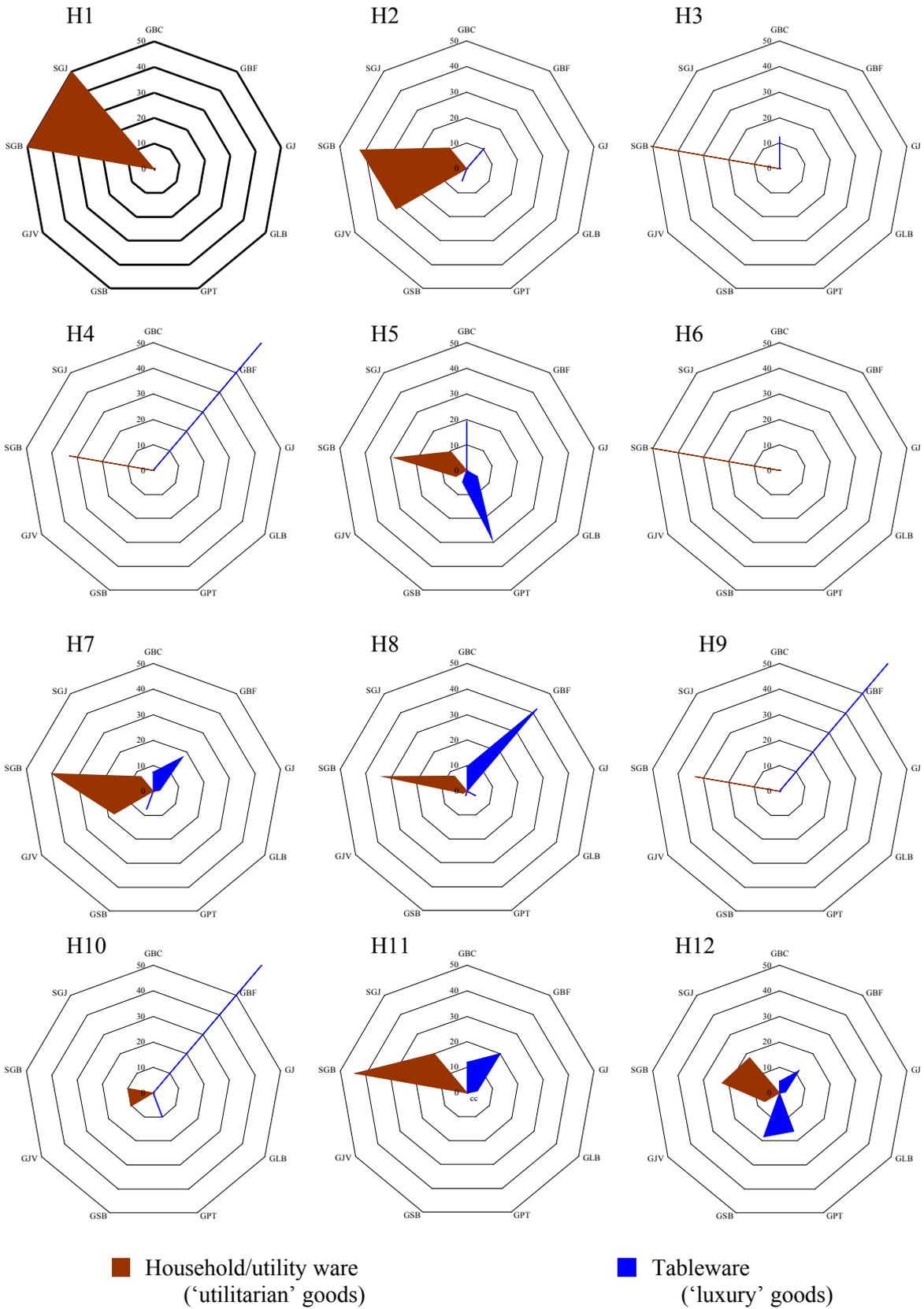


Figure 7.34: Consumption profiles of glass vessels artefact types (proportional values)
 GBC - Glass beaker/cup; GBF - Glass bottle/flask/pyxis; GJ - Glass jug; GLB - Glass large bowl; GPT - Glass plate/tray; GSB - Glass small bowl; GJV - Glass jar/vase; SGB - Small glass bottle; SGJ - Small glass jar/vase
 H1-H12 = Houses 1-12

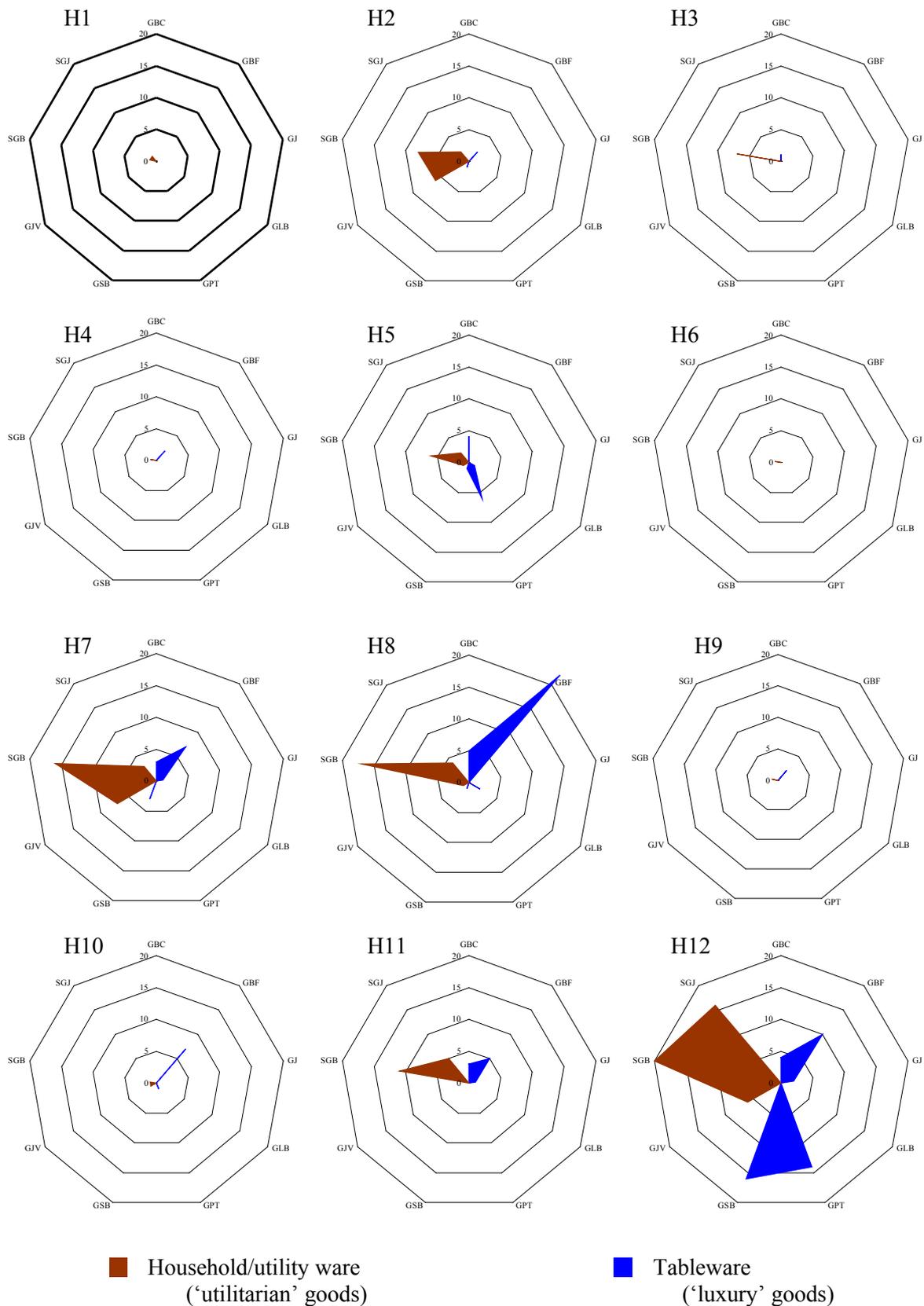


Figure 7.35: Consumption profiles of glass vessels artefact types (absolute values)
 GBC - Glass beaker/cup; GBF - Glass bottle/flask/pyxis; GJ - Glass jug; GLB - Glass large bowl; GPT - Glass plate/tray; GSB - Glass small bowl; GJV - Glass jar/vase; SGB - Small glass bottle; SGJ - Small glass jar/vase
 H1-H12 = Houses 1-12

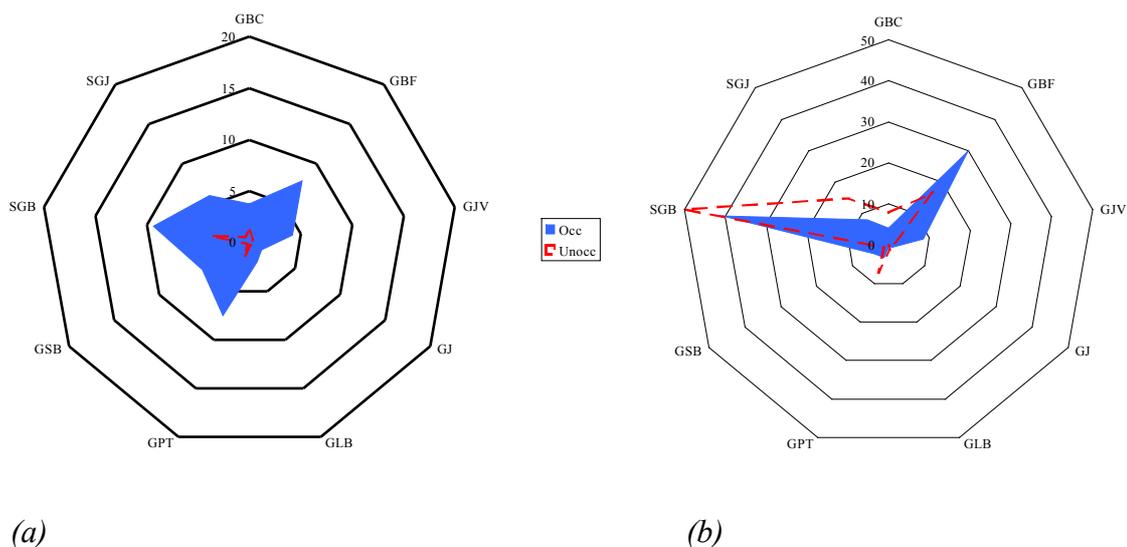


Figure 7.36 (a) and (b): Average glass vessel consumption profile divided by upper and lower states of occupation in (a) absolute terms and (b) as a proportional representation.

7.2.1.1: Glass versus Ceramic Vessels

The advent of glass-blowing, which was empire-wide by the mid-first century CE (Stern 1999), led to more efficient manufacture and standardisation of glass vessels²⁰ and thus resulted in lower prices. Although Diocletian’s edict on prices suggests that a glass bottle was ten to twenty times the price of a comparable ceramic vessel (cf. Stern 1999, 462), the discrepancy may not have been so great in the first century; Peña (1999, 37) suggests that in the Early Dominate glass containers may have been of comparable cost to inexpensive pottery vessels. Strabo (16.2.25) stated that some drinking cups could be bought “for a copper”, while Pliny (*HN* 36.199) noted in 70 CE that glass tableware had “almost ousted silver and gold” (Stern 1999, 479). Although Pliny refers to glass vessels in comparison to those of precious metals,

²⁰ For example, some utilitarian vessels (such as bottles) were blown in smooth-walled molds to expedite production and standardise capacity (Stern 1999, 468).

which held a higher place in the hierarchy of Roman material values (Fleming 1997, 12), this could also be an explanation for the relative lack of fineware in the ‘elite’ houses in my data population.

Fine tablewares were more economically profitable as they could be traded long-distance, whereas household containers and tableware for daily use were consumed within local and regional markets (Stern 1999, 467). This corresponds to the local and peri-local markets for ceramic vessels that Peña and McCallum (2007b) present. As with pottery exchange networks, glass vessels would have also been available through itinerant traders. It is probable that such traders would have collected broken glass for recycling (Stern 1999, 467; also see Keller 2005. For the recycling and reuse of pottery see Peña 2007).

Glass tableware vessels were also a successful rival to pottery alternatives (Fleming 1997, 3) and were widely accessible from Tiberius’ reign (14-37 CE). It has been stated that glass vessels outnumbered thin-walled pottery by as much as two or three times in the cities buried by Vesuvius (Stern 1999, 470). To test this, comparative analysis of tableware vessels has been carried out for the current data set. From the available information it is not possible to identify the quantity of thin-walled ware present. Therefore, working from the assumption that tableware comprise fineware or thin-walled material, this category of data can be contrasted to glass tableware (*figures 7.37 and 7.38, refer to tables 7.1 and 7.5*). There is obviously a strong correlation between the occurrences of the two types, although the ratios of incidence are not consistent according to the state of occupation.

It is immediately apparent that the pattern cited by Stern is not supported. In fact, only two houses yielded a greater number of glass tableware vessels than ceramic counterparts (Houses 5 and 8), with the former representing storage of goods.

One explanation for this could be that the evidence Stern refers to was from the Herculaneum site museum, analysed by Morel (1979)²¹, and could thus potentially reflect selective archaeological recovery strategies rather than a ‘true’ behavioural phenomenon. Nevertheless, the discrepancy between results is sizeable and suggests that the consumption of glass was not as prevalent as has been previously generalised in the literature.

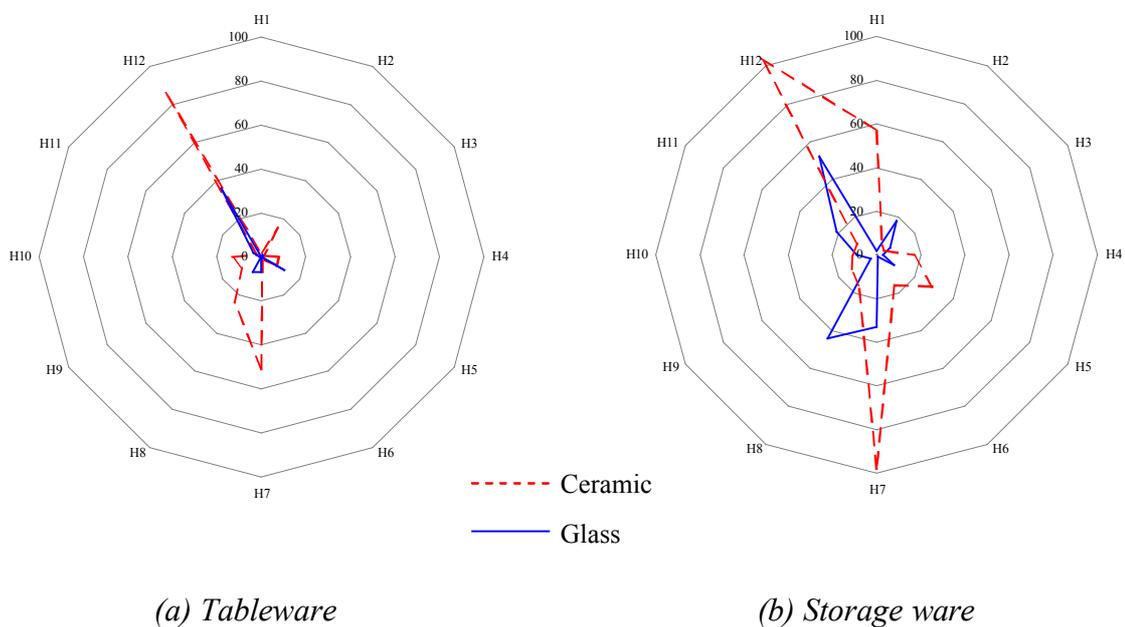


Figure 7.37 (a) and (b): Cumulative consumption profile for tableware (a) and storage ware (b)

7.2.1.2: Tableware:Storageware Ratios

To test the applicability and validity of the concept of the generalised comparative descriptions of consumed household ceramic vessels devised by Shephard (1987), discussed in Chapter Four, the ratios of tableware to storage ware in the Pompeian

²¹ 260 glass vessels (71.0 per cent) and 106 thin-walled pottery (29.0 per cent).

household assemblages have been investigated. Shephard stated that lower-class ceramic assemblages demonstrated a greater proportion of storageware to tableware. However, in my analysis glass vessel ratios have also been taken into account.

I concur with the statement made by Leone and Crosby (1987) that storageware:tableware ratios are somewhat ambiguous. This is not only because of the presence and use of non-ceramic vessels but also because low frequencies can cause deceptive index scores, and many vessels (especially glass) could be for either storage or table use. For example, *figure 7.38* displays the index values as a column chart and demonstrates that Houses 1 and 6 both have high ratio values for ceramic vessels and would indicate 'low-class' assemblages according to Shephard. It is interesting to see that where ratio values for glass vessels are present, they exceed the ceramic equivalents in all but one example, House 5. Therefore, even though the glass vessels were 'more expensive' alternatives, they are present in greater numbers as household storage vessels. This verifies the statement made in chapter three that the nature of the storage vessels needs to be taken into account because small bottles are a significant influence on the results.

I would argue that it is much more productive to investigate the storageware:tableware ratios by considering *all* vessels, not just ceramic ones, as a more realistic image of consumption patterns are created (*figure 7.39*). Once again Houses 1 and 6 yield high values, although all of the remaining houses, except for House 5, yield ratios of less than five. This would suggest that the houses from the

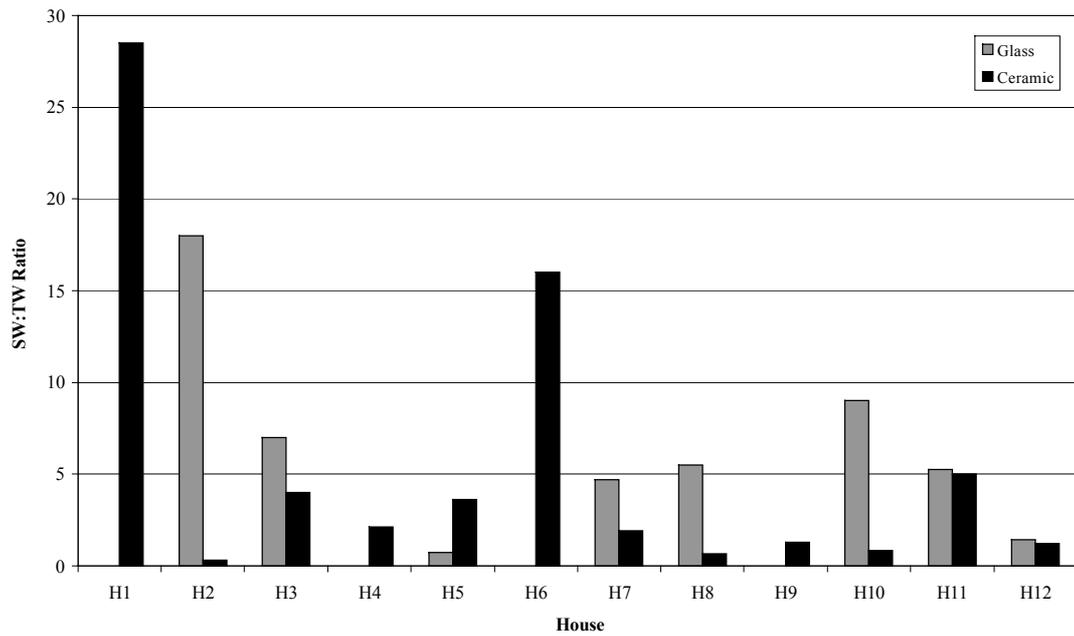


Figure 7.38: *Storageware:tableware ratios for glass and ceramic vessels (where the ratio values are zero, storageware vessels are present but tableware were absent).*

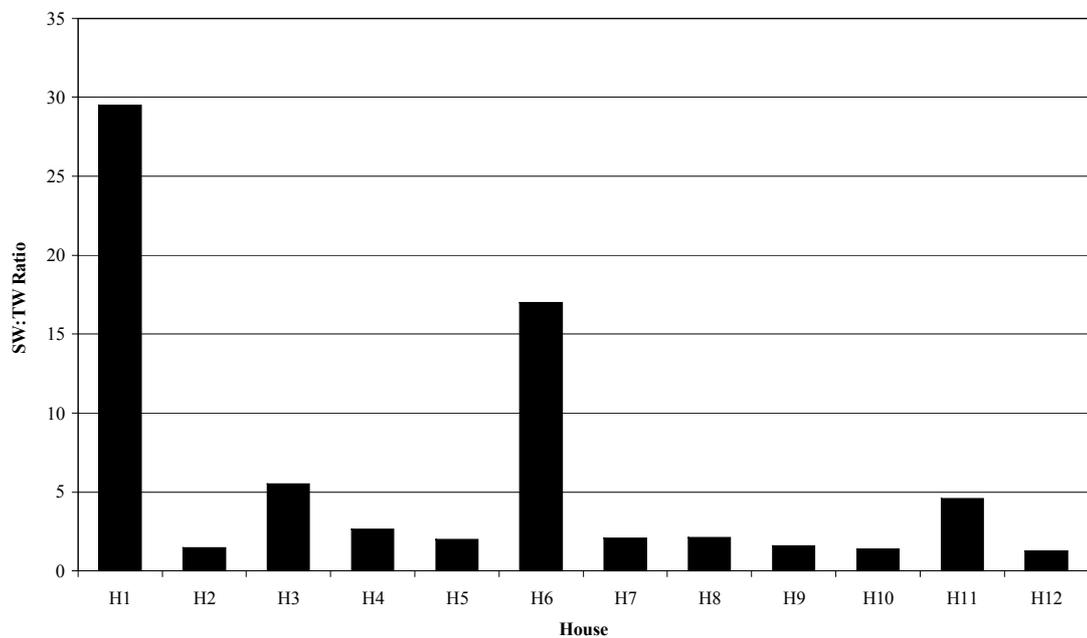


Figure 7.39: *Overall storageware:tableware ratios*

current data population do largely appear to fit within Shephard's model. However, there is the additional factor of occupation status, for which this method of vessel analysis does not provide any scope for consideration. It has therefore been demonstrated that the formulation of a quantitative index can be misleading and should be viewed with caution, especially if individual vessel materials are analysed in isolation.

It could be argued that, overall, the data reflect that the greater relative price for glass left many consumers selecting pottery vessels in the decision-making stage of acquisition. The concept of consumer decision-making through evaluation of information is perceptible through the constellations of consumer durables present in archaeological assemblages, as well as through references made in ancient documentary sources. For example, Petronius states that he would buy glass as a substitute for vessels made from precious metals if it did not break. In this situation, a decision is being inferred using product attribute information and utilitarian rationale.

The presence of GLB (glass large bowl) at the bottom of the ranked list of glass vessels identifies it as a fringe good, suggesting that the labelling of the glass assemblage of House 5 as being 'atypical' is valid, particularly based on its level of occupation. Such a phenomenon also raises questions about the consumption of vessels for use in convivial dining practices (cf. Dunbabin 2003). The spatial layout of early Roman dining in the first century CE, however, favoured small vessels with small tables being shared by several diners. Examination of additional Pompeian data would be useful to further investigate potential trends.

In the next section bronze vessels will be examined as part of the OV category. Glass vessels will be returned to later in the chapter (*section 7.3*) as part of a more general discussion incorporating all vessel data.

7.2.2: Bronze Vessels

In *section 7.1*, the ceramic vessels relating to cooking were one of the types of object that had a noticeably low occurrence. It was posited that this phenomenon could indicate the importance that these goods held for those leaving the city when gathering necessary equipment. An alternative interpretation is that bronze food preparation vessels were widely used and formed a part of the overall vessel assemblage that was complementary to ceramic goods. Investigation of this facet of the data is important in ascertaining the consumption behaviour of the households in this study.

When the occurrence of both ceramic and bronze cooking vessels are compared (*table 7.7*), it is immediately apparent that bronze items are much more prevalent both in terms of frequency and representation across the population sample. Furthermore, they are represented to a much greater extent by the occupied houses, a factor that could be explained when it is considered that refugees would have been more likely to carry bronze vessels than ceramic, as they are more robust and of greater value.

The Correspondence Analysis biplot for bronze vessels (*figure 7.40*) indicates that the cooking vessels of BC (bronze casseruola) and BCPB (bronze cooking pot/basin/pot/fragment) demonstrate close associations with one another; this indicates that the consumption habits of the households in the population sample reflect a correlation between these two artefact types. This is particularly the case for Houses 4, 7, 9 and 11, which are all concentrated around BCPB. *Figure 7.40* also illustrates the significant influence the level of occupation has on these data. There is a clear cluster of fully occupied houses, only punctuated by the presence of House 4

(unoccupied). This introduces interesting questions relating to the occupation of this property, as it has been suggested that it had been largely looted and subsequently occupied by squatters (Allison 2004b). If this interpretation was indeed the scenario in 79 CE, then these vessels potentially represent an indication of core goods belonging to those squatting here. This hypothesis can be tested further by investigating the ranking of bronze goods: if these items represent fringe goods when the entire sample population is considered, it is unlikely that these are the transported items of squatters, as they would arguably possess the most commonly occurring and most multifunctional items within of this class of vessel.

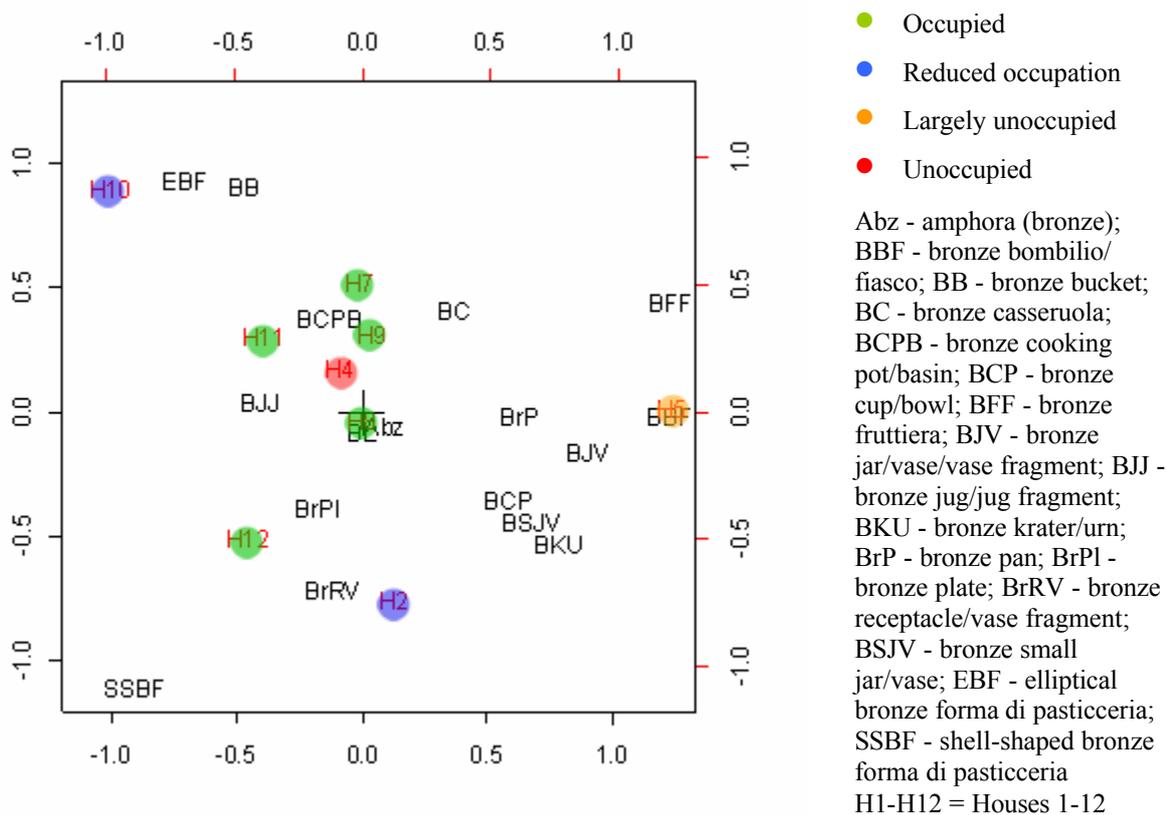


Figure 7.40: Correspondence Analysis for bronze vessels by artefact type with BL (bronze lid) omitted. Houses 1, 3 and 6 all yielded no bronze vessels.

Table 7.7: Cooking vessel occurrence (House labels in smaller font indicates an overall frequency of zero for that assemblage)

House	Artefact Type				
	Bronze casseruola	Bronze cooking pot/basin/pot/fragment	Bronze pan	Pottery cooking pot	Pottery pan
	BC	BCPB	BrP	PCP	PPn
H1					
H2	2		1		
H3					
H4		1	1		
H5	4	1	1		
H6					
H7	10	4	1	2	
H8	5	2			
H9	1	1			
H10					
H11	2	3			
H12		2		2	1
<i>Total</i>	<i>24</i>	<i>14</i>	<i>4</i>	<i>4</i>	<i>1</i>

The serving vessel forms are predominantly located in the lower half of the biplot and demonstrate strongest associations with Houses 2, 5 and 12. House 5 occupies a position on the far right of the biplot, distanced from all of the other houses. This could be either a reflection of the fact it had a low level of occupation, or that it was a site of storage and consequently does not yield an assemblage of bronze goods that might be seen as more ‘typical’ elsewhere. House 8, located on the centroid, yielded a wide range of bronze vessel artefact types and appears as the closest thing to an ‘average’ assemblage. Significantly, it yielded both BC (bronze casseruola) and BCPB (bronze cooking pot/basin).

SSBF (shell-shaped bronze forma di pasticceria) pulls House 12 away from all of the other points because this is the only assemblage to yield this artefact type. Consequently it has a different character in comparison to the other houses in this

plot. House 4 has maintained relative proximity to the other households due to 40 per cent of the assemblage ($n = 2$) consisting of items from the high-mass category of BJJ (with a further 40 per cent, $n = 2$, coming from the moderately high-mass categories of BCPB and ABz (bronze amphora); see *table AppC.12* for numerical statistics). The most significant aspect of this biplot is the close association of cooking vessels with nearly all of the houses. Houses 2 and 12 are the only exceptions, the latter primarily being explained by the effect of the outliers of SSBF and BKU (bronze krater/urn). With regard to house area, there is little pattern in the data, with houses of different sizes sharing associations, although there is a cluster of small houses (200-300m²) close to the centroid (*figure AppD.7*). However, this trend seems to be influenced more by state of occupation than by house size.

The Correspondence Analysis by form presents a clearer picture (*figure 7.41*). House 5 is once again noticeably distanced from the main cluster of points, being significantly drawn by the CB (cup/bowl) and BtF (bottle/flask) artefact categories in the upper right quadrant, which constitute 41 per cent ($n = 9$) of the bronze vessel component for this house (refer to *table 7.5*). The close association House 4 has with the cluster of houses from the upper tiers of occupation reinforces the pattern from *figure 7.40*. The cause of this can be traced back to the high proportional occurrence of JJV (jug/jar/vase) and PC (pan/pot/casseroles), together forming 80 per cent representation of the assemblage (40 per cent each). When these artefact types are considered in terms of the consumptive priorities inferred on them (subconsciously or otherwise) by the household members it is not insignificant that the dominant representatives form the top two positions in the weighted rankings (see *table 7.8*). As discussed above House 4 has previously been interpreted by Allison as largely abandoned with occupation limited to the presence of squatters. The presence of core

goods that rank so highly on the bronze vessel list supports this hypothesis. For further discussion in relation to the position of these categories in cumulative ranked lists of vessels of all materials see *section 7.3*. It is also not a surprise to find items such as SSBF (shell-shaped bronze forma di pasticceria) at the fringe-goods end of the list, as they represent an object that falls outside of the bounds of ‘necessity’ and takes position within the realm of a ‘desired’ good, but probably not as far as being classed as a luxury item for the households concerned in this study.

In terms of artefact categories PC (pan/pot/casseruola) has few associations, despite having numerous associations with houses. JJV (jug/jar/vase), however, demonstrates a correspondence with PI (plate) as well as several associations with houses. This indicates that while PC is a core good, it does not

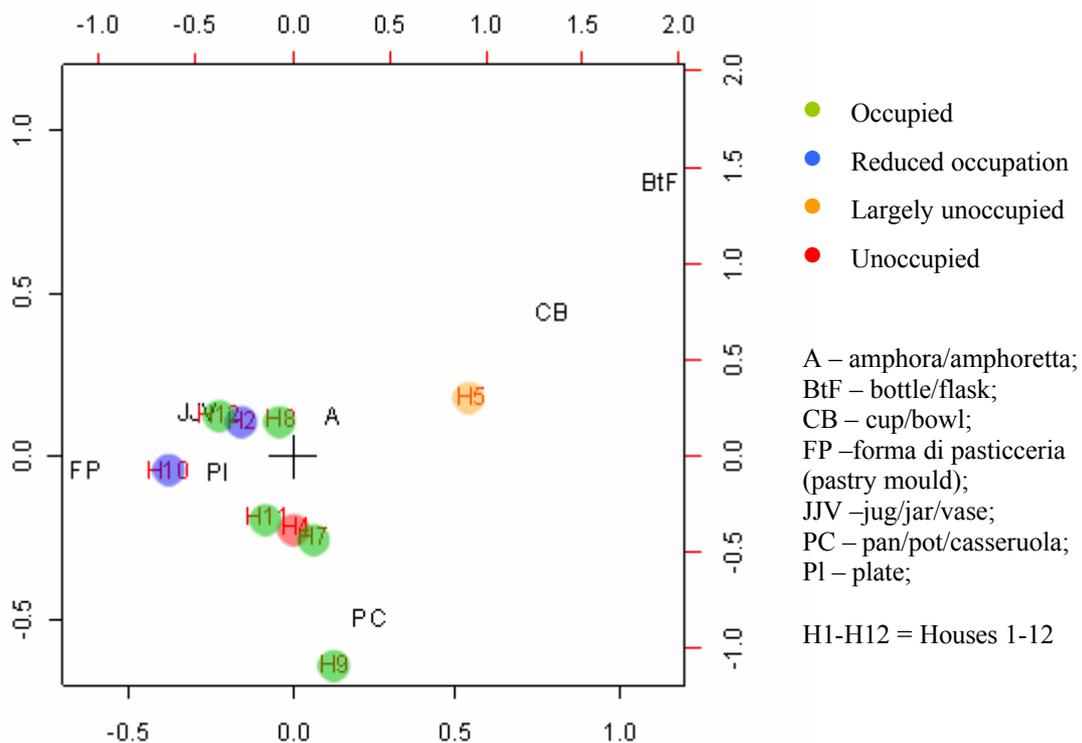


Figure 7.41: Correspondence Analysis for bronze vessels by form. Houses 1, 3 and 6 all yielded no bronze vessels.

necessarily relate to the possession of other forms of vessels. JJV, however, is shown to correspond to PI and thus indicates corresponding consumption of goods.

When these bronze vessel data are summarised in the form of consumption profiles (*figures 7.43 and 7.44*), several trends are evident. Firstly, the prominence of the artefact category BJJ (bronze jug/jug fragment) is noticeable in most of the assemblages, some to a greater degree than others. For example, Houses 7, 8, 11 and 12 (all fully occupied) clearly demonstrate this peak at a point approaching the six on a clock face. Lesser versions of these peaks can also be seen in Houses 2, 4 and 10, but are absent from the remaining two properties. This demonstrates the near-ubiquitous nature of the artefact type BJJ in the suites of vessels acquired by these households, and is reflected in the average profiles (*figure 7.42*). The unoccupied houses largely reflect the proportional profile for the occupied houses in *figure 7.42b* but exhibit additional peaks at BrP (bronze plate) and BFF (bronze fruttiera), and an exaggerated peak at Abz (bronze amphora). *Figure 7.42a* illustrates, however, that the small quantities of vessels in the unoccupied houses make these proportional patterns amplified and inconclusive.

In *figures 7.43 and 7.44*, although Houses 7, 8 and 12 all appear to have similarly diverse assemblages, there is a significant difference: House 12 lacks a peak at the two o'clock position, BC (bronze casseruola), and possesses a small peak for BCPB. This appears to be an unusual trait in this assemblage as it indicates a near-absence of cooking vessels. This is particularly surprising when the size of the bronze vessel assemblage for this property is taken into account (n = 36).

Table 7.8: Weighted ranking of all bronze vessel artefact types

Weighted Rank	Bronze Vessel Artefact Type	Weighted Value
1	Bronze jug/jug fragment	33.25
=2	Bronze casseruola	12
=2	Bronze receptacle/vase fragment	12
4	Bronze cooking pot/basin/pot/fragment	8.17
5	Bronze plate	7
6	Amphora (bronze)	5
=7	Bronze bucket	2.67
=7	Bronze cup/bowl	2.67
9	Bronze fruttiera/fruttiera	2
=10	Bronze pan	1.33
=10	Elliptical bronze forma di pasticceria	1.33
12	Bronze small jar/vase	1
13	Bronze jar/vase/vase fragment	0.75
14	Bronze krater/urn	0.67
15	Bronze bombilio/fiasco	0.33
16	Shell-shaped bronze forma di pasticceria	0.17
17	Bronze lid	0.08

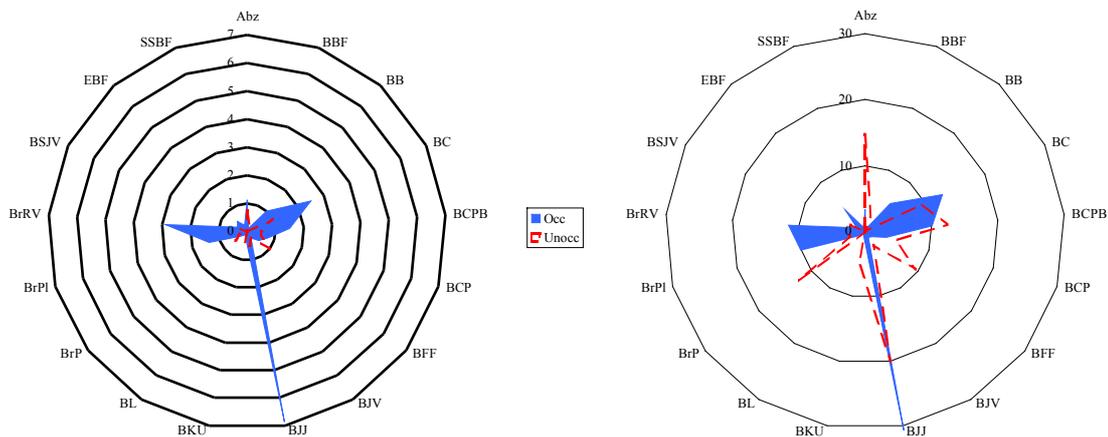


Figure 7.42: Average bronze consumption profiles divided by upper and lower states of occupation in (a) absolute terms and (b) as a proportional representation.

Abz - amphora (bronze); BBF - bronze bombilio/fiasco; BB - bronze bucket; BC - bronze casseruola; BCPB - bronze cooking pot/basin/pot/fragment; BCP - bronze cup/bowl; BFF - bronze fruttiera; BJV - bronze jar/vase/vase fragment; BJJ - bronze jug/jug fragment; BKU - bronze krater/urn; BL - bronze lid; BrP - bronze pan; BrPl - bronze plate; BrRV - bronze receptacle/vase fragment; BSJV - bronze small jar/vase; EBF - elliptical bronze forma di pasticceria; SSBF - shell-shaped bronze forma di pasticceria. H1-H12 = Houses 1-12 (Houses 1, 3 and 6 yielded no bronze vessels).

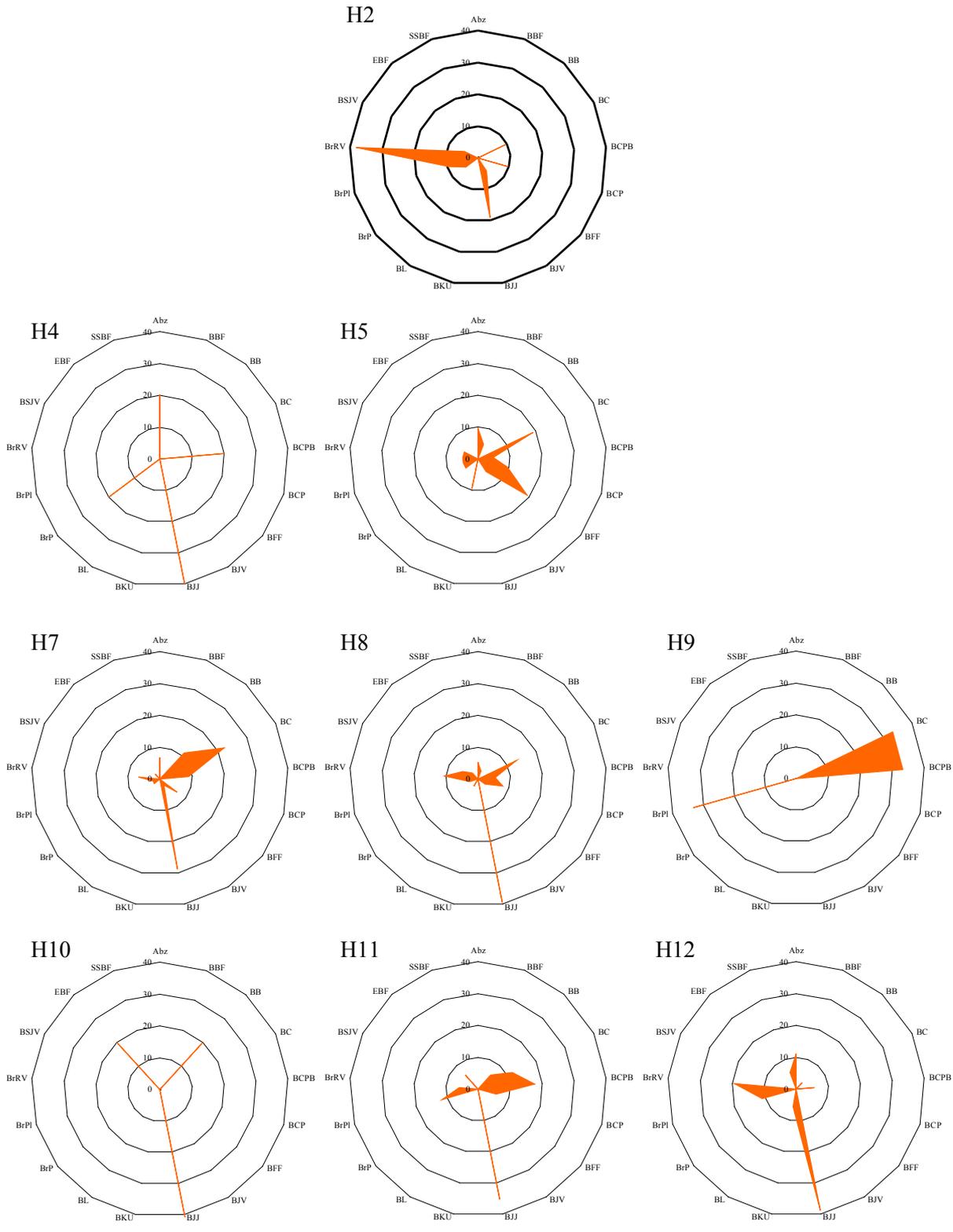


Figure 7.43: Consumption profiles of bronze vessel artefact types (proportional values)
 Abz - amphora (bronze); BBF - bronze bombilio/fiasco; BB - bronze bucket; BC - bronze casseruola;
 BCPB - bronze cooking pot/basin/pot/fragment; BCP - bronze cup/bowl; BFF - bronze fruttiera; BJV -
 bronze jar/vase/vase fragment; BJJ - bronze jug/jug fragment; BKU - bronze krater/urn; BL - bronze lid;
 BrP - bronze pan; BrPI - bronze plate; BrRV - bronze receptacle/vase fragment; BSJV - bronze small
 jar/vase; EBF - elliptical bronze forma di pasticceria; SSBF - shell-shaped bronze forma di pasticceria
 H1-H12 = Houses 1-12 (Houses 1, 3 and 6 yielded no bronze vessels).

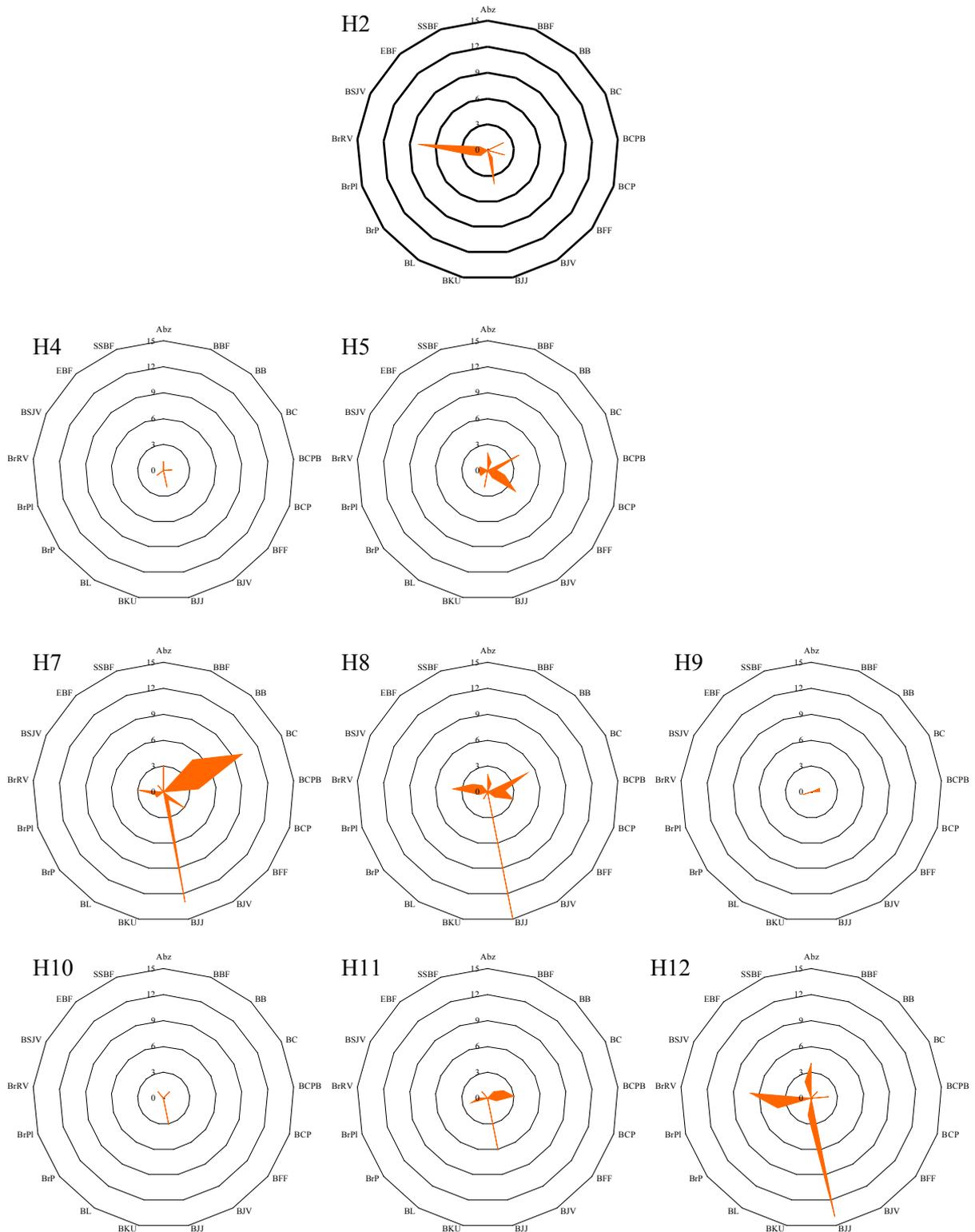


Figure 7.44: Consumption profiles of bronze vessel artefact types (absolute values)
 Abz - amphora (bronze); BBF - bronze bombilio/fiasco; BB - bronze bucket; BC - bronze casseruola;
 BCPB - bronze cooking pot/basin/pot/fragment; BCP - bronze cup/bowl; BFF - bronze fruttiera; BJV -
 bronze jar/vase/vase fragment; BJJ - bronze jug/jug fragment; BKU - bronze krater/urn; BL - bronze lid;
 BrP - bronze pan; BrPl - bronze plate; BrRV - bronze receptacle/vase fragment; BSJV - bronze small
 jar/vase; EBF - elliptical bronze forma di pasticceria; SSBF - shell-shaped bronze forma di pasticceria
 H1-H12 = Houses 1-12 (Houses 1, 3 and 6 yielded no bronze vessels).

7.2.3: *Silver Vessels*

The quantity of silver vessels is too low overall to enable meaningful statistical analysis, with House 7 (Casa del Menandro) dominating the representation of this component due to the large ‘treasure’ hoard found within this property (see Allison 2004a; Painter, 2001). Although four houses (2, 5, 6 and 7) from the sample population have yielded such commodities, House 7 represents 91.7 per cent of the total number (see *figure AppD.8* for Correspondence Analysis results).

It is interesting to see that these houses do not all belong to the ‘fully occupied’ classification. Only House 7 falls into this group, with Houses 2 and 6 representing reduced occupation, and House 5 largely unoccupied. The potentially significant factor for this class of artefact appears to be the size of the house, with all four houses falling into Wallace-Hadrill’s 4th quartile (1994, 79-81; Allison 2004b). This does, however, include the smallest of this division: House 6 (350 m²).

Aside from the silver vessels from House 7, the noticeable artefact type that occurs multiple times is SPC (silver patera/casseruola/plate), found in all four houses. No firm interpretations can be drawn from this, however, as there are insufficient data available for this category. Nevertheless, the silver vessels can be considered as part of the overall vessel analysis in the following section. Prior to that discussion, however, a further element relating to the silver hoard from House 7 (Casa del Menandro) can be discussed here: value.

Although it is not possible to assess perceived value or final financial value after the decorative work by a silversmith, it is possible to assess value according to the weight of the metal. The silver plate has an aggregate weight of 23.5 kg, equating to 72 Roman pounds (Painter 2001, 26). From this information two observations can

be made: the value of this hoard in relation to established purchasing power of houses in the data population, and comparison of this to the sumptuary laws discussed in Chapter Two. According to Painter, 72 pounds of silver is the equivalent of “more than HS 35,000” (2001, 26), which when compared to the calculated coinage in *figure 6.20*, this represents a considerable investment of capital: 308 years wheat equivalent, or approximately 428 times the value of the coinage from House 7 (or 592 times the mean purchasing power of the coinage from the fully occupied houses in the population sample). This indicates the scale of the value involved in this component of the household assemblage, also reflecting a high level of consumer-product involvement.

The *Lex Fannia* placed a 100 pounds limit on the permitted use of silver plate at a dining table. This is 1.33 times the weight of the Menandro hoard and, based on Painter’s (2001) valuation of silver by weight, equated to nearly HS 47000. In these terms the available evidence from my data set suggests that although these households are considered ‘elite’ by modern scholars, they fall short of the imposed restrictions by quite some margin. It is acknowledged that this does not take into account the removal of luxury items such as silver plate from households, but this does present a way of correlating documentary evidence with the archaeological record. The final consideration is that the *Lex Fannia* was established in 161 BCE, which, due to the increased ‘liberal’ attitude to material wealth, meant that the Menandro hoard (over two hundred years later in date) probably represents luxury possessions that were well within the boundaries of what was deemed ‘acceptable’²² – especially when the added factor of inflation is taken into account.

²² Compare this to the situation in 275 BCE when Cornelius Rufinus was allegedly expelled from the Senate for possessing *ten pounds* in weight of silver tableware (refer to discussion in Chapter Three; Astin 1989, 185).

7.3: Overall Analysis of Vessels

Figure 7.24 has already demonstrated the positive correlation between CV (ceramic vessels) and OV (other vessels) but the composition of the assemblages can be further investigated by dividing OV into its primary constituent parts: glass, bronze, and silver (also refer back to the ternary diagram of *figure 7.28*). It is immediately evident that the overall OV to CV correlation illustrated in *figure 7.24* is reflected by glass vessels (*figure 7.45*), which exhibit a strong adherence to the trend line ($r^2= 0.860$, significant at the $p=0.01$ level). Silver vessels also demonstrate this correlation, although the results should be approached hesitantly because, as discussed in the previous section, the majority of the data (91.7 per cent) come from House 7; this is supported by the fact that the silver:CV correlation is not significant at the $p=0.05$ level. Bronze vessels do not share the pattern, exhibiting a very weak positive correlation indicating that an increase in the consumption of ceramic vessels does not necessarily result in an increased consumption of bronze vessels (the correlation is not significant at the $p=0.05$ level). This could potentially be down to economic reasons, such as cost and/or availability, but it could also reflect preferences: once the acquisition of the more ‘essential’ bronze vessels (such as cookware) had been achieved, a consumptive ‘threshold’ was reached, beyond which few households ventured (for a comprehensive discussion of bronze vessels from Pompeii, see Tassinari (1979, 1993)).

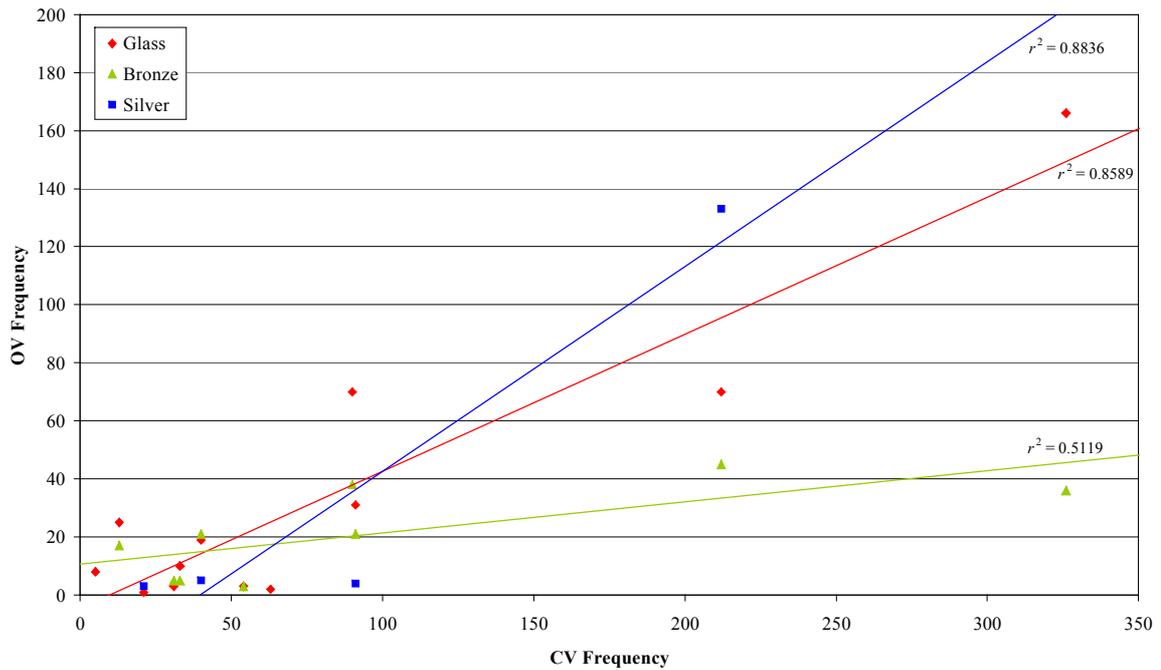


Figure 7.45: Occurrence of OV (other vessels) by material in relation to CV (ceramic vessels)

As with the individual vessel materials in the previous sections, the process of weighted ranking is a useful tool to investigate the assemblages. The overall table of vessel ranking (table 7.9) enables comparative reference. Bronze cooking vessels, which represented strong core goods in terms of solely bronze vessels, occupy a lower position in the overall rankings but nonetheless are still core goods. This is because fewer cooking vessels would be needed than serving vessels. Furthermore, as integral utilitarian possessions they are likely to have been among the items removed from the households during the evacuation of the city.

Further to this, a summary for the major trends in vessel acquisition and use that have been identified in the foregoing Correspondence Analyses can be created (table 7.10), and expressed in the following generalised terms:

- *glass vessels*: predominantly represented by storage vessels, with some serving vessels (if dual purpose then there is the potential for more serving vessels)
- *bronze vessels*: predominantly represented by cooking vessels, with some storage and serving vessels
- *ceramic vessels*: a wide range of vessel forms, storage being strongest, then serving, then (low) cooking.

Although this is a simplified way of stating consumption patterns from the data population it is useful to acknowledge basal trends from which more detailed models can be constructed. The next layer of the discussion is provided by the creation of overall vessel form profiles for each household from the foregoing discussions (*sections 7.1 and 7.2*)²³. These illustrate several dominant trends that are in accordance with *table 7.10* and the Correspondence Analysis outputs from earlier in this chapter:

- *glass*: bottle/flask (BF), jug/jar/vase (JJV), cup/bowl (CB)
- *bronze*: jug/jar/vase (JJV), pot/pan/casseroles (PPBC)
- *ceramic*: amphora/amphoretta (A), jug/jar/vase (JJV), ceramic lamp (CL)

By subjecting the cumulative vessel data to Correspondence Analysis it is possible to develop greater definition in the patterning of consumer preference or orientation. Overall, there is an apparent distribution by material with a division between ceramic and bronze vessels, and glass overlapping the two. Silver vessels are located in a

²³ For the complete breakdown of all vessel materials present in the assemblages, see *figure AppD.7* in Appendix C.

Table 7.9: Weighted ranking of vessel artefact types

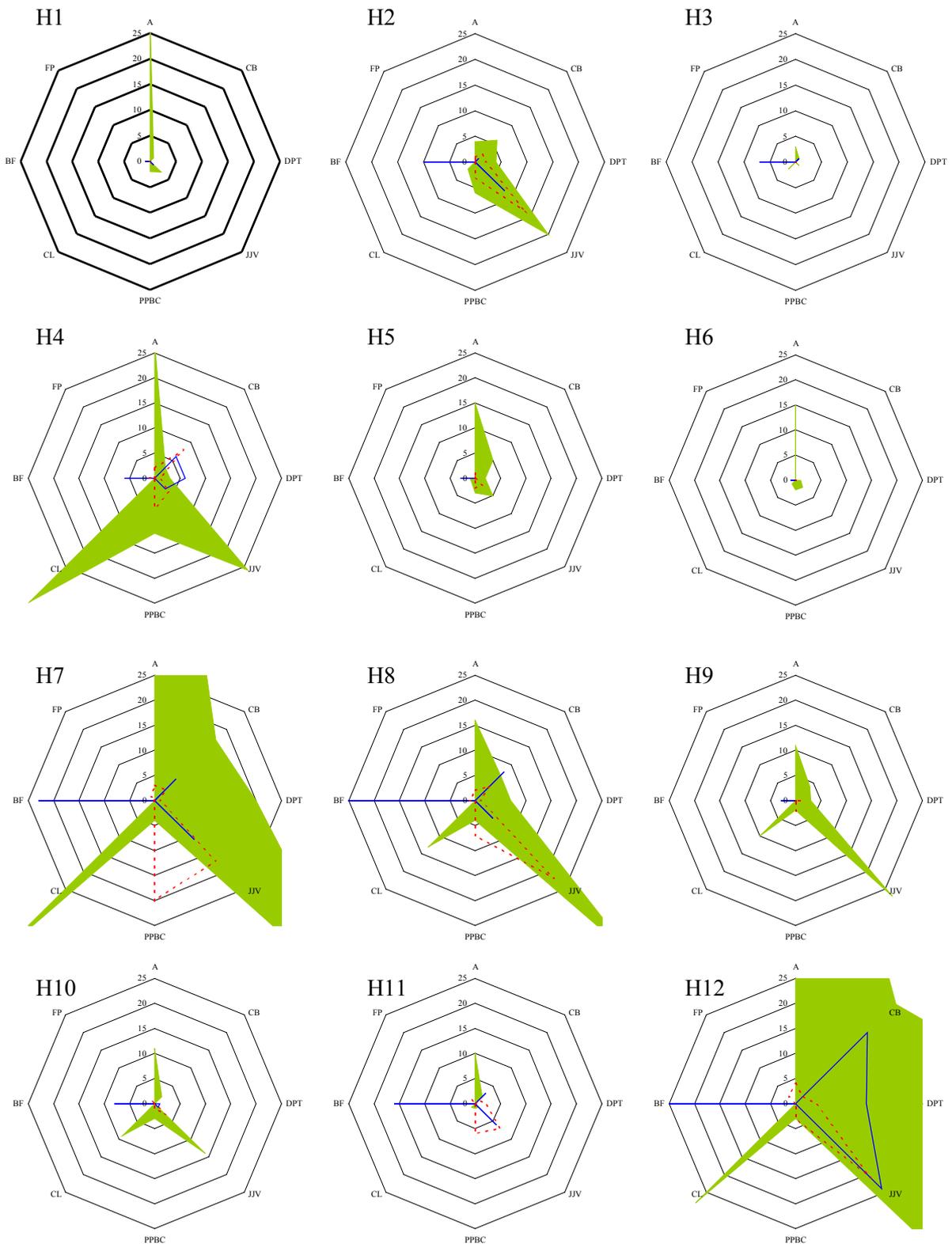
Weighted Rank	Vessel Artefact Type	Weighted Value
1	Pottery amphora/amphoretta/hydria	328
2	Pottery jar/vase	134.17
3	Small glass bottle	90
4	Pottery beaker/small vase	61.5
5	Pottery plate/dish/tray	47.83
6	Pottery vessel lid	39.67
7	Glass bottle/flask/pyxis	38
8	Pottery jug	34.5
9	Pottery pot	30
10	Bronze jug/jug fragment	33.25
11	Small glass jar/vase	19.25
12	Pottery cup/small bowl	18.67
13	Silver patera/casseruola/plate/plate fragment	16
14	Terra sigillata bowl/cup	12.67
15	Pottery large bowl	12.5
=16	Bronze casseruola	12
=16	Bronze receptacle/vase fragment	12
18	Pottery dolium	11.67
19	Glass jar/vase	11
20	Glass beaker/cup	10
21	Glass small bowl	9.17
22	Bronze cooking pot/basin/pot/fragment	8.17
23	Silver cup/bowl/cup fragment	7.17
24	Bronze plate	7
25	Pottery vessel base	6.5
26	Small pottery jar/small amphoretta	5.5
27	Glass plate/tray	5.25
28	Amphora (bronze)	5
29	Terra sigillata plate/dish	4
30	Silver vessel fragment	3.25
=31	Bronze bucket	2.67
=31	Bronze cup/bowl	2.67
33	Bronze fruttiera/fruttiera	2
34	Pottery amphora fragment/lid	1.67
=35	Bronze pan	1.33
=35	Elliptical bronze forma di pasticceria	1.33
37	Terra sigillata fragment	1.25
=38	Bronze small jar/vase	1
=38	Glass jug	1
40	Bronze jar/vase/vase fragment	0.75
=41	Bronze krater/urn	0.67
=41	Pottery cooking pot	0.67
43	Silver vessel/forma di pasticceria	0.58
44	Glass large bowl	0.5
45	Silver jug	0.42
=46	Bronze bombilio/fiasco	0.33
=46	Marble bottle/flask	0.33
=46	Marble plate/tray	0.33
=46	Wooden/unidentified vessel	0.33
50	Silver amphoretta/aryballos	0.25
51	Shell-shaped bronze forma di pasticceria	0.17
=52	Lead vase/tray	0.08
=52	Pottery bottle	0.08
=52	Pottery pan	0.08
=52	Pottery plastic vase	0.08
=52	Stone jug	0.08

Table 7.10: House assemblage comparisons by associations of vessel type/form
(‘assoc.’ = association)

House	CV assoc.*	Glass assoc. ⁺	Bronze assoc.
H1	Pot (Jug)	Bottle, small Jar/ vase, small	-
H2	(Cup/small bowl) (Pot)	Jar/vase (Bottle, small)	‘Receptacle’/vase (Plate)
H3	<i>terra sigillata</i> fragment (<i>terra sigillata</i> bowl)	Bottle, small	-
H4	Cup/small bowl Jar/amphoretta, small (Jar/vase)	Bottle/flask/pyxis	Cooking pot/basin Jug Amphora
H5	Beaker/small vase <i>terra sigillata</i> plate	Bowl, small Jar/vase, small Beaker/cup	Bottle/flask/pyxis Jar/vase Fruttiera
H6	(Beaker/small vase)	Bottle, small	-
H7	Jar/amphoretta, small Cup/small bowl Jar/vase	Bottle, small (Jar/vase) (Jug)	Cooking pot/basin Casseruola (Bucket)
H8	Beaker/small vase <i>terra sigillata</i> plate	Bottle/flask/pyxis (Beaker/cup) (Bottle, small)	Amphora (Jug)
H9	Jar/amphoretta, small Cup/small bowl (Jar/vase)	Bottle/flask/pyxis	Cooking pot/basin Casseruola
H10	Jug	Bottle/flask/pyxis	Elliptical forma di pasticceria (Bucket)
H11	(<i>terra sigillata</i> bowl) (Jug)	Bottle, small Beaker/cup	Cooking pot/basin Jug
H12	Bowl, large Plate/dish/tray (Jar/vase)	Jar/vase, small Small bowl Beaker/cup	‘Receptacle’/vase Plate (Jug)
<i>Assemblage Character</i>	<i>Serving vessels Storage vessels</i>	<i>Storage vessels Some serving vessels</i>	<i>Cooking/food preparation vessels Some storage vessels</i>

* minus amphorae and dolia

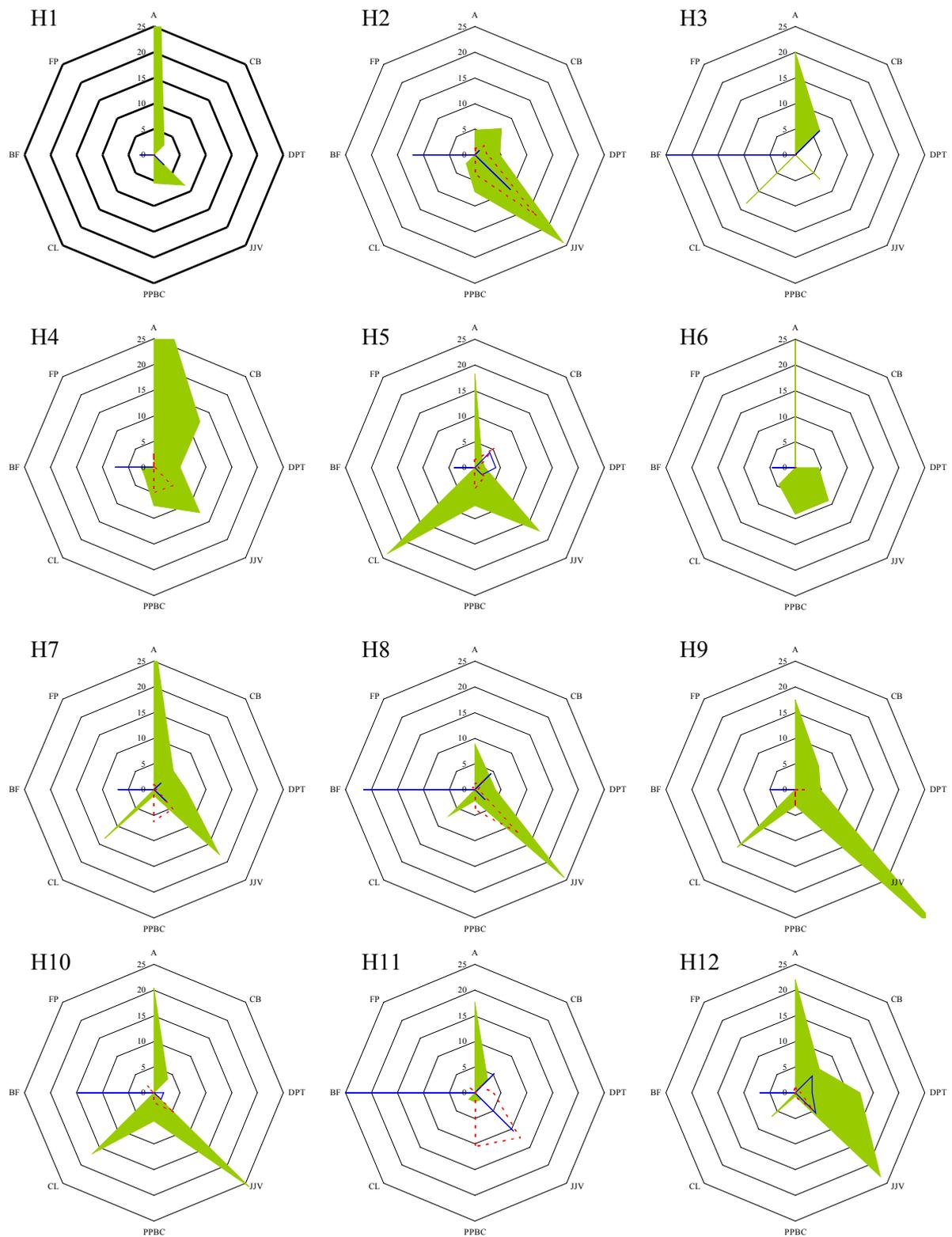
⁺ minus unidentified glass objects



A – amphora/amphoretta; BtF – bottle/flask; CB – cup/bowl; FP –forma di pasticceria (pastry mould); JJV –jug/jar/vase; PC – pan/pot/casseroles; Pl – plate; H1-H12 = Houses 1-12

— Glass ■ Ceramic
 - - - Bronze

Figure 7.46: Consumption Profiles of vessel form by material (ceramic, bronze, and glass). Absolute values.



A – amphora/amphoretta; BtF – bottle/flask; CB – cup/bowl; FP –forma di pasticceria (pastry mould); JJV –jug/jar/vase; PC – pan/pot/casseroles; Pl – plate; H1-H12 = Houses 1-12

— Glass ■ Ceramic
 - - - Bronze

Figure 7.47: Consumption Profiles of vessel form by material (ceramic, bronze, and glass). Proportional values.

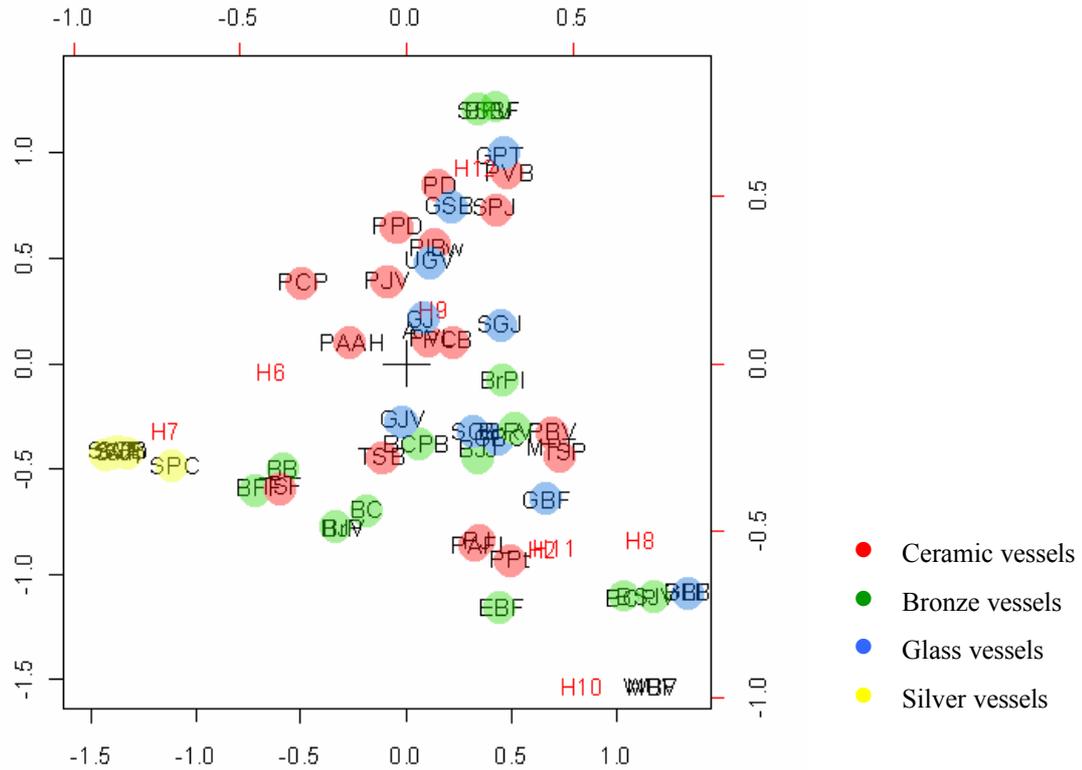


Figure 7.48: Correspondence Analysis biplot of vessel artefact types for 'occupied houses', with material indicated

GBC - Glass beaker/cup; GBF - Glass bottle/flask/pyxis; GJV - Glass jar/vase; GJ - Glass jug; GLB - Glass large bowl; GPT - Glass plate/tray; GSB - Glass small bowl; SGJ - Small glass jar/vase; SGB - Small glass bottle; A - amphora (bronze); BBF - bronze bombilio/fiasco; BB - bronze bucket; BC - bronze casseruola; BCPB - bronze cooking pot/basin; BCP - bronze cup/bowl; BFF - bronze fruttiera; BJV - bronze jar/vase/vase fragment; BJJ - bronze jug/jug fragment; BKU - bronze krater/urn; BrP - bronze pan; BrPl - bronze plate; BrRV - bronze receptacle/vase fragment; BSJV - bronze small jar/vase; EBF - elliptical bronze forma di pasticceria; SSBF - shell-shaped bronze forma di pasticceria; PAFL - Pottery amphora fragment/lid; PAAH - Pottery amphora/amphoretta/hydria; PBV - Pottery beaker/small vase; PCP - Pottery cooking pot; PCB - Pottery cup/small bowl; PJV - Pottery jar/vase; PJ - Pottery jug; PIBw - Pottery large bowl; PPD - Pottery plate/dish/tray; PPT - Pottery pot; SPJ - Small pottery jar/small amphoretta; TSF - terra sigillata bowl/cup; TSP - terra sigillata plate/dish; H1-H12 = Houses 1-12

single cluster around House 7 in the lower left quadrant of the biplot, while other miscellaneous materials (marble and wood) are located at the extreme bottom right. I propose, therefore, that it is possible to identify a consumption orientation reflected by predominant assemblage character. In figure 7.48 the y-axis represents a scale of vessel material: the upper part of the biplot indicates a ceramic-oriented vessel

consumption profile, whereas the lower part indicates a bronze-oriented consumption profile. Such a situation could be seen to suggest an indication of expenditure on vessels; this model is not a spectrum in the strict terms of a low-to-high scale, but in two predominant bands of consumption preference with glass offering a mid-range alternative. Additionally, it is of interest that all three *terra sigillata* categories are located within the lower half of the biplot, which leads to the tentative suggestion that, with high resolution data, finewares could be shown to indicate a further band of consumption orientation that occupies an intermediate position.

When atypical vessel materials/types are present in the assemblages they are located in the periphery of the biplot and do not interrupt the overall pattern discussed. For example, the silver vessels ‘pull’ House 7 to the left but do not significantly alter its position on the proposed scale of consumption orientation, as it occupies a similar relative position when silver vessels are omitted from the analysis. Furthermore, the bronze vessels at the top of the biplot are atypical to the overall data population and only represented by House 12, and are consequently peripheral to the main plot geography. When all houses are included in the analysis, the patterns are more opaque but still present. This indicates that the factor of occupation status casts a significant influence on the results, with the presence of low occupation houses and abandoned houses obscuring patterns.

To further test the patterns identified here, the data have been subjected to Correspondence Analysis again but this time divided by vessel form (*figure 7.49*). The pattern in the previous analysis is repeated here, with a ceramic-bronze vessel division, glass overlapping the two, and silver vessels as outliers. In this format the depiction of perceived consumption orientations by ‘expenditure’ on vessels is even stronger. It is therefore possible to create a schematic model of vessel consumption in

which dominant orientations are illustrated (*figure 7.50*), which has a strong correlation to the vessel assemblage profiles in *figures 7.46 and 7.47*.

The model depicts the strength of the vessel material correspondences that are revealed from the statistical analyses in this chapter in respect to ceramic, bronze, and silver vessels. Glass is not illustrated as it occupies a position in the biplot that conceptually overlaps both ceramic and bronze; further investigation of the data could enable an additional glass vessel dimension to be added to this model. This is currently beyond the scope of this thesis, however.

Figure 7.50 demonstrates that the assemblages for Houses 9 and 12 are dominated by ceramic vessels, with House 10 yielding a pattern that has a relatively equal divide between bronze and ceramic vessels. Houses 2, 8 and 11, however, all exhibit a strong bronze facet to their assemblage orientations. House 7 is strongly associated with silver so occupies a position to the extreme left of the model. If this component is removed, House 7 exhibits a similar overall vessel character to House 10, therefore it is positioned in a corresponding position on the vertical 'axis'. House 6 yielded an assemblage with a character dissimilar to the other properties, with influential silver and ceramic components, but a lack of bronze vessels.

Depicting the vessel consumption orientations in a schematic model such as *figure 7.50* enables a simplified view to be constructed that can be used in future studies as a source for comparison. For instance, if additional examples from Allison's original sample of thirty houses (see Chapter Five) were investigated using my framework, they could be superimposed onto this model thereby enabling direct comparison of consumption orientations.

This chapter has presented detailed sequential analysis of the ceramic, glass, and bronze vessel data, with brief consideration of the silver objects. It is apparent

that consideration of ceramic vessels in isolation, although valuable, does not provide the full picture for vessel consumption in Pompeian houses. It has been demonstrated that to build a detailed profile of consumer orientations it is necessary to consider not just different vessel forms and artefact types, but also alternative constituent materials. By doing this, it is possible to create comprehensive profiles (*table 7.10* and *figures 7.46* and *7.47*) as well as schematic models drawn from statistical analyses.

Now that the data population has been investigated using a bottom-up approach, Chapter Eight will re-examine the data from Chapters Six and Seven and apply them to the consumer theory constructs discussed in Part I to create a method of modelling consumer behaviour and patterns of consumption.

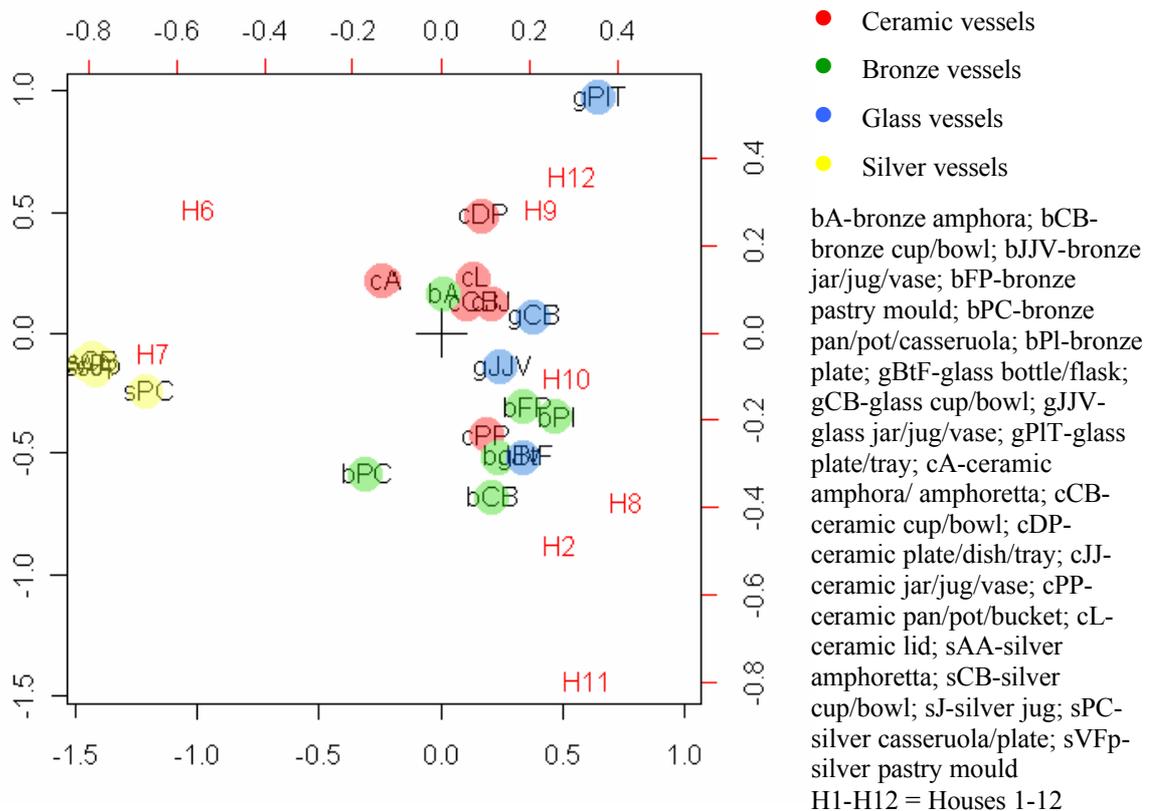


Figure 7.49: Correspondence Analysis biplot of vessel form for 'occupied houses', with material indicated

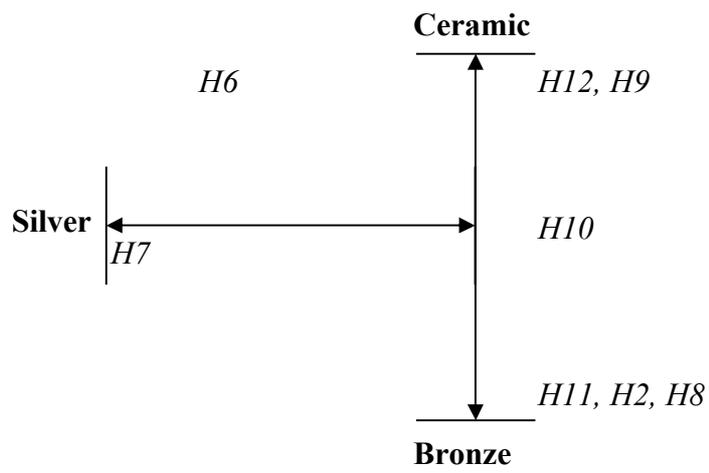


Figure 7.50: Conceptualized orientations of vessel consumption

CHAPTER EIGHT:
MODELLING CONSUMER BEHAVIOUR AND HOUSEHOLD CONSUMPTION

In this chapter I bring together more explicitly the two parts of this thesis in a novel way, by integrating rigorous statistical analysis of Pompeian data with testing of modern constructs and models of consumer theory. The foregoing data analysis will be re-examined in terms of the consumer theory constructs from Chapter One, specifically identification of consumption orientations recognised via materialism and discretionary expenditure. This process will enable information to be assembled about the motivations behind the access, selection, and use of material goods. This subject will also be addressed in relation to ancient consumers in broader terms through the concept of life-processes/events, as well as evaluating the implications for consumption orientations in the aftermath of the 79 CE eruption.

The concepts and theories expounded earlier in this thesis have significance for studying the Roman world, though I shall not argue that they are social *universals*. I do not accept the assumption in classical economics of there being ‘common human nature’ and fixed, universal behaviour. If such a belief was valid it would be reflected in the field of consumption by the idea of ‘unchanging needs’ (refer to Campbell 1998, esp. 240). However, the application of the constructs of materialism and discretionary expenditure on household goods provide a contextual setting in which to frame the Pompeian assemblages.

8.1: Materialism

As argued in Chapter One, ‘materialism’ is not solely a modern phenomenon when discussing consumer behaviour and can be used as a construct to approach social behaviour and commodities in the ancient world. Consumers use possessions to define themselves and reinforce identity, individually and collectively, thereby communicating social values to others (*social constructionist*) as well as being of significance for the consumers themselves (*individual-centred*). Subsequently, these can be interpreted in terms of value ascription and a psychology of possession. In these terms, materialism can be incorporated into the Pompeian data population.

Despite the Marxist undercurrents, this directed interpretation of value systems holds an intriguing potential for the ancient world, especially when accessed through Richins and Dawson’s materialism scale (1990; 1992). This comprises three components: ‘acquisition centrality’, ‘possession-defined success’, and ‘acquisition as the pursuit of happiness’ (see also, *Richins 1994a; 2004*). This may seem out of place in a study of Roman assemblages, but consider the following: how would first-century Pompeians from the houses investigated in this study respond to the summary in *table 8.1* of a survey by Richins and Dawson (1992, esp. 310, table 3)? This frame of investigation has also been used by other scholars of modern consumption, such as Sahdev and Gautama (2007) who considered consumer perceptions of brand and materialism. It is unlikely that any responses from the Pompeians would be Catonic in nature, as frugality does not seem to be overtly evident in these households. Although ownership of goods would perhaps not be conceived in the exact terms of *table 8.1*, there are numerous relevant aspects. For instance: perceptions of self and others represented through objects and consumer durables; the acquisition of goods

beyond the necessary, including both non-immediate self-created desires and luxury goods; social emphasis represented by both ordinary/mundane- and luxury consumption; quantity; perceptions of quality, rarity, and exoticism; and finally, underlying motivations and emotional responses such as acceptance, (dis)approval, ridicule, or envy. When phrased in these terms, it is not hard to imagine Pompeians, and many others from the Roman world considering their lives enriched by luxury commodities or ‘desired’ goods.

8.1.1: Analysis I

To engage the materialism construct with the Pompeian data population, the first stage is to consider assemblage components in terms of a high-low materialism dichotomy. Using constructs from modern consumer studies (such as Richins 1994a; 1994b), *table 8.2* presents modern examples that can be assessed in relation to their applicability for the ancient data. It is apparent that many of the high-materialism items are non-portable, architectural components, such as decorative elements or even the houses themselves. The low-materialism goods are largely represented by objects that are predominantly utilitarian in nature, such as tools and storage or food preparation vessels. Performing Correspondence Analysis on elements from the Pompeian household data serves to assess the validity of the construct and assists in investigating patterns within the data set (*figure 8.1*).

When the data are displayed in this format several interpretations can be made. Firstly, there is no apparent division between high- and low-materialism consumer durables, which is to be expected because everyday ‘mundane’ objects are still

Table 8.1: Materialism scale (after Richins (1994a) and Richins and Dawson (1992). (Terminology has been adjusted where necessary to more relevant alternatives, indicated in italics)

(I) Possession-defined success:

I admire people who own *luxury goods*

The *things* I own say a lot about how well I'm doing in life

I don't place much emphasis on the amount of material objects people own as a sign of success

I like to own *things* that impress people

I don't pay much attention to the kinds of *material objects* other people possess

(II) Acquisition centrality:

I usually buy only the *things* I need

I try to keep my life simple, as far as possessions are concerned

The *things* I own aren't all that important to me

I enjoy spending money on *things* that aren't practical

Buying *luxury/unnecessary goods* gives me a lot of pleasure

I like a lot of luxury in my life

I put less emphasis on *material goods/things* than most people I know

(III) Acquisition as the pursuit of happiness:

I have all the things I really need to enjoy life

My life would be better if I owned certain *things* I don't have

I wouldn't be any happier if I owned better/nicer *things*

I'd be happier if I could afford to buy *more things or luxury/unnecessary goods*

It sometimes bothers me quite a bit that I can't afford to buy all the *things* I'd like

Table 8.2: Low- and high- materialism objects

	<i>Modern examples</i> (after Richins (1994a, 531, table 6))	<i>Ancient examples</i> (from Pompeian household data)
Low-materialism items	Food Books Pets Bed Woodworking equipment Family mementos/photos Mother's wedding gown Mother's ring/opal pendant	Food Bed Tools Weaving equipment Architectural furniture such as door fittings Food preparation vessels Storage jars/bottles
High-materialism items	Jewellery/diamonds Fur/leather coat Sports car Persian rugs Boat Sauna room Investment property/vacation house Artwork	Jewellery Marble furniture/statues Serving vessels – bronze/silver Mosaic pavements Frescoes Private bath complex (such as at House 7, House of the Menander) The house itself

necessary. Secondly, House 8 (lower left quadrant) is the only one to demonstrate a clear separation from the high-materialism goods, with jewellery (J – lower right quadrant) representing the closest association. Thirdly, all but one of the houses that represent low-level occupation are located on the periphery of the plot with a concentrated cluster of houses around the centroid, suggesting anomalous assemblages in this context. Overall, I would argue that this simplified dichotomy of goods does not translate in an acceptable way for archaeological data. By creating a high-low division, nuances in consumption behaviour are obscured and, without the option to communicate with the agents involved, this division is too subjective and burdened with modern assumptions of value ascription.

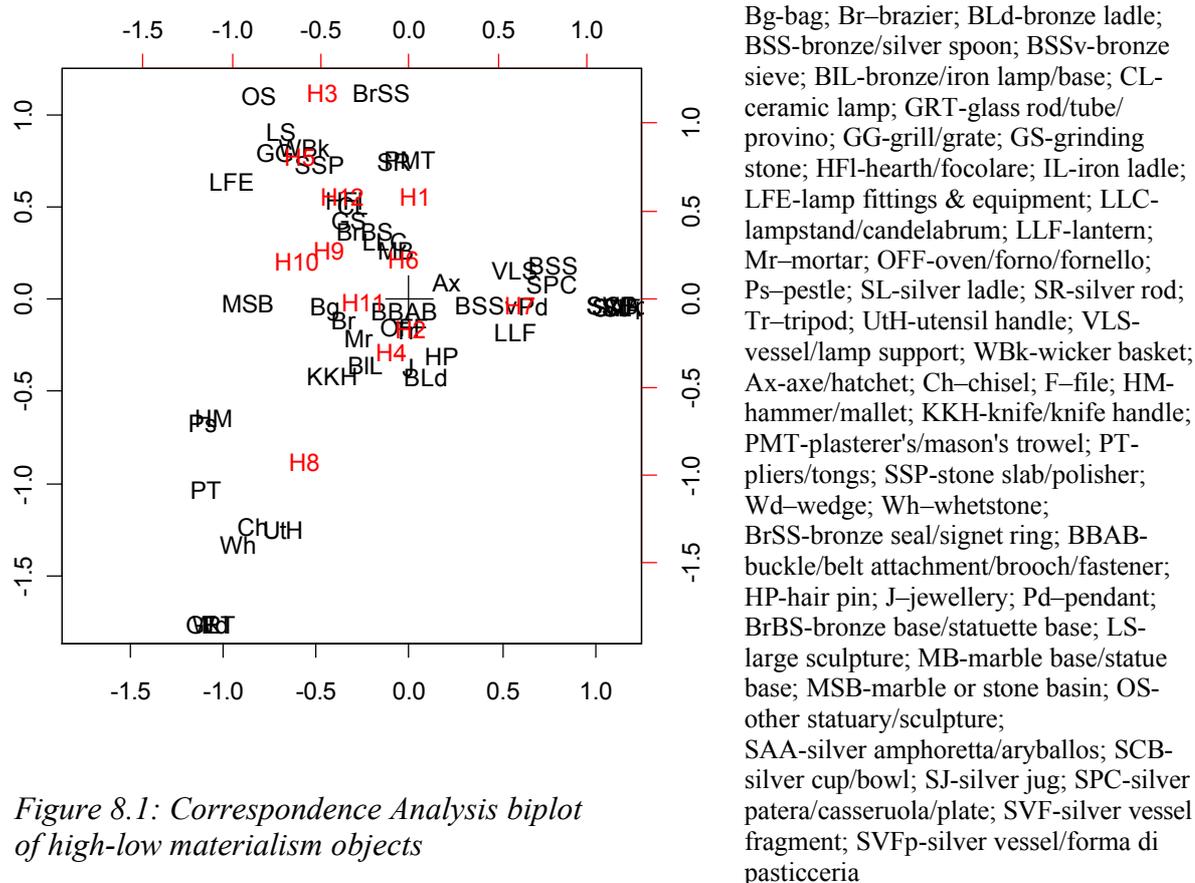


Figure 8.1: Correspondence Analysis biplot of high-low materialism objects

8.1.2: Analysis II

These interpretations can, however, be tested further by considering the data as a spectrum of materialism. For example, does House 8 maintain the relatively isolated assemblage character indicated in *figure 8.1*? *Table 8.3* presents an interpretation of Richins' (1994b) six-part materialism division, which takes other factors, such as identity and utility, into account and introduces a parallel division of the Pompeian data. Only houses from the upper two divisions of occupation (Houses 2, 6-12) have

been included for this second stage of examination because the low-occupation houses skew the data.

Jewellery can fall under multiple classifications, such as ‘identity’ and ‘appearance-related’, but for the statistical analysis here will be considered under the latter of these divisions. Non-jewellery components from the personal adornment functional category (PAD) are also included in this division, apart from signet seal/ring, which is located in the identity category (*table 8.3*). Coinage is not included in the table because, as discussed in Chapter Five, it is not a commodity. For ‘cosmetics’, the functional category of toilet, surgical or pharmaceutical instruments (TSP) has been used. Tools, glass storage vessels, and household utensils have been identified as representative of goods that fall within the utilitarian classification; the functional category of MWT (objects for the manufacture or working of textiles) can also be represented in this category, but has been omitted from statistical analysis due to the skewing effect identified in Chapter Six.

Correspondence Analysis of these data proves valuable for establishing consumption behaviour characteristics within ancient households (*figure 8.2*). There is clear clustering of these divisions of materialism, consequently indicating the overall consumption orientations of the households concerned. For example, Houses 9 and 11 most strongly correspond to items of ‘enjoyment’-related goods. Houses 8, 10 and 12 exhibit consumption orientations that were associated with ‘identity’ and ‘utilitarian’ goods. ‘Appearance-related’ items are the dominant characteristic for House 2 (upper left quadrant – also arguably associated with ‘enjoyment’ goods). House 7 also demonstrated a consumption orientation toward goods related to appearance but it is associated with ‘financial aspects’ as well due to the hoard of silver vessels. House 6 is a little more ambiguous as it shares strong affinities with

three, perhaps four, of the classifications. This will be investigated further in the following discussion. This data analysis suggests that it is possible to identify a conceptual ‘spectrum’ of materialism based on these categorisations, according to the y-axis (and split by the x-axis): Houses 8, 10 and 12 occupy the utilitarian/identity end of the scale (in the lower half of the biplot), and Houses 9 and 11 represent more desirous/superfluous consumption behaviour (in the upper half of the biplot). Houses 2 and 6 would have represented more of a ‘mid-point’ consumption orientation.

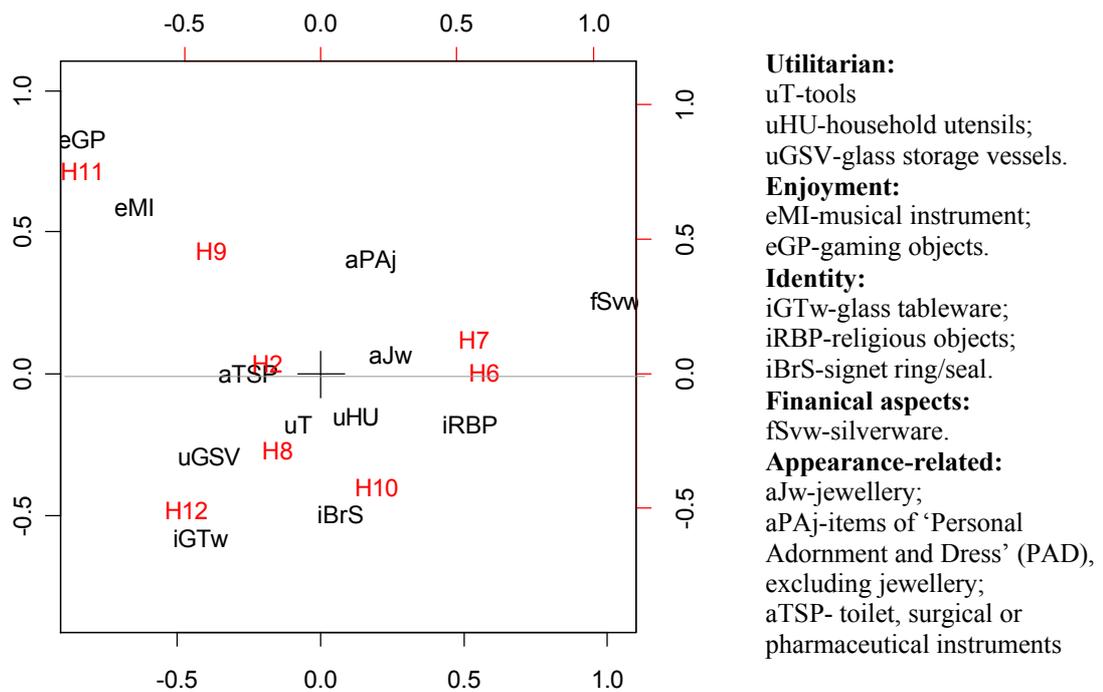


Figure 8.2: Correspondence Analysis biplot of classifications of materialism

Table 8.3: Materialism scale relating to possessions and meanings (after Richins 1994a, 527, table 3, with additions)

Meaning of possession	Element	*D. Occ.	+Full Occ.	Downgraded Occupation			Full Occupation				
				H2	H6	H10	H7	H8	H9	H11	H12
Utilitarian: Provides a necessity; enhances work efficiency or effectiveness; valued for performance or functional attributes	Tools	15	67	9	1	5	16	41	7	3	0
	Household utensils	37	272	14	5	18	126	54	22	10	60
	Weaving implements	25	110	20	1	4	19	22	58	0	11
	Glass storage vessels (e.g. bottles)	28	153	18	1	9	33	44	3	21	52
	Clothing	-	-	-	-	-	-	-	-	-	-
	Food	-	-	-	-	-	-	-	-	-	-
	House/home	-	-	-	-	-	-	-	-	-	-
Enjoyment: Provides pleasure, allows enjoyable activity; provides relaxation, comfort, escape	Musical instrument	0	3	0	0	0	0	1	2	0	0
	Gaming	10	123	10	0	0	22	9	19	53	20
	House	-	-	-	-	-	-	-	-	-	-
	(societal consumption could be represented here by amphitheatre games and other such activities)	-	-	-	-	-	-	-	-	-	-
Identity: Part of self; self-expression; represents accomplishment; is source of pride; symbolizes personal history	Jewellery	21	208	13	8	0	103	70	13	12	10
	Tableware (e.g. glass flasks)	18	119	2	0	9	22	31	2	10	54
	Religious objects	4	15	1	1	2	10	3	0	0	2
	Signet ring/seal,	0	2	0	0	0	1	0	0	0	1
	<i>bull</i>	0	1	0	0	0	1	0	0	0	0
	Symbolic items denoting freedman status	-	-	-	-	-	-	-	-	-	-
	Clothing	-	-	-	-	-	-	-	-	-	-
	House	-	-	-	-	-	-	-	-	-	-

Meaning of possession	Element	*D. Occ.	+Full Occ.	Downgraded Occupation			Full Occupation				
				H2	H6	H10	H7	H8	H9	H11	H12
Financial aspects: Expensive item	Luxury goods (such as silverware, expensive/exotic jewellery). Silverware	8	133	5	3	10	133	0	0	0	0
Appearance-related: Enhances appearance or self-feelings	Personal Adornment (PAD)	23	244	14	8	1	123	76	14	18	13
	(of which Jewellery)	21	208	13	8	0	103	70	13	12	10
	Clothing	-	-	-	-	-	-	-	-	-	-
	Cosmetics (TSP)	8	59	7	0	1	14	30	4	8	3
	Hair pins	0	6	0	0	0	4	2	0	0	0
Interpersonal ties: Represents interpersonal ties: symbolic ties to others, gifts, symbols of familial history; facilitates interpersonal ties	Difficult to identify archaeologically but could be represented through dowries by textiles, furniture, land, property, financial gifts. Pena and McCallum suggest pottery could have been given by a workshop owner as gifts to a patron's household (2009b, 2)										

*D.Occ. = Downgraded Occupation

+Full Occ. = Full Occupation

8.1.3: Analysis III

Further testing of the validity of these interpretations was carried out using an alternative classification of materialism provided by Richins (1994a, 529, table 4), in which there are four principal ‘Dimensions’ each subdivided into two possession types. It is the subdivisions that are of most interest from this construct because they form a meaningful frame upon which the Pompeian data can be superimposed. *Table 8.4* sets out elements from the household data arranged according to the categories, with modern examples being indicated for comparison. Coins were included in the table; they were, however, omitted from the Correspondence Analysis in order to maintain consistency throughout this study. Hearths were included in the Necessities division because they are ubiquitous in the data. Furthermore, Salza Prina Ricotti (1978/1980, 239-40) reported that 93 per cent of rich houses possessed hearths, while the figure was 66 per cent for medium houses and 40 per cent for poor houses (see also Allison 2004, 102) – thus potentially indicating the difference between the ability and the preference to acquire such features. Allison notes that braziers were often additional to hearths and not a more accessible alternative (Allison 2004, 102).

It is apparent that symbolic and received possessions are difficult for us to identify without being able to consult the agents involved. There are examples in the archaeological record, however, from the region of Pompeii that do indicate such objects; for example, at Moregine a first century CE gold armband in the form of a coiled snake was recovered with an inscription²⁴ on the inner surface that identifies the bracelet was a gift to a slave-girl from her master (Rocco 2003, 177-178, figure 8). There are also objects from Roman Britain that indicate they could have been

²⁴ DOM(I)INUS ANCILLAE SUAE

intended for gift. For instance, there are examples of brooches and rings that carry inscriptions of secular wishes; this includes a silver ring inscribed with ‘ΑΜΑ ΜΕ’ – translated as ‘Love me’ (*RIB* 2422.2, Collingwood and Wright 1991, 15*ff.*; for further examples of such inscribed rings, see *RIB* 2422.19, *RIB* 2422.47, and *RIB* 2422.48; for a brooch, see *RIB* 2421.1). Despite these tantalising clues, there was insufficient evidence to consider the fourth dimension (Achieved/Received possessions) in the Pompeian household data. This analysis was thus restricted to the first three groups from Richins’ four dimensions; it has been performed according to the possession types indicated by their artefactual elements (*figure 8.3*) as well as by their overall character (*figure 8.4*).

As with the previous form of materialism scaling in Analysis II, it is possible to identify varied consumption orientations for the houses. Moreover, the outcomes in this format are similar to those in *figure 8.2*. For example, House 7 reflected an orientation towards Prestige (Prs) and Symbolic (Sym) goods, corresponding to the profile in *figure 8.2* that indicated a proclivity for Financial and Appearance-related goods. Similarly, Houses 8 and 10 demonstrated a Utilitarian/Identity consumption profile, which is repeated in *figure 8.4* in the form of Ordinary/Symbolic possessions. House 10 also has a relationship with Necessary goods (shared with House 12) thereby repeating the previously indicated consumption orientations demonstrating associations with Ordinary and Necessary goods. The case of House 6 is made clearer by the indicated correspondence with Symbolic (and Necessary) items – previously represented via Identity and Appearance-related objects.

Table 8.4: Materialism by 'Dimensional' categorisation (after Richins 1994a, 529, table 4, with additions)

	Possession type	Modern example	Element from Pompeian data		Occ.			Full Occ.				
					H2	H6	H10	H7	H8	H9	H11	H12
Dimension 1	<i>Instrumental possessions</i>	Bicycle Stereo/CD/MP3 player Computer	Writing equipment	iWC	0	0	0	2	0	0	2	0
	<i>Symbolic possessions</i>	Mother's ring Mother-in-law's lamp Mother's wedding gown	Religious objects Signet ring	sRBP sBrS	1 0	1 0	2 0	10 1	3 0	0 0	0 0	2 1
Dimension 2	<i>Ordinary possessions</i>	Camera	Tools	oT	9	1	5	16	41	7	3	0
		Pet	Household utensils	oHU	14	5	18	126	54	22	10	60
		Tools	Ceramic lamps	oCL	2	1	9	44	13	10	1	28
		Books	Glass storage vessels	oGSV	18	1	9	33	44	3	21	52
<i>Prestige possessions</i>	Diamond jewellery	Jewellery	pJw	13	8	0	103	70	13	12	10	
	Fur/leather coat	Silver vessels	pSvw	5	3	10	133	0	0	0	0	
	Investment property Persian rugs	Marble ('luxury') furniture - including statuary	pLF	0	0	5	2	2	0	3	3	
Dimension 3	<i>Recreational possessions</i>	Musical instrument Scuba diving equipment Fishing rod	Recreational objects	rRP	10	0	0	22	10	21	53	20
		<i>Necessities</i>	Bed/ Furniture	Bed	nBed	0	6	0	34	2	2	0
	Food		Hearth	nHef	1	1	1	3	1	1	1	2
	House		Coins (gold & silver)	nCgs	100	0	8	2000	272	0	760	172
	Refrigerator/freezer Clothes Money		Coins (bronze) Food and clothes	nCbz	20	17	7	82	106	16	61	32
Dimension 4	<i>Achieved possessions</i>	A book I wrote Athletic awards	-	-								
	<i>Received possessions</i>	Pearl necklace (gift from a special friend) / Gold chain (gift from spouse)	(Possessions of a young child could fall within this grouping)	-								

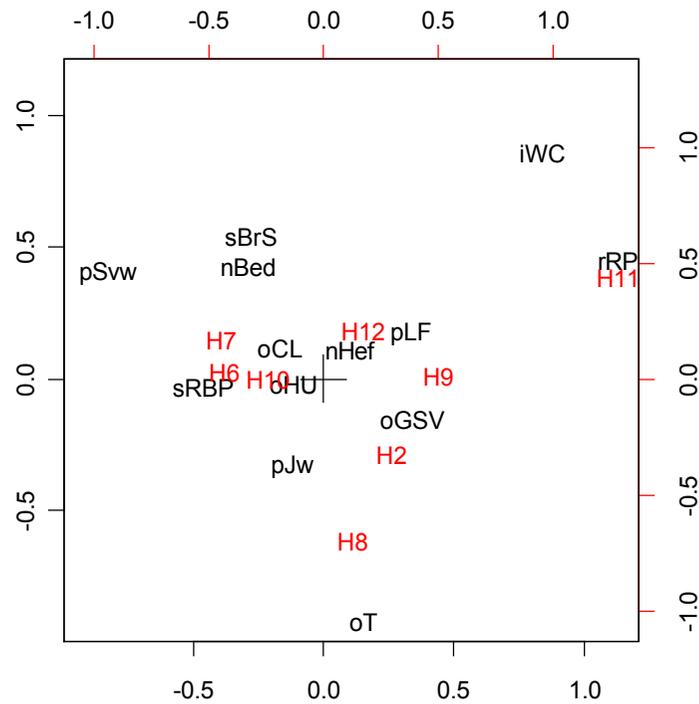


Figure 8.3: Correspondence Analysis of artefact components (Dimensional classification of materialism)

Instrumental possessions (Ins)
 iWC-writing equipment;
Symbolic possessions (Sym)
 sRBP-religious objects;
 sBrS-signet ring;
Ordinary possessions (Ord)
 oT-tools;
 oHU-household utensils;
 oCL-ceramic lamps;
 oGSV-glass storage vessels;

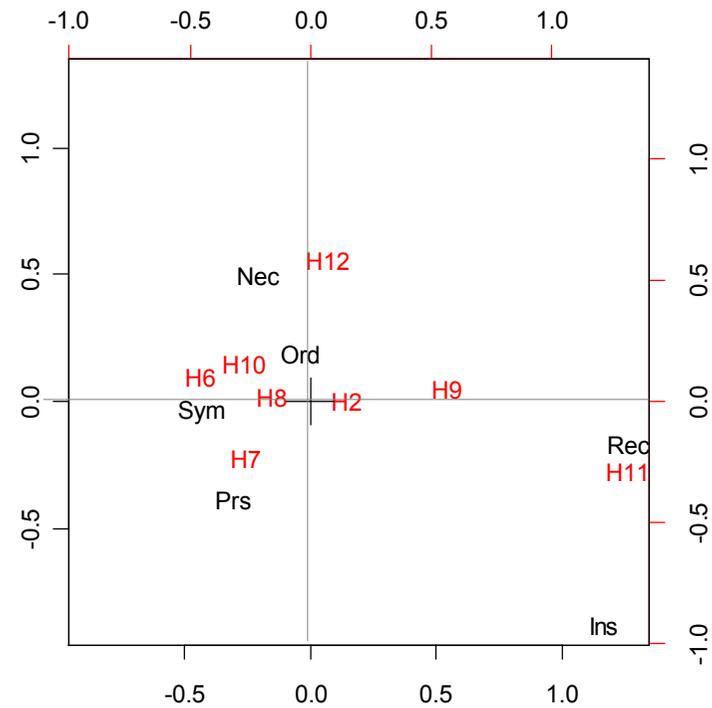


Figure 8.4: Correspondence Analysis of Dimensional classification of materialism

Recreational possessions (Rec)
 rRP-recreational objects;
Necessities (Nec)
 nBed- Bed;
 nHef-hearth;
Prestige possessions (Prs)
 pJw- jewellery;
 pSvw- silver vessels;
 pLF- marble ('luxury') furniture
 (including statuary);

There is an additional interpretation that can be made from *figure 8.4*: the *x*-axis through the centroid represents a division between goods that are utilitarian (above the line) and those that are more symbolic or emotional in nature (below the line). Further, I would argue that the *y*-axis is a significant indicator of the materialism scale, with households located further down this axis representing more desirous or emotionally-driven consumption orientations. Therefore, the scale of consumption ranges from House 12 at the utilitarian end of the spectrum, through to Houses 7 and 11 at the more ‘luxurious’ end. A way to further investigate this latter position is through the construct of discretionary expenditure, which will be discussed below.

Finally, one further observation from this analysis requires discussion before proceeding: the overall frame Richins (1994a) gives for this materialism scale is through Dimensions 1-4, indicated in *table 8.4*, but what does this mean, and is there any way to identify them in the Pompeian data? *Figure 8.4* suggests that this frame is not as significant as it first seemed. For instance, the categories that form the Dimensions are not associated with one another in the geography of the biplot. In fact, if a horizontal line is drawn just below the ‘Sym’ plot point, each Dimension has one half above the line and one half below. This situation raises questions as to the validity of the ‘Dimensional’ component. I would argue that it is a stage too far in the construct and requires caution in its use. The divisions of possession type are much more valuable in their conception, as not only are they descriptive and simple to relate to the data, but they are also demonstrably valid. Overall, therefore, the format used here is valuable for explaining and modelling consumption orientations and has the structure in place to investigate higher-level emotional objects, represented by Achieved- and Received possessions, if they can be identified archaeologically.

8.1.4: House 8 – A Discussion

House 8 (Casa del Fabbro) has been described by Ling and Ling (2005, 145) as probably the best example in *insula* I.10 of “the old stereotype of the ‘industrialization’ of domestic buildings in Pompeii’s final years”. Is this statement supported by the consumption orientations presented above? Firstly, in Analysis I, House 8 was the only example that demonstrated a diversion from the high-materialism goods; the closest association being jewellery. In Analysis II the pattern was supported with Utilitarian objects being the dominant component, with ‘Appearance-related’ items being subsidiary. Both of these analyses are supportive of the statement by Ling and Ling, although in *figure 8.4* (Analysis III) House 8 is located directly upon the x -axis indicating a more significant orientation toward Symbolic and Prestige objects than would be expected if the above statement was true; a greater utilitarian consumption orientation would be reflected by being located further up the y -axis. Therefore, these results are successful in investigating a more nuanced identification of patterns in consumption behaviour. The revised picture of the character of the assemblage of House 8 is one that is dominated by low-materialism utilitarian items but has an additional connection with desirous and emotion-driven objects, most visible through consumer durables representing identity-related behaviour. This secondary facet of the consumption profile for House 8 will be addressed further by examining the concept of ‘discretionary expenditure’ (Analysis IV).

8.2: Discretionary spending

In Analysis I, it was demonstrated that the division between low and high materialism goods is an arbitrary one, with an inevitable 'grey area'. This is because of the function of the items as well as the possessor's perceptions (as well as those of the observer) and the discrepant needs of individuals. 'Discretionary spending' incorporates numerous foregoing theoretical concepts, such as consumer perception, attribute information processing, satisficing, identity, and an underlying level of mundane consumption. Furthermore, it is an alternative way to create a dialogue of desire because it represents the process of the purchase (acquisition) of 'wants' rather than 'needs'.

Discretionary and non-discretionary expenditure are not two distinct classes but fall along a continuum and are best explored in less-absolute terms. This construct represents a method of exploring resource allocation; in modern consumer studies this concept is expressed in terms of finance allocation but I believe that for application to the ancient world it would have to encompass categories, such as horizontal exchange, which go beyond consideration of financial spending alone. In essence this is a way in which to investigate trade-off expenditure based upon value prioritisation: "Value prioritization occurs when consumers order expenditure based on the utility achieved from the product category as long as it is higher than some specific level" (Crouch *et al.* 2007, 248).

Danziger (2004, 24ff.) divides acquisitions into four main types, placing them into a matrix of discretionary spending that reflects goods according to their physical/material or emotional qualities on one axis, and their extravagant and practical/necessity qualities on the other. These are represented in *figure 8.2* with

definitions and examples of objects from the Pompeian assemblages. For example, discretionary spending on 'Utilitarian' goods represents items that are perceived as making life better in a way that is measurable, such as a microwave or blender in the modern home. This represents something that is physical and practical, such as bronze cookware or bronze lampstands in the Pompeian household. This is an important component for studies of the ancient world because it is an intermediate stage between 'necessity' and 'luxury' but maintains a connection with mundane consumption of durables. As such, it acknowledges that 'luxury' does not always have to be the most expensive thing available; desired items, or luxury acquisitions, are different things to different people (Danziger 2004). Investigating the less extraordinary experiences and consumptive behaviour is often more difficult to access in the archaeological record but can contain the more central meanings to life experience (cf. Bourdieu 1984; Fournier 1998; Kleine *et al.* 1993).

Desired, exotic items that form 'Lifestyle luxuries' are physical/material but extravagant, and represented in the modern world by objects such as designer clothes, cars, and watches. Additionally, 'Indulgences', represent physical but emotional acquisitions and enable an additional dimension in the interpretation of material consumption. Analysis IV investigates the applicability of this concept to the Pompeian household data and identifies patterns in consumer motivation. It also serves to verify further the interpretations from the preceding analyses in this chapter.

A significant consideration for the application of the conceptual framework of discretionary expenditure to ancient material consumption is that the matrix is relevant for all social levels, income brackets, and life stages (Danziger 2004, 25-6), which negates the need to incorporate information regarding profession or occupation,

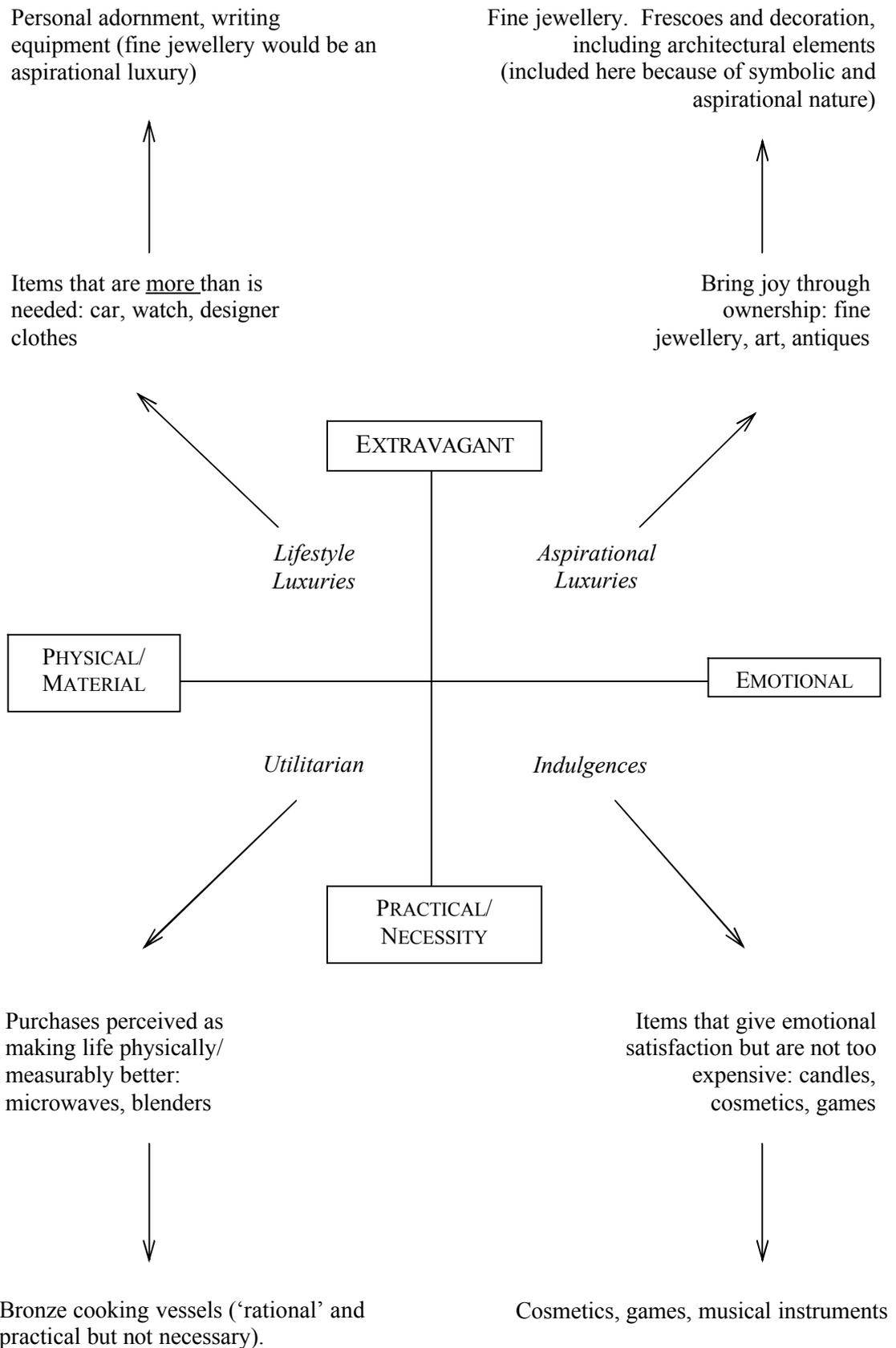


Figure 8.5: Discretionary products matrix (after Danziger 2004, 25, with additions).

and therefore wealth profiles and ‘wage’ levels. Ryan and Dziurawiec (2001, 194), however, argue that gender difference does play a role in materialistic behaviour. Similarly, Flouri suggests that family environments can serve as important indicators and gauges of materialism, especially for adolescents (1999).

There can be little argument about a base level of rational cognition in the ancient world when the selection of fundamental core goods was concerned. Cooking pots are much less conspicuous items than tableware, for example, and are unlikely to have been an item constituting an identity-statement. Therefore, such a utilitarian object has functional requirements and not a large symbolic component. The choice thus falls within the parameters of need-fulfilment. Depending on availability, accessibility, freedom of choice, and economic constraints (whether financial or regarding exchange of goods), the act of satisficing becomes significant. The individual tasked with acquiring a replacement vessel is faced with a choice: do they acquire an exact replacement, or do they opt for something different? What if there is no exact replacement? Is this a familiar situation resulting in the decision that a broken pot is all too much trouble, therefore opting for a more robust, durable alternative, such as a bronze vessel? A decision/choice of this nature would suggest cognitive reasoning in terms of weighing-up economic outlay in relation to duration of functional return.

8.2.1: Analysis IV

When the classifications represented in *figure 8.5* are examined using Correspondence Analysis some clear trends become evident in the data (*figures 8.6* and *8.7*),

replicating those produced above. For instance, Houses 6 and 7 show an association with ‘Lifestyle’ (Lfst) goods, consistent with the demonstrated orientations toward Prestige (Prs) and Symbolic (Sym) goods in Analysis III; this is also consistent with (Financial), Appearance and Identity-related goods in Analysis II. Similarly, Houses 2, 10 and 12 (upper right quadrant) again exhibit a relatively strong correspondence with Utilitarian (Util) objects, as in Analysis II; equating to Ordinary possessions in Analysis III.

There are two household assemblages in *figures 8.6* and *8.7* that reflect consumption behaviour with no strong orientations: Houses 6 and 8. However, this type of analysis still permits commentary on their character. House 6 is at the base of the biplot in *figure 8.6*, which indicates that its consumption orientation is one of the most distant from Utilitarian (in the lower left quadrant with Lifestyle goods) – once again the *y*-axis reflects the utility-emotion scale of consumer durables. House 8, however, is located at the centroid and reflects an orientation that is the most ‘average’ in the data set when considered in categories of discretionary expenditure. It is located lower on the *y*-axis than would be expected, but *figure 8.6* illustrates the non-utilitarian components that it is associated with, such as iTSP (toilet, surgical or pharmaceutical instruments). This pattern is in accordance with the interpretation discussed in *section 8.1.4*, which stressed a multi-pronged examination of the data to access nuanced emotion-driven consumption orientations.

Finally, in relation to this discussion on materialism and discretionary expenditure on consumer durables, the overall behavioural aspect can be evaluated through the concepts of product risk (cost) and involvement (importance). For the current data population, this facet has been approached through the creation of a two-

way matrix (*table 8.5*), which provides examples from the Pompeian household assemblages as representations of the divisions.

As with high-materialism objects, there are few commodities in the current data population that can be considered high-involvement, especially if the cost is also perceived as high. The latter part of this trend is not dissimilar to modern contexts, where consumer involvement with goods becomes greater as the costs increase.

Table 8.5: Consumer durable involvement

		INVOLVEMENT/ IMPORTANCE	
		High	Low
COST	High	<i>Status-related items, e.g. fine jewellery Marble furniture Silver vessels</i>	<i>Bronze cookware Glass tableware</i>
	Low	<i>Religious items</i>	<i>Ceramic cups/beakers Glass storage vessels Weaving equipment Household utensils (basic) Tools</i>

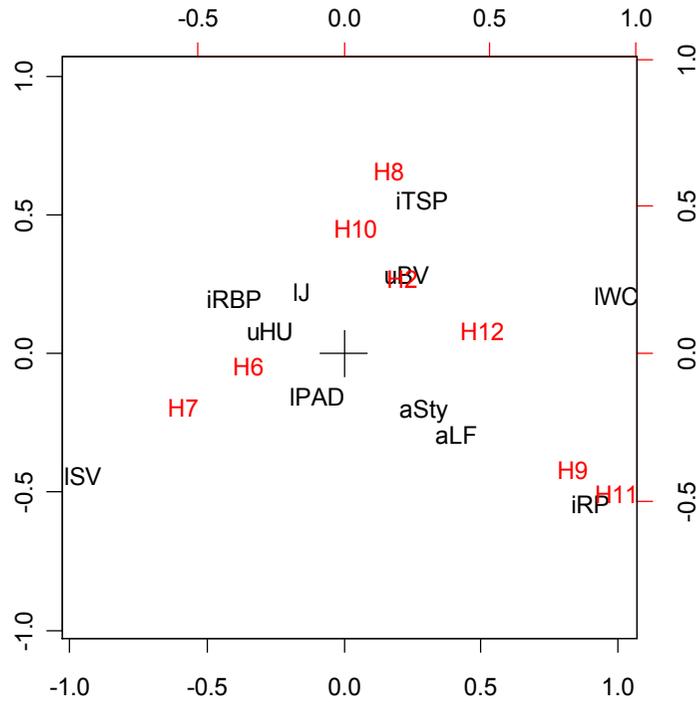


Figure 8.6: Correspondence Analysis of artefact components (discretionary expenditure)

Lifestyle Luxuries

IJ-jewellery;
 IPAD-items of ‘Personal Adornment and Dress’ (PAD), excluding jewellery
 IWC-written communications
 ISV-silver vessels

Aspirational Luxuries

aSty-statuary
 aLF- Lux Furniture

Indulgences

iTSP-toilet, surgical or pharmaceutical instruments
 iRBP-religious objects
 iRP-recreational purposes

Utilitarian

uBV- bronze vessels
 uHU-utilitarian household utensils

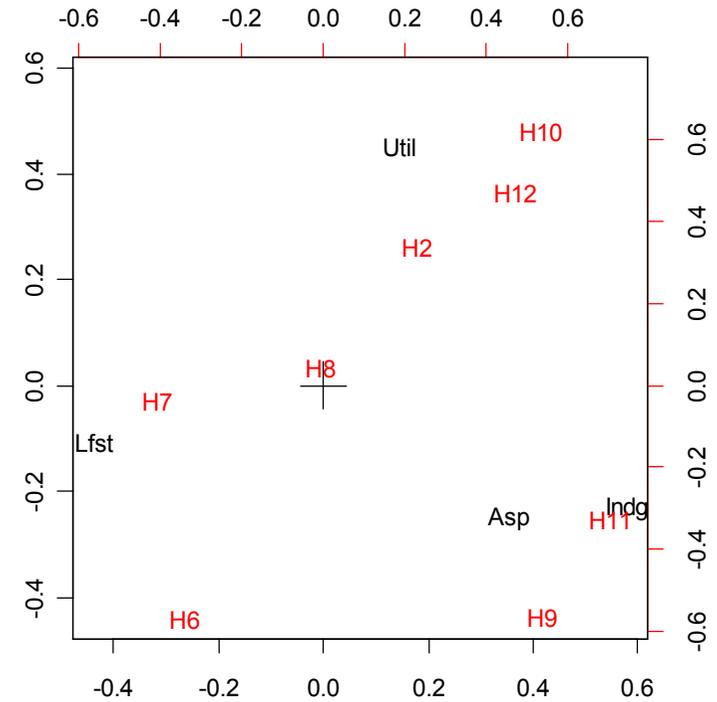


Figure 8.7: Correspondence Analysis of discretionary expenditure

8.3: Consumption and Life-Events

To understand people's life experiences, the full constellation of consumer durables needs to be considered, with mundane as well as luxury goods taken into account, which is why Pompeii provides particularly good data. Moreover, such a perspective is not solely for the interpretation of household assemblages; during escape from Pompeii both low and high materialism items were removed by individuals. The lower end of the spectrum was represented by utilitarian objects that fulfilled mundane needs, as well as religious items perhaps in the hope that they could offer protection from the situation people found themselves in. The higher end of the spectrum was represented by expensive and portable items, such as jewellery. The dynamic balance between the symbolic and the functional is redressed in such situations, as there is an increased priority on the necessary and the utilitarian: perceptions of image and social hierarchy become relegated in significance when the basal priority of survival is faced. This relates back to consumers responding to experiential and goal-derived motivations, as lived experience commands a different conception of object/commodity (Fournier 1998, 367). Moreover, an additional component of consumption theory becomes pertinent in this discourse: 'life-event transitions' (see Gentry 1997, 29). These are events (stresses) that disrupt familiar routines and frequently cause consumption patterns to change due to the changed nature of the life of an individual or of a subsection of the population. 'Stresses' in this context have been broadly defined by Thoits (1995, 54) as: "any environmental, social, or internal demands which require the individual to readjust his/her usual behaviour patterns" (see also Lee *et al.* 2007; Mathur *et al.* 2008).

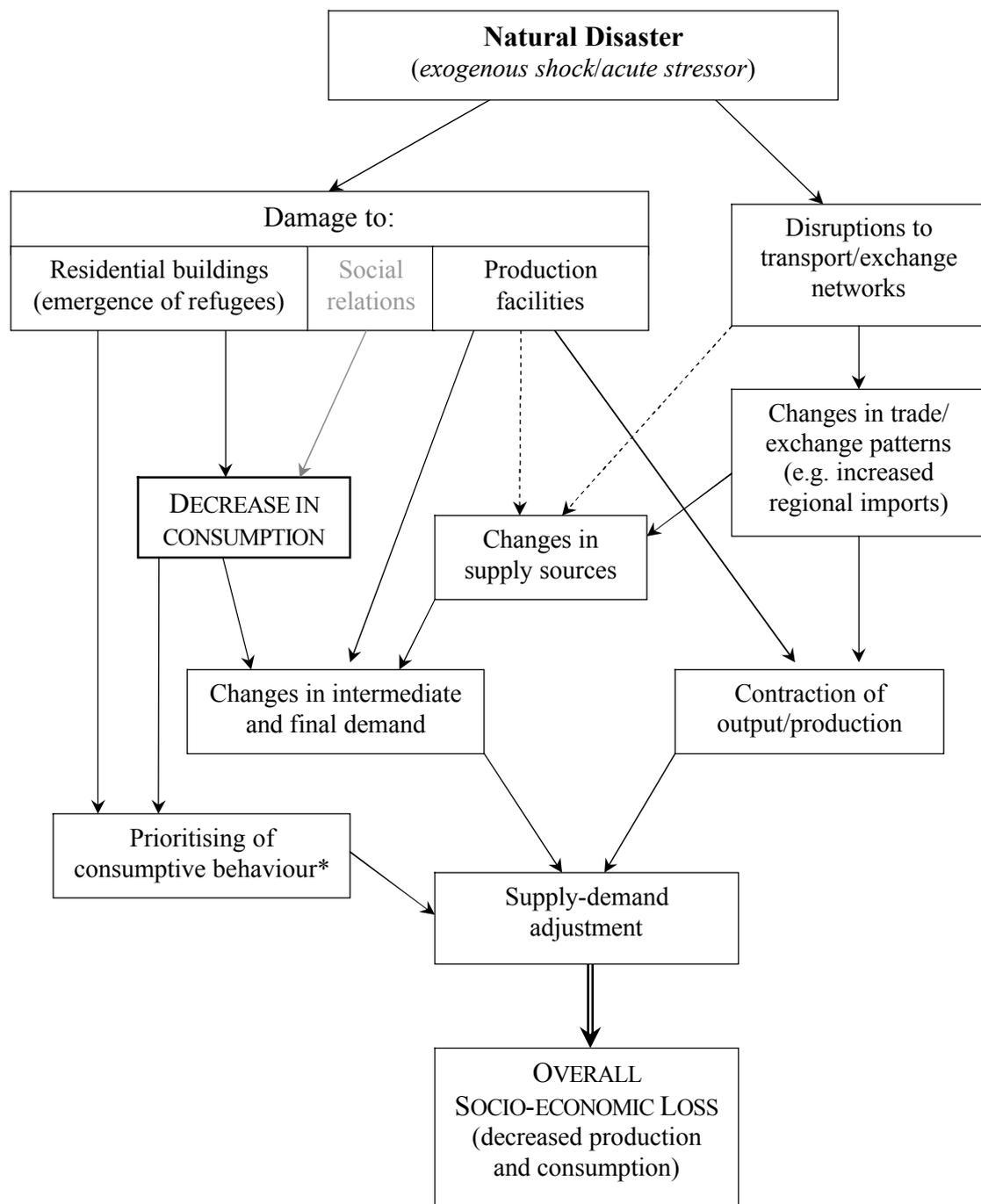
Although such experiences can be both positive (for example marriage or childbirth) and negative (such as job loss or the death of a family member), the applicability for the Pompeian context lies in the latter form, as they are often represented as discrete events (referred to as *acute* stressors by Lee *et al.* 2007, 428). I would argue that the natural disasters that befell the Campanian region in the latter half of the first century are extreme examples of such negative events. The earthquake(s) of 62 CE can be seen as the first case, as it caused a shift in consumption patterns on a considerable scale, through the remodelling of houses and public buildings. It is probable that smaller scale consumptive habits also experienced a shift, whether as a result of a reduction in commodity availability (such as if workshops or production locales were damaged), or through a redirection of private (financial) resources to enable restoration.

The second example is the volcanic eruption of 79 CE, which was experienced on a massive scale. This did more than just change acquisition-decisions for day-to-day objects; it caused a rapid re-evaluation of consumptive needs and superfluous goods. Gentry states that for negative events consumers experience a reduction in aspiration levels and an increased downward social comparison (1997, 29). It is not hard to imagine those fleeing the city in August 79 becoming less involved in goods that were previously socially significant, redirecting their focus onto the utilitarian. The use of objects that had previously been contemplated in terms of being social ‘anchors’ or ‘markers’ would have changed, probably becoming broader. In a study of consumption behaviour after economic shock in Indonesia, it was revealed that households “reduced spending on semi-durables while maintaining expenditures on foods” and that some households used wealth to smooth consumption (Frankenberg *et al.* 2003, 280*ff.*; also see Thomas and Frankenberg 2006). Not only would many

durables become more deferrable (i.e. less necessary) after a natural disaster but they would also be the least ‘liquid’ type of commodities, with items such as jewellery being relatively liquid (*cf.* Frankenberg *et al.* 2003, esp. 288). I would argue that it is plausible to view the actions of Pompeians during the aftermath of the 79 CE eruption in these terms.

The contrast between rural and urban is an interesting one to consider in this context. In a study of consumers in modern India, Sehrawet and Kundu (2007, 632) compared urban and rural populations, concluding that consumer behaviour differed between the two backgrounds due to socio-economic attitudes. Generally, rural consumers are relatively poor and do not have access to infrastructure, resulting in limited spending power (Sehrawet and Kundu 2007, 632). When a situation occurs resulting in some form of economic crisis, households that are “close to a subsistence level ... are very reluctant to cut consumption further” (Chetty and Looney 2006, 2352). Thomas and Frankenberg (2006, 14), however, state that rural households are often less affected in such situations due to having lower interactions with monetized sectors of the economy.

Studies that evaluate socio-economic impacts of modern natural disasters are relevant to our attempts to understand the wider implications for Pompeian households. Four primary facets of impact have been argued for in recent literature (Auffret 2003; Crowards 2000; IMF 2003; Rasmussen 2006): (1) an immediate contraction of economic output/production; (2) an increase in imports to the region, including the trade of materials for reconstruction after earthquake damage; (3) increased strain on public finances, such as through the necessary rebuilding of public buildings in Pompeii prior to 79 CE; (4) an increase in poverty, especially as the



* including the post-event spectrum of shelter–housing–house–‘home’ discussed by Wilford (2008).

Figure 8.8: Life-event impact on consumers and the wider socio-economic background (after Yamano et al. 2007, 171, figure 4, with additions)

poorer segments of society are disproportionately affected. Although these effects would have had immediate impact, they would also have had longer-term effects on production and trade (IMF 2003, 9-12) – even if this was just represented in terms of connectivity between inland regions of Roman Italy. Even in the modern world, measurement of these economic impacts is problematic due to assumptions of market stability and averaged fiscal measurements, which therefore negates the possibility of such quantification for the ancient world. Even without numerical assessment, however, these concepts can be profitably incorporated into dialogues of consumer behaviour and exchange activities in the Roman world. *Figure 8.8* displays a conceptual structure for the impact of a natural disaster as a life-event impacting on consumers and the wider socio-economic background.

One aspect that is not accounted for in the diagram is a shift in the representation of modes of acquisition. As encountered in many modern post-disaster cases, such as the aftermath of Hurricane Katrina in 2005 (Wilford 2008), there is often degeneration to social disorder, reflected in the looting and theft of many goods left behind. This is a process that has been commented on in the past for sites such as Pompeii, in terms of both contemporaneous and more recent looting (Allison 2004a; 2007). Furthermore, a study of behaviour in Bangladesh after the exogenous shock of flooding demonstrates that the exchange mechanism of private transfers (gift-giving) was prevalent as a socio-economic response (Mozumder *et al.* 2009). This not only circumvents the act of purchase when commodity availability is extremely low but also assists in reinforcing social ties. An interesting consequence of this behaviour is the reduction in household consumption variability, a feature that shares direct proportionality with the severity of the natural disaster because private transfers become a more significant construct in more severe events (Mozumder *et al.* 2009).

Natural disasters would not have been the only ‘exogenous shocks’ that Roman Italy would have felt. Military conflict also impacted on parts of the civilian populace, whether through pressures from refugee populations or economic conditions, such as State taxes to alleviate military expenditure discussed in Chapter Three. Furthermore, taking particular events that are experienced by an individual and expanding this concept to the perspective of the life-course creates additional facets of consumptive behaviour and response to external influences (see *figure 8.8*).

8.3.1: Analysis V: Consumer Behaviour and a Life-Event in Pompeii

When the discretionary expenditure construct applied in Analysis IV is extended to the entire data population (i.e. all twelve houses), an intriguing pattern is revealed. By including the houses of lower level occupation the additional perspective of the storage of consumer durables can be investigated, using examples such as House 5. Furthermore, this provides an opportunity to investigate whether it is possible to identify consumer motivations behind such behaviour. *Figure 8.9* displays the Correspondence Analysis output for discretionary expenditure evaluation of all twelve houses, indicating that House 5 occupies a position at the very bottom of the biplot. When the data are considered in terms of the overall classifications for this format of data analysis, the assemblage for House 5 demonstrates an association with Aspirational Luxuries but no other categories. There are also no indicated associations with the other houses, suggesting an irregular consumption pattern for items of discretionary expenditure. This can largely be explained by the fact that the predominant correspondence for House 5 is statuary (aStyl). This represents a class

of artefact that would be far from a necessity if the occupants were (i) fleeing the city immediately prior to the eruption, or (ii) leaving the property for other reasons, but with the intention to return at a later point.

Considered in these terms, it is not surprising also to find that the house closest to the plot point of House 5 is another house of low occupation, House 3 (abandoned), which has also been interpreted as having objects stored within the building (Allison 2004a; 2004b). Therefore, following this process of data analysis potentially offers a method of evaluating the state of occupation in 79 CE for other houses in the city. Although this is a tentative interpretation, it is one that supports the current data.

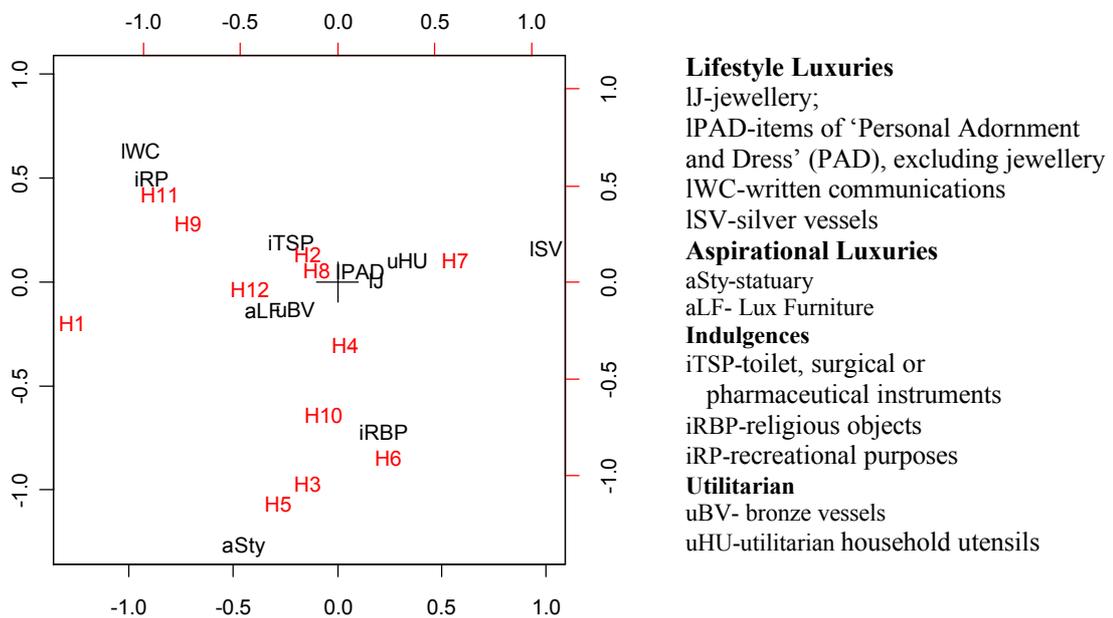


Figure 8.9: Correspondence Analysis discretionary expenditure for all Houses

This chapter has presented and demonstrated the practical applicability of a flexible basis for investigating materialism and discretionary spending. These constructs form a conceptual bridge between ‘consumption’ and ‘consumerism’ as they incorporate both utilitarian and luxury consumer durables. The flexibility of the framework provides the capacity to investigate materialism at its various levels, thereby reducing assumptions and permitting testing of interpretations.

The following chapter will now summarise the main arguments from this thesis and conclusions will be drawn.

CHAPTER NINE:

CONCLUSION

“[T]he study of consumption – beset though it is with evidential problems – has the potential to tell us a great deal about the Roman economy.”

Harris (1993, 28)

The arguments contained within this thesis have presented consumer theory as a valid construct with which to approach and investigate the ancient world. I have demonstrated that Harris is correct in stating that consumption has great potential, and that the ‘evidential’ problems he refers to can be reduced by being cognisant of the limitations of available data. With critical awareness, the study of the consumption of consumer durables can aid in addressing some of the larger perennial questions that arise, such as rationality (economic and social), as well as some constructs that have a much more recent tradition, such as globalisation and consumerism. It is apparent that the theoretical and practical implications from this study are not limited solely to research questions that are economic in nature; there are multiple sociological aspects that are accessible, such as identity. Furthermore, cognitive processes and behavioural motivation can be investigated through concepts such as information processing and consumer perceptions, as well as from the added perspective of life-events and life-processes. Transitional events such as natural disasters impact upon consumer behaviour and shift the balance of modes of acquisition; therefore it is necessary to take these variables into consideration for sites in the Campanian region. The theoretical framework presented in this thesis responds to the call by Hurcombe

(2007a) for archaeological debates on the conception of materiality, material engagement, and social constructions of meaning. The analysis that I have conducted does not produce all of the answers to the questions being explored; it does, however, allow for more rigorous interpretation of the archaeological data, revealing unexpected complexity in the material record of Pompeian houses.

The analysis of archaeological data in Part II of this thesis, within the framework established in Part I, demonstrates that the application of the theoretical perspective is possible, and assists in furthering our understanding of socio-economic interactions in the ancient world. Through the construction of consumption profiles it is possible to investigate consumption orientations and patterns in consumer behaviour within the Roman household. Furthermore, by performing data analysis at numerous levels and from multiple perspectives, the value of the study is enhanced and assumptions are reduced as interpretations are tested and evaluated.

The analysis of Functional Categories in Chapter Six set the foundations upon which subsequent analyses could develop. By investigating the data in these relatively broad groups, basic patterns and key artefact categories can be identified, thereby permitting elimination of outliers and a focus on the more significant artefact classes. Although some categories of artefact create a bias on the aggregate data population, their removal need not mean that they are completely discarded. They can enable investigation of consumption behaviour from alternative perspectives and directions. For example, coins are not consumed goods, *per se*, but they aid in negotiating the act of consumption: it was demonstrated in *section 6.4* that they can add to the discussion through their representation of purchasing power and as indicators of the potential consumptive ability possessed by households. Even when

the available information is limited in detail in some areas, such as coin denomination, effective analysis is still possible.

Greene (2008, 73) states that there was an “Augustan ‘tableware boom’ [that] brought mass-produced terra sigillata to the tables of diners”. In my analysis of the Pompeian vessel data, the significance of vessels of alternative materials – especially glass – was emphasised, not least through the very low quantities of fineware present in the houses. Therefore, these urban consumers evidently had choice available to them, and not just in terms of ceramic vessels. It would consequently be more appropriate to refer to this ‘tableware boom’ in overall vessel terms and not just those of fineware. The preponderance of glass and metal tableware over ceramics in the Pompeian sample examined may indicate an elite (or aspirational) level of consumption.

Assemblage diversity was investigated in Chapter Seven by examining the extent of vessel artefact type variation, which can be related to the concept of ‘memes’ (discussed in Chapter One), as diversity in material culture can be represented through the frequency and variance of memes – in this case represented by artefact types – present (Lumsden and Wilson 1981, 314-15). For ceramic vessels, it has been demonstrated that there was a strong positive correlation between the number of vessels in an assemblage and the number of artefact types represented (*figure 7.5*): larger assemblages tended to be more diverse. There was also a positive correlation between ceramic diversity and house size (*figure 7.6*), but this was shown to be too weak to be a sole explanatory factor. Vessels of other materials exhibited a similar pattern to the pottery in terms of factors relating to assemblage diversity, although the correlation between artefact frequency and diversity was slightly weaker. In other words, for both vessel categories, larger assemblages were associated with

greater variation in terms of representation of different artefact types. This indicates that when households consumed quantitatively ‘more’ they also broadened their consumption repertoire. Furthermore, this pattern reflects the fact that a range of such commodities were available to these Pompeian residents – probably through market exchange systems.

Economic availability would not have been the only significant factor, however, in the acquisition of consumer durables. This thesis has quantitatively explored this argument through the constructs of materialism and discretionary expenditure (Chapter Eight), concluding that socio-cultural perceptions also played a significant role. It was demonstrated that consumption orientations can be assessed within an emotional-utilitarian spectrum of acquisition; for example, in *section 8.1.3*, Houses 7 and 11 exhibited assemblages of consumer durables that were more ‘desirous’ in nature, whereas the assemblages for Houses 10 and 12 exhibited goods of a more utilitarian nature.

In Part I of this thesis, the concept of elite ‘markers’ was investigated through both documentary evidence (in Chapter Two) and pottery (in Chapter Four), with Richardson arguing that probate inventories indicated that these ‘markers’ became more common within lower social levels (Richardson 2003, 444). In my data analysis (Part II) it has not been possible to identify artefacts that could constitute such markers. Although silver vessels could be argued to have functioned in these terms, I believe that within this data population it would be erroneous to ascribe such a label to silver vessels. The reasons for this are twofold: (i) in the aftermath of the 79 CE eruption there would have been attempts at the recovery of valuable consumer

durables – by household members²⁵ as well as ‘opportunists’²⁶; (ii) the households that comprise the data population examined in this thesis are all from a similar social stratum – they are all atrium houses that have been labelled as ‘elite’. Therefore, if ‘elite markers’ were present in Pompeian assemblages, it would follow that their identification would not necessarily be possible in this thesis. I would argue that while no particular artefacts in this study can be identified as ‘elite markers’, the spectrum of goods here combine to produce ‘markers’ of consumption orientations and socio-cultural perceptions related to materialism. Further exploration of Pompeian houses using the structures of analysis presented in this thesis could help to establish if the preponderance of metal/glass vessels relative to ceramic tableware is an elite marker.

By combining analytical perspectives from the levels of both Functional Category (Chapter Six) and artefact type (Chapter Seven), a flexible basis for investigation of constructs, such as materialism and discretionary spending, has been created. These are both constructs that form a facet of consumption that deals predominantly (although not exclusively) with excess. Therefore, it bridges the gap between ‘consumption’ and ‘consumerism’ without the unavoidable modernistic connotations involved with the latter. As has been demonstrated in Chapter Eight, materialism can operate on various levels and be reflected through numerous consumption orientations – most visible when considered in terms of constellations of consumption.

²⁵ Although Allison states that after the eruption “[i]t was probably very difficult for any survivors to have located or identified any of their own property” (2002, 113).

²⁶ The recovery of valuable objects for personal gain without being recorded during modern clearance of the houses is not problematic in this study as the judgement sample selected for analysis was based upon a date of excavation that implemented careful excavation methods under Maiuri – especially when compared to examples from the preceding century (see Chapter Five).

Due to limitations on time and space, this study has not explored every avenue of consumption available to the current data population. There is potential for detailed statistical analysis of additional functional category components; for instance, it would be valuable to analyse the category of household utensils to complement the existing vessel discussion. In addition, it would be interesting to return to the houses removed from Allison's original sample of thirty properties and incorporate them into a further study. This would comprehensively test the impact of the variable of excavation date, as well as create an extended catalogue of consumption profiles, potentially permitting the refinement of interpretations and conclusions made in this study. If excavation date did prove to be as significant as has been predicted, then there is the potential to incorporate the additional houses on a predictive modelling basis using multivariate regression analysis on my current data population; this would theoretically provide a model of consumer durables that were not recorded by early excavators.

The concept of glocalisation was discussed in Chapter One but has been restricted to the theoretical section of this thesis. Extension of my theoretical framework to sites in more peripheral locations within the Roman Empire, such as Britain, would enable more direct application of the concept of the glocal (see Pitts (2008) for an example of such a study). There is also scope for the study of the Eastern Empire, which benefits from the relatively good survival of papyric evidence. Roman Egypt provides an especially rich resource in these terms. It can be argued that this region would have been atypical of economic activity and trade due to its rich agricultural productivity and invaluable natural resources – quarrying being just one example – thereby occupying unique place in the exchange networks of the empire. However, all provinces will exhibit 'atypical' patterns in some form and will appear

‘unique’ in comparison to one another. The significant aspect to consider is that underlying consumption patterns will exhibit similar trends and the data are therefore comparable, especially when considered in terms of glocal connectivity.

As discussed in Chapter Two, there is much potential encapsulated within documentary records such as customs receipts from Roman Egypt. These represent a resource that has not yet realised its full potential but will play an important part in future discussions surrounding consumption patterns – especially as records such as these provide the opportunity to collate quantitative data about commodity distribution.

An additional aspect that is possible to address through the application of the analytical and theoretical framework expounded in this thesis is the identification of variations in consumption patterns exhibited by different sectors of the social population. For example, how do consumption orientations differ between the ‘elite’ and ‘freedmen’? (Mouritsen’s (2001) work will prove valuable for investigating the latter).

Application of my framework to other Roman archaeological assemblages will also aid in examining the effect of accessibility across the rural-urban divide, and the significance of distance from the market. Through studies such as that carried out by Peña and McCallum (2009a; 2009b), it is becoming increasingly possible to integrate studies of production and consumption via quantitative data to reveal nuanced information on socio-economic activity in the ancient world.

Miller (1980) applied a method for calculating an index for expenditure scaling of ceramic goods to nineteenth-century assemblages and observed that there tended to be a bias towards low value (everyday) dishes due to use and deposition patterns (see *section 4.1* for discussion of Miller’s study). Although the calculation of

comparable indices is not possible for the data population investigated in this thesis, it could be argued that from the analyses that have been performed in Chapters Seven and Eight, this phenomenon was also observable in Pompeian households. Furthermore, this pattern was not limited to ceramic assemblages, but was also present in other facets of the assemblages (glass vessels provide an example of this, with core goods represented by low-value, everyday utilitarian objects, such as bottles). If a greater depth of information for first-century Roman vessels becomes available to us through new documentary evidence, it may be possible in the future to use a structure (such as Miller's) to analyse expenditure and thus refine investigation of Roman consumption habits. Currently, there are insufficient data for such a study to be possible, although with further investigation this may become a fruitful direction to follow.

It has been necessary to make assumptions in this study concerning ancient value ascriptions but this issue is present in all methods of interpreting material culture in the archaeological record. By bringing an innovative multi-pronged approach to the subject, I have demonstrated that these assumptions can be minimised and verified through integrated levels of analysis. Furthermore, this framework is widely applicable to many periods of the archaeological record, with scope for expansion into artefact types not present in this current study. It would also be possible to conduct a similar analysis at a scale other than that of the 'household'.

Temin (2001) reminds us that models are abstract representations of reality as well as simplified descriptions of events. This study is subject to the same limitations, although by examining data at a multitude of levels simplistic explanations are avoided and nuances in consumption behaviour are perceptible. Davies (1998) and Greene (2005) both state that historical, archaeological, and economic approaches can

create variations in theoretical interpretations, as an inherent difficulty exists in harmonising the conclusions drawn from differing types of evidence. This may be the case, but I have demonstrated that they can be successfully integrated to create a framework that can be applied to various geographical and temporal areas.

The analyses carried out here have demonstrated that the picture of consumption in a series of elite houses is neither simple nor standardised. This is an important conclusion of the research. The explanation of the variation does seem in part to be due to differing consumption practices/strategies. There is clearly potential to develop this work in future with a larger sample, to build on and test further the interpretational suggestions offered above.

APPENDIX A: Summary information for houses in sample population

House	House	No. Artefacts	Excavation Date (terminal)	State of occupation		Area (m ²)
H1	<i>House I 6,8-9</i>	164	1927	3	largely unoccupied. Storage.	200
H2	<i>Casa dei Quadretti Teatrali</i>	648	1927	2	partially occupied	575
H3	<i>Casa di Stallius Eros</i>	129	1927	4	abandoned	300
H4	<i>Casa del Sacerdos Amandus</i>	145	1924	4	probably abandoned	300
H5	<i>Casa dell'Efebo</i>	691	1925	3	largely unoccupied. storage. Owners left, minimal staff left	650
H6	<i>House I 7,19</i>	176	1926	2	partially occupied	350
H7	<i>Casa del Menandro</i>	1915	1932	1	occupied	1800
H8	<i>Casa del Fabbro</i>	1266	1933	1	occupied	320
H9	<i>House I 10,8</i>	371	1933	1	occupied - industrial features installed	265
H10	<i>Casa degli Amanti</i>	247	1933	2	downgraded occupancy	460
H11	<i>Casa della Venere in Bikini</i>	457	1954	1	occupied	200
H12	<i>Casa di Julius Polybius</i>	1589	1978	1	occupied	700

APPENDIX B

Artefact types arranged into 'Functional Categories' (FuncCat)

FuncCat #	FuncCat Code	FuncCat	Artefact Type to Include
1	PAD	Objects of personal adornment or dress	Bronze seal/signet ring Buckle/belt attachment/brooch/ fastener Hair pin Jewellery Pendant
2	TSP	Toilet, surgical, or pharmaceutical instruments	Bone spoon Bronze serpent-handled basin Iron scraper/strigil Mirror Razor/scrapper Surgical/hygiene instrument Tweezers
3	MWT	Objects used in the manufacture or working of textiles	Needlework/net-making Spinning implement Weaving implement
4	HU	Household utensils & apparatus	Bag Brazier Bronze funnel Bronze ladle Bronze or silver spoon Bronze sieve/sieve fragment Bronze/iron lamp/base/fragment Ceramic lamp Glass rod/tube/provino Grill/grate Grinding stone Hearth/focolare Iron food warmer Iron ladle Lamp fittings & equipment Lampstand/lampstand fragment/ candelabrum Lantern/lantern fragment Metal sieve/sieve fragment Mortar Oven/forno/fornello Pestle Pottery funnel Pottery sieve Pumice stone

			Silver ladle Silver rod Tripod Utensil handle Vessel/lamp support Wicker basket
5	HF	Household furniture	Architectural door fitting Bed/couch Bed/couch fragment Bone or bronze pyxis Box/Casket Bronze base/statuette base Bronze basin/basin lid Built-in cupboard Casket fitting Chest fitting Chest/cista Chest/cupboard fitting Cupboard Cupboard fitting Door/chest/cupboard fitting Fixed seat Fixed statue base Fountain/fountain fitting Furniture fitting Key Large sculpture/sculpture frag Marble base/statue base/basin base Marble or stone basin Marble pilastrino Marble seat Masonry platform/podium Other statuary/sculpture/fragments Pottery basin/krater Pottery large basin/labrum Puteal/puteal fragment Seat/footstool/stool fragments Shelving/mezzanine/suspension nails Small bronze/wooden container Stone small basin/basin fragment Sundial Table/table fittings/table base Tank/sink Wooden pergola
6	RP	Objects used for recreational purposes	Gaming piece Musical instrument
7	WM	Objects employed in weighing and measuring	Measuring equipment Scales Weights

8	WC	Objects used for, or associated with, written communications	Inkwell Stylus/pen
9	OT	Objects associated with transport	Cart/wagon Harness Vehicle fragment
10	BS	Buildings and services	Architectural fitting Building material Cistern head Drain/pipe/tap/cess pit Fixed block/support/ledge Impluvium/compluvium Latrine Niche Pool Recess Stairway Water tub/pool
11	T	Tools	Axe/hatchet Chisel File Hammer/mallet Knife/knife handle Plasterer's/mason's trowel Pliers/tongs Plumb bob Saw Small shovel/pan Stone slab/polisher Wedge Whetstone
12	FF	Fasteners and fittings	Bone disc Bone fitting/strip Bronze or wood knob Hook Iron or lead strip Metal handle Miscellaneous ornaments Nail Ring Wooden circle
13	AHA	Objects associated with agriculture, horticulture, and animal husbandry	Fishing Gardening/pruning knife Hoe Hook or knife Ladder Oil or wine press fittings Pick/pickaxe

			Rake Scythe/sickle Shears Shovel Spade
14	ME	Military equipment	Weapon
15	RBP	Objects associated with religious beliefs and practices	Aedicula/shrine/lararium Lararium painting/lararium niche Moveable altar Shrine sculpture
16	M	Miscellaneous – including objects the function of identification of which is unknown or uncertain	Bell Bronze disc/reel Bronze strip/lamina Chain Circular Stone Glass sheet/substance Leg irons Marble slab/tondo/decorated fragment Metal rod Metal tube Miscellaneous lid Miscellaneous metal object Polished stone Stone lid Unidentified cloth Unidentified fixture/mound Unidentified implement Unidentified substances Wooden board/disc
17	O	Organics	Animal skeleton Animal tooth/horn Egg shell/oyster shell Hazelnuts Human skeleton Seashell/conch/snail shell Straw Wax
18	CV	Ceramic Vessels	Pottery amphora fragment/lid Pottery amphora/amphoretta/hydria Pottery beaker/small vase Pottery bottle Pottery cooking pot Pottery cup/small bowl Pottery dolium Pottery jar/vase Pottery jug

			Pottery kernos Pottery large bowl Pottery pan Pottery plastic vase Pottery plate/dish/tray Pottery pot Pottery vessel base Pottery vessel lid Small pottery jar/small amphoretta Terra sigillata bowl/cup Terra sigillata fragment Terra sigillata plate/dish Unidentified pottery vessel
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19	OV	Other Vessels	Amphora (bronze) Bone vase Bronze bombilio/fiasco Bronze bucket Bronze casseruola Bronze cooking pot/basin/pot/fragment Bronze cup/bowl Bronze fruttiera/fruttiera Bronze jar/vase/vase fragment Bronze jug/jug fragment Bronze krater/urn Bronze lid Bronze pan Bronze plate Bronze pot Bronze receptacle/vase fragment Bronze small jar/vase Elliptical bronze forma di pasticceria Glass beaker/cup Glass bottle/flask/pyxis Glass jar/vase Glass jug Glass large bowl Glass plate/tray Glass small bowl Lead vase/tray Marble bottle/flask Marble plate/tray Shell-shaped bronze forma di pasticceria Silver amphoretta/aryballos Silver cup/bowl/cup fragment Silver jug Silver patera/casseruola/plate/plate fragment Silver vessel fragment Silver vessel/forma di pasticceria Small glass bottle
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			Small glass jar/vase Stone jug Unidentified glass vessel/lid/fragment Wooden/unidentified vessel
20	C	Coins	Coin Part of coin hoard
21	OMW	Objects and waste material associated with metal working	-
22	AHB	Objects and waste material associated with antler, horn, bone, and tooth working	-
23	PVP	Objects and waste material associated with the manufacture of pottery vessels or pipeclay objects	-

ANCIENT SOURCES

- Athenaeus 2008 *The Learned Banqueters, Books VI-VII* (Olson, S.D., Trans.).
Harvard University Press. Loeb Classical Library, London
- Celsus 1948 *De Medicina* (Spencer, W.G., Trans.). William Heinemann Ltd, London
- Cicero 1928 *De Legibus* (Keyes, C.W., Trans.). William Heinemann Ltd. Loeb
Classical Library, London
- Cicero 1943 *De Re Publica* (Keyes, C.W., Trans.). William Heinemann Ltd. Loeb
Classical Library, London
- Cicero 1948 *The Verrine Orations* (Greenwood, L.H.G., Trans.). William Heinemann
Ltd. Loeb Classical Library, London
- Cicero 1999 *Letters to Atticus, Vol. 4*. Harvard University Press. Loeb Classical
Library, London
- Cicero 2001 *Letters to Friends, Vol. 1* (Shackleton Bailey, D.R., Trans.). Harvard
University Press. Loeb Classical Library, London
- Gellius 1948 *Attic Nights, Vol. 2* (Rolfe, J.C., Trans.). William Heinemann Ltd. Loeb
Classical Library, London
- Justinian 1979 *The Digest of Roman Law. Theft, Rapine, Damage and Insult* (Kolbert,
C.F., Trans.). Penguin, London
- Lysias 2000 *Lysias* (Todd, S.C., Trans.). University of Texas Press, Austin
- Macrobius 1969 *The Saturnalia* (Davies, P.V., Trans.). Columbia University Press,
London
- Nepos 1984 *Pausanias* (Rolfe, J.C., Trans.). Harvard University Press. Loeb Classical
Library, London
- Petronius 1986 *The Satyricon* (Sullivan, J.P., Trans.) (Revised ed.). Penguin, London

- Plautus 1916 *Aulularia* (Nixon, P., Trans.). William Heinemann Ltd. Loeb Classical Library, London
- Pliny 1947 *Natural History, Vol. 3: Books VIII-XI* (Rackham, H., Trans.). William Heinemann Ltd. Loeb Classical Library, London
- Pliny 1999 *Natural History, Vol. 9: Books XXXIII-XXXV* (Rackham, H., Trans.). Harvard University Press. Loeb Classical Library, London
- Plutarch 1914 *Cato Maior* (Perrin, B., Trans.). William Heinemann Ltd. Loeb Classical Library, London
- Plutarch 1916 Sulla, *Plutarch's Lives, Vol. 4*. William Heinemann Ltd. Loeb Classical Library, London
- Plutarch 1998 Solon, *Plutarch. Greek Lives: A selection of nine Greek lives*. (Waterfield, R., Trans.) Oxford University Press, Oxford
- Polybius 1927 *Histories, Vol. 6*. William Heinemann Ltd. Loeb Classical Library, London
- Propertius 1999 *Propertius: The Poems* (Lee, G., Trans.). Oxford University Press, Oxford
- Sallust 1945 *Bellum Catilinae, Sallust*. William Heinemann. Loeb Classical Library, London
- Seneca 1962 *Epistulae Morales* (Gummere, R.M., Trans.). William Heinemann Ltd. Loeb Classical Library, London
- Statius 2003 *Thebaid* (Shackleton Bailey, D.R., Trans.). 2 vols. Harvard University Press. Loeb Classical Library, London
- Suetonius *De Vita Caesarum* (Rolfe, J.C., Trans.). <http://www.cartage.org.lb/en/themes/BookLibrary/books/bibliographie/S/Suetonius/vitellius.html>

- Suetonius 1998 *Lives of the Caesars, Vol. 1* (Rolfe, J.C., Trans.) (revised ed.).
Harvard University Press. Loeb Classical Library, London
- Tacitus 1904 *The Annals of Tacitus: Books I-VI. An English Translation* (Ramsay,
G.G., Trans.). John Murray, London
- Tacitus 1941 *The Annals* (Jackson, J., Trans.). William Heinemann Ltd. Loeb
Classical Library, London
- Tacitus 1970 *Agricola* (Hutton, M., Trans.) (Revised ed.). William Heinemann Ltd.
Loeb Classical Library, London
- Valerius Maximus 1684 *The Life of Valerius Maximus*, London
- Velleius Patercus 1924 *Compendium of Roman History* (Shipley, F.W., Trans.).
William Heinemann. Loeb Classical Library, London

BIBLIOGRAPHY

- Abdi, H. 2003 Multivariate analysis. In Lewis-Beck, M., A. Bryman, and T. Futing (eds.), *Encyclopedia for Research Methods for the Social Sciences*: 699-702. Sage, Thousand Oaks
- Abdi, H. 2007 Coefficients of correlation, alienation and determination. In Salkind, N.J. (ed.), *Encyclopedia of Measurement and Statistics*: 158-62. Sage, Thousand Oaks
- Adams, C.E.P. 2001 'There and Back Again': Getting around in Roman Egypt. In Adams, C.E.P. and R. Laurence (eds.), *Travel and Geography in the Roman Empire*: 138-66. Routledge, London
- Adams, C.E.P. and N. Gonis 1999 Two customs-house receipts from the Bodleian Library. *Zeitschrift für Papyrologie und Epigraphik* **126**: 213-19
- Adams, W.Y. and E.W. Adams 1991 *Archaeological Typology and Practical Reality: A dialectical approach to artifact classification and sorting*. Cambridge University Press, Cambridge
- Ahuvia, A.C. 2005 Beyond the extended self: Loved objects and consumers' identity narratives. *Journal of Consumer Research* **32**: 171-84
- Alcalde, M.C. 2009 Between Incas and Indians: Inca Kola and the construction of a Peruvian-global modernity. *Journal of Consumer Culture* **9**(1): 31-54
- Aldridge, A. 2003 *Consumption*. Polity Press, Cambridge
- Alhabeeb, M.J. 2007 On consumer trust and product loyalty. *International Journal of Consumer Studies* **31**: 609–12

- Allison, P.M. 1991 'Workshops' and 'patternbooks', *Akten des 4. Internationalen Kolloquiums zur römischen Wandmalerei in Köln, Sept. 1989. Kölner Jahrbuch für Vor- und Frühgeschichte* 24: 79-84
- Allison, P.M. 1992a Artefact assemblages: Not 'the Pompeii Premise'. In Herring, E., R. Whitehouse, and J. Wilkins (eds.), *Papers of the 4th Conference of Italian Archaeology*, Vol. 3.1: 49-56. Accordia Research Centre, London
- Allison, P.M. 1992b The Distribution of Pompeian House Contents and its Significance. PhD Thesis. School of Archaeology, Classics and Ancient History. University of Sydney
- Allison, P.M. 1993 How do we identify the use of space in Roman housing? In E. Moormann (ed.) *Functional and spatial analysis of wall painting: Proceedings of the 5th International Congress of Ancient Wall Painting, Amsterdam 1992*: 4-11. Annual Papers on Classical Archaeology.
- Allison, P.M. 1995 Painter-workshops or decorator's teams? *Mededelingen van het Nederlands Instituut te Rome, Antiquity* 54: 98-108
- Allison, P.M. 1997a Artefact distribution and spatial function in Pompeian houses. In Rawson, B. and P. Weaver (eds.), *The Roman Family in Italy. Status, sentiment, space*: 321-54. Clarendon Press, Oxford
- Allison, P.M. 1997b Subject matter and meaning in the paintings of the Casa della Caccia Antica in Pompeii. In Scagli, D. (ed.), *I temi figurati nella pittura parietale antica (IV sec. a.C.-IV sec. d.C)*: 19-14. Atti del VI Convegno Internazionale sulla Pittura Parietale Antica, Bologna
- Allison, P.M. 1999a Introduction. In Allison, P.M. (ed.), *The Archaeology of Household Activities*: 1-18. Routledge, London

- Allison, P.M. 1999b Labels for ladles: Interpreting the material culture of Roman households. In Allison, P.M. (ed.), *The Archaeology of Household Activities*: 57-77. Routledge, London
- Allison, P.M. 2002 Recurring tremors: the continuing impact of the AD 79 eruption of Mt Vesuvius. In Gratton, J. and R. Torrence (eds.), *Natural Disasters and Cultural Change*: 107-25. Routledge, London
- Allison, P.M. 2004a *Pompeian Households: An analysis of the material culture*. Monograph 42 Cotsen Institute of Archaeology, University of California, Los Angeles
- Allison, P.M. 2004b Pompeian Households: An on-line companion. <http://www.stoa.org/pompeianhouseholds>. Data accessed: September 2008
- Allison, P.M. 2006a Artefact distribution within the auxiliary fort at Ellingen: Evidence for building use and for the presence of women and children. *Sonderdruck aus Bericht der Römisch-Germanischen Kommission* **87**: 389-452
- Allison, P.M. 2006b Insula of the Menander in Pompeii Vol. III: The finds in context: an on-line companion. <http://www.le.ac.uk/ar/menander/index.html>. Date accessed: September 2008
- Allison, P.M. and F. Sear 2002 *The Casa della Caccia Antica in Pompeii, Häuser in Pompeji 11*. Hirmer, München
- Andreau, J. 2008 The use and survival of coins and of gold and silver in the Vesuvian cities. In Harris, W.V. (ed.), *The Monetary Systems of the Greeks and Romans*: 208-25. Oxford University Press, Oxford
- Andrews, D. and G. Ritzer 2007 The global in the sporting local. *Global Networks* **7**(2): 35–153

- Appadurai, A. (ed.) 1986 *The Social Life of Things: Commodities in cultural perspective*. Cambridge University Press, Cambridge
- Appadurai, A. 1990 Disjuncture and difference in the global cultural economy. In Featherstone, M. (ed.), *Global Culture: Nationalism, globalization, and modernity. A theory, culture, and society special issue*: 295-310. Sage, London
- Arkell, T. 2000 The probate process. In Arkell, T., N. Evans, and N. Goose (eds.), *When Death Do Us Part: Understanding and interpreting the probate records of early modern England*: 3-13. Leopard's Head Press, Oxford
- Astin, A.E. 1978 *Cato the Censor*. Clarendon Press, Oxford
- Astin, A.E. 1989 Roman government and politics, 200-134 B.C. In Astin, A.E., F.W. Walbank, M.W. Frederiksen, and R.M. Ogilvie (eds.), *The Cambridge Ancient History, Vol. VIII: Rome and the Mediterranean to 133 B.C.*, 2nd ed.: 163-96. Cambridge University Press, Cambridge
- Auffret, P. 2003 High Consumption Volatility: The impact of natural disasters? *World Bank Policy Research Working Paper 2962*
- Ault, B.A. 2005 *The Excavations at Ancient Halieis. Vol. 2, The Houses: The organization and use of domestic space*. Indiana University Press
- Ault, B.A. and L.C. Nevett 1999 Digging houses: archaeologies of Classical and Hellenistic Greek Domestic Assemblages. In Allison, P.M. (ed.), *The Archaeology of Household Activities*: 43-56. Routledge, London
- Bagnall, R.S. 1995 *Reading Papyri, Writing Ancient History*. Routledge, London
- Bagozzi, R.P., Z. Gürhan-Canli, and J.R. Priester 2002 *The Social Psychology of Consumer Behaviour*. Open University Press, Buckingham

- Barclay, K., M. Biddle, and C. Orton 1990 The chronological and spatial distribution of the objects. In Biddle, M. (ed.), *Object and Economy in Medieval Winchester*, Vol. 1: 42-73. Clarendon Press, Oxford
- Barzel, Y. 1982 Measurement cost and the organization of markets. *Journal of Law and Economics* **25**(1): 27-48
- Basu, K. 2004 Consumer Cognition and Pricing in the 9's in Oligopolistic Markets, *Center for Analytical Economics Working Paper*. Cornell University
- Bataille, G. 1998 *Georges Bataille: Essential writings*. Sage, London
- Baudrillard, J. 1998 *The Consumer Society: Myths and structure*. Sage, London
- Baudrillard, J. 2001 *Selected Writings* (2nd ed.). Stanford University Press, Stanford.
Edited and translated by M. Poster
- Baugher, S. and R.W. Venables 1987 Ceramics as Indicators of Status and Class in Eighteenth-Century New York. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 31-53. Plenum Press, London
- Bauman, Z. 1998 *Globalization: The human consequences*. Polity Press, Cambridge
- Baxter, M.J. 1991 Principal component and correspondence analyses of glass compositions: An empirical study. *Archaeometry* **33**(1): 29-41
- Baxter, M.J. 1993 *Exploratory Multivariate Analysis in Archaeology*. Edinburgh University Press, Edinburgh
- Baxter, M.J. and H.E.M. Cool in prep. Correspondence Analysis in R for Archaeologists.
- Baxter, M.J., H. E. M. Cool, M. P. Heyworth, and C. Jackson 1995 Compositional variability in colourless Roman vessel glass. *Archaeometry* **37**(1): 129-41
- Baxter, M.J., H. E. M. Cool, and C. Jackson 2006 Comparing glass compositional analyses. *Archaeometry* **48**(3): 399-414

- Bayman, J.M. 1996 Shell ornament consumption in a Classic Hohokam Platform Mound Community Centre. *Journal of Field Archaeology* **23**(4): 403-20
- Belk, R.W. 1983 Worldly possessions: Issues and criticisms. *Advances in Consumer Research* **10**: 514-19
- Belk, R.W. 1985a Materialism: Trait aspects of living in the material world. *Journal of Consumer Research* **12**(3): 265-80
- Belk, R.W. 1985b Possessions and the extended self. *Journal of Consumer Research* **15**: 139-68
- Belk, R.W. and G. Ger 1994 Problems of marketization in Romania and Turkey. In Shultz II, C.J., R.W. Belt, and G. Ger (eds.), *Research in Consumer Behaviour. Volume 7: Consumption in Marketizing Economies*: 123-55. JAI Press, New York
- Belk, R.W., G. Ger, and S. Askegaard 1997 Consumer desire in three cultures: Results from protective research. *Advances in Consumer Research* **24**(1): 24-28
- Bell, H.I., V. Martin, E.G. Turner, and D. Van Berchem (eds.) 1962 *The Abinnaeus Archive: Papers of a Roman officer in the reign of Constantius II*. Clarendon Press, Oxford
- Berg, M. 2002 From imitation to invention: Creating commodities in Eighteenth-Century Britain. *The Economic History Review* **55**(1): 1-30
- Berger, J. and C. Heath 2007 Where consumers diverge from others: Identity signalling and product domains. *Journal of Consumer Research* **34**(2): 121-34
- Berry, C.J. 1994 *The Idea of Luxury: A conceptual and historical investigation*. Cambridge University Press, Cambridge
- Bhabha, H.A. 1994 *The Location of Culture*. Routledge, London

- Bloch, P.H. and M.L. Richins 1983 A theoretical model for the study of product importance perceptions. *Journal of Marketing* **47**: 69-81
- Blyth, P.H. 1999 The consumption and cost of fuel in hypocaust. In Delaine, J. and D.E. Johnston (eds.), *Roman Baths and Bathing*: 87-98. Proceedings of the First International Conference on Roman Baths. *Journal of Roman Archaeology Supplementary Series* 37
- Bocock, R. 1993 *Consumption*. Routledge, London
- Bourdieu, P. 1984 *Distinction: A social critique of the judgement of taste*. Routledge, London
- Branstner, M.C. and T.J. Martin 1987 Working-class Detroit: Late Victorian consumer choices and status. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 301-20. Plenum Press, London
- Bratlinger, P. and R. Higgins 2006 Waste and value: Thorstein Veblen and H.G. Wells. *Criticism* **48**(4): 453-75
- Breglia, L. 1950 Circolazione monetale ed aspetti di vita economica Pompei. *Pompeiana: Raccolta di studi per il secondo centenario degli scavi di Pompei*: 41-59
- Brewer, J. and R. Porter 1993 Introduction. In Brewer, J. and R. Porter (eds.), *Consumption and the World of Goods*: 1-15. Routledge, London
- Briscoe, J. 1981 *A Commentary on Livy: Books XXXIX-XXXVII*. Clarendon Press, Oxford
- Brown, F.E. 1986 Continuity and change in the urban house: Developments in domestic space organisation in seventeenth-century London. *Comparative Studies in Society and History* **28**(3): 558-90

- Bruno, M., L. Conti, P. Pensabene, and B. Turi 2002 Pompeii after the AD 62 earthquake: Historical, isotopic, and petrographic studies of quarry blocks in the Temple of Venus. In Herrmann, J.J., N. Herz, and R. Newman (eds.), *ASMOSIA V: Interdisciplinary studies on ancient stone. Proceedings of the Fifth International Conference of the Association for the Study of Marble and Other Stones in Antiquity*: 282-88. Archetype Publications, London
- Burke, P. 1993 *Res et verba*: Conspicuous consumption in the early modern world. In Brewer, J. and R. Porter (eds.), *Consumption and the World of Goods*: 148-61. Routledge, London
- Campbell, C. 1995 The sociology of consumption. In Miller, D. (ed.), *Acknowledging Consumption*: 96-126. Routledge, London
- Campbell, C. 1998 Consumption and the rhetorics of need and want. *Journal of Design History* **11**(3): 235-46
- Cancik, H. (ed.) 2005 *Brill's New Pauly. Antiquity: Encyclopaedia of the ancient world*. (Vol. 7). Brill, Leiden
- Canessa, C. 1909 Le trésor monétaire de Boscoreale. *Le Musée* **6**: 259-65
- Carlson, J.P., L.H. Vincent, D.M. Hardesty, and W.O. Bearden 2009 Objective and subjective knowledge relationships: A quantitative analysis of consumer research findings. *Journal of Consumer Research* **35**: 864-76
- Carmel, Y. and Y. Ben-Haim 2005 Info-gap robust-satisficing model of foraging behavior: Do foragers optimize or satisfice? *The American Naturalist* **166**(5): 633-41
- Carr, G. 2001 'Romanisation' and the body. In Davies, G., A. Gardner, and K. Lockyear (eds.), *TRAC 2000. Proceedings of the Tenth Annual Theoretical*

- Roman Archaeology Conference, London 2000*: 112-24. Oxbow Books, Oxford
- Carroll, M., G. Montana, L. Randazzo, and R. Giarrusso 2008 Recovering evidence for the use of marble and coloured limestone in the first century AD in excavations at the sanctuary of Venus at Pompeii. *Journal of Fasti Online*: <http://www.fastionline.org/docs/FOLDER-it-2008-119.pdf>
- Chetty, R. and A. Looney 2006 Consumption smoothing and the welfare consequences of social insurance in developing economies. *Journal of Public Economics* **90**: 2351–56
- Christopher, A.N. and B.R. Schlenker 2000 The impact of perceived material wealth and perceiver personality on first impressions. *Journal of Economic Psychology* **21**: 1-19
- Chua, B.H. 2009 From small objects to cars: Consumption expansion in East Asia. In Lange, H. and L. Meier (eds.), *The New Middle Classes: Globalizing lifestyles, consumerism and environmental concern*: 101-15. Springer, Amsterdam
- Church, R. 1999 New perspectives on the history of products, firms, marketing, and consumers in Britain and the United States since the mid-nineteenth century. *Economic History Review* **52**(3): 405-35
- Cochrane, A. and K. Pain 2000 A globalizing society. In Held, D. (ed.), *A Globalizing World? Culture, economics, politics*: 5-45. Routledge, London
- Coffee, N. 2006 Eteocles, Polynices, and the economics of violence in Statius' Thebaid. *American Journal of Philology* **127**(3): 415-52
- Coffee, N. 2009 *The Commerce of War*. University of Chicago Press, Chicago

- Coles, R.A., H. Maehler, and P.J. Parsons (eds.) 1987 *The Oxyrhynchus Papyri, Volume LIV*. Graeco-Roman Memoirs, No. 74. Egypt Exploration Society, London
- Collingwood, R.G. and R.P. Wright 1991 *The Roman Inscriptions of Britain. Volume II Instrumentum Domesticum Fascicule 2*. Edited by S.S. Frere and R.S.O. Tomlin. Alan Sutton Publishing, Gloucester
- Conrad, G.W. 1978 Models of compromise in settlement pattern studies: An example from coastal Peru. *World Archaeology* **9**(3): 281-98
- Cool, H.E.M. 2002 An overview of the small finds from Catterick. In Wilson, P.R. (ed.), *Cataractonium: Roman Catterick and its Hinterland. Excavations and research, 1958-1997 part II*: 24-43. CBA Research Report 129. Council for British Archaeology, London
- Cool, H.E.M. 2006 *Eating and Drinking in Roman Britain*. Cambridge University Press, Cambridge
- Cool, H.E.M. and M.J. Baxter 1999 Peeling the onion: An approach to comparing vessel glass assemblages. *Journal of Roman Archaeology* **12**: 72-100
- Cool, H.E.M. and M.J. Baxter 2002 Exploring Romano-British Finds Assemblages. *Oxford Journal of Archaeology* **21**(4): 365-80
- Cool, H.E.M., G. Lloyd-Morgan, and A.D. Hooley 1995 *The Archaeology of York. 17/10: The small finds. Finds from the fortress*. York Archaeological Trust and the Council for British Archaeology, York
- Cooper, N. 1996 Searching for the blank generation: Consumer choice in Roman and post-Roman Britain. In Cooper, N. and J. Webster (eds.), *Roman Imperialism: Post-colonial perspectives*: 85-98. Proceedings of a Symposium held at

- Leicester University, November 1994. Leicester Archaeological Monograph 3. School of Archaeological Studies, University of Leicester, Leicester
- Cooper, N. 2000 Rubbish counts: Quantifying portable material culture in Roman Britain. In Pearce, S. (ed.), *Researching Material Culture: 75-86*. Leicester Archaeology Monographs 8. Material Culture Study Group Occasional Paper 1. University of Leicester, Leicester
- Corrigan, P. 1997 *The Sociology of Consumption: An introduction*. Sage, London
- Courtney, P. 1997 Ceramics and the history of consumption. *Medieval Ceramics* 2: 95-108
- Cox, J. and N. Cox 2000 Probate 1500-1800: A system in transition. In Arkell, T., N. Evans, and N. Goose (eds.), *When Death Do Us Part: Understanding and interpreting the probate records of early modern England: 14-37*. Leopard's Head Press, Oxford
- Crouch, G.I., H. Oppewal, T. Huybers, S. Dolnicar, J.J. Louviere, and T. Devinney 2007 Discretionary expenditure and tourism consumption: Insights from a choice experiment. *Journal of Travel Research* 45(3): 247-58
- Crowards, T. 2000 *Comparative Vulnerability to Natural Disasters in the Caribbean*. Caribbean Development Bank, Staff Working Paper No. 1/00 (Bridgetown, Barbados: Caribbean Development Bank)
- Crummy, N. 1983 *Colchester Archaeological Report 2: The Roman small finds from excavations in Colchester 1971-9*. Colchester Archaeological Trust Ltd., Colchester
- Curchin, L.A. 2007 The Romanization of art in Celtiberia (Central Spain). *Brathair* 7(1): 3-16

- Danziger, P.N. 2004 *Why People Buy Things They Don't Need: Understanding and predicting consumer behaviour*. Dearborn Trade Publishing, Chicago
- D'Arms, J. 1981 *Commerce and social standing in ancient Rome*. Harvard University Press, Cambridge
- Daube, D. 1969 *Roman Law: Linguistic, social and philosophical aspects*. At the University Press, Edinburgh
- Davies, J.K. 1998 Ancient economies: Models and muddles. In Parkins, H. and C. Smith (eds.), *Trade, Traders and the Ancient City*: 225-56. Routledge, London
- Daw, N.D., Y. Niv, and P. Dayan 2005 Uncertainty-based competition between prefrontal and dorsolateral striatal systems for behavioral control. *Nature Neuroscience* **8**(12): 1704-11
- Dawkins, R. 1976 *The Selfish Gene*. Oxford University Press, Oxford
- de Botton, A. 2005 *Status Anxiety*. Penguin, London
- de Grazia, V. 1996 Introduction. In de Grazia, V. and E. Furlough (eds.), *The Sex of Things: Gender and consumption in historical perspective*: 1-10. University of California Press, London
- de Ligt, L. 1993 *Fairs and Markets in the Roman Empire: Economic and social aspects of periodic trade in a pre-industrial society*, Amsterdam
- De Sena, E.C. and J.P. Ikäheimo 2003 The supply of amphora-borne commodities and domestic pottery in Pompeii 150 BC - AD 79: Preliminary evidence from the House of the Vestals. *European Journal of Archaeology* **6**(3): 301-21
- Deetz, J. 1982 Households: A structural key to archaeological explanation. *American Behavioural Scientist* **25**(6): 717-24

- Dickinson, A. 1985 Actions and Habits: The development of behavioural autonomy. *Philosophical Transactions of the Royal Society of London B: Biological Sciences* **308**: 67-78
- Dittmar, H. and L. Pepper 1992 Materialistic values, relative wealth and person perception: Social psychological belief systems from adolescents from different socio-economic backgrounds. *Meaning, Measure, and Morality of Materiality*(Special volume): 40-45
- Dittmar, H. and L. Pepper 1994 To have is to be: Materialism and person perception in working-class and middle-class British adolescents. *Journal of Economic Psychology* **15**: 233-51
- Dixon, S. 1985 Polybius on Roman women and property. *American Journal of Philology* **106**(2): 147-70
- Douglas, K. 2004 Born to trade. *New Scientist* **2465**: 24-28
- Douglas, M. and B. Isherwood 1996 *The World of Goods: Towards an anthropology of consumption* (2nd ed.). Routledge, London
- Dudey, T. and P.M. Todd 2001 Making good decisions with minimal information: Simultaneous and sequential choice. *Journal of Bioeconomics* **3**: 195-215
- Dunbabin, K.M.D. 1993 Wine and water at the Roman *convivium*. *Journal of Roman Archaeology* **6**: 116-42
- Dunbabin, K.M.D. 2003 *The Roman Banquet: Images of conviviality*. Cambridge University Press, Cambridge
- Duncan-Jones, R. 1982 *The Economy of the Roman Empire. Quantitative studies*. Cambridge University Press, Cambridge
- Duncan-Jones, R. 1994 *Money and Government in the Roman Empire*. Cambridge University Press, Cambridge

- Dyson, S.L. 1985 The villas of Buccino and the consumer model of Roman rural development. In Malone, C. and S. Stoddart (eds.), *Papers in Italian Archaeology IV, Part iv: Classical and medieval archaeology*: 67-84. BAR International Series 246. Archaeopress, Oxford
- Eade, J. 1997 *Living the Global City: Globalization as local process*. Routledge, London
- Eckardt, H. 2000 Illuminating Roman Britain. In Fincham, G., G. Harrison, R. Holland, and L. Revell (eds.), *TRAC 99. Proceedings of the Ninth Annual Theoretical Roman Archaeology Conference, Durham 1999*: 8-21. Oxbow Books, Oxford
- Eckardt, H. 2002 *Illuminating Roman Britain*. éditions monique mergoil, Montagnac
- Edwards, C. 1993 *The Politics of Immorality in Ancient Rome*. Cambridge University Press, Cambridge
- Egri, M. 2007 The use of amphorae for interpreting patterns of consumption. In Croxford, B., N. Ray, R. Roth, and N. White (eds.), *TRAC 2006: Proceedings of the Fifteenth Annual Theoretical Roman Archaeology Conference*: 43-58. Oxbow, Oxford
- Ellis, S.J.R. 2004 The distribution of bars at Pompeii: Archaeological, spatial and viewshed analyses. *Journal of Roman Archaeology* **17**: 371–84
- Erdkamp, P.P.M. 2002 Introduction. In Erdkamp, P.P.M. (ed.), *The Roman Army and the Economy*: 5-16. J.C. Gieben, Amsterdam
- Evans, J. 1993 Pottery function and finewares in the Roman North. *Journal of Roman Pottery Studies* **6**: 95-118

- Evans, J. 2001. Material approaches to the identification of different Romano-British site types. In James, S. and M. Millett (eds.) *Britons and Romans: advancing an archaeological agenda*: 26-35. CBA Research Report 125, York
- Fant, J.C. 2007 Real and painted (imitation) marble at Pompeii. In Dobbins, J.J. and P.W. Foss (eds.), *The World of Pompeii*: 336-46. Routledge, London
- Fant, J.C. 2008 Bars with marble surfaces: Evidence for the Mediterranean marble trade and for Pompeii's innkeepers. *Archaeological Institute of America 109th Annual Meeting*: Chicago, January 2008
- Fant, J.C. 2009 Bars with marble surfaces at Pompeii: Evidence for sub-elite marble use. *Journal of Fasti Online* **159**: <http://www.fastionline.org/docs/FOLDER-it-2009-159.pdf>
- Fant, J.C., S. Cancelliere, L. Lazzarini, M. Preite Martinez, and B. Turi 2002 White marble at Pompeii: Sampling the Casa dei Vettii. In Lazzarini, L. (ed.), *ASMOSIA VI: Interdisciplinary studies on ancient stone. Proceedings of the Sixth International Conference of the of the Association for the Study of Marble and Other Stones in Antiquity*: 309-16. Bottega d'Erasmus, Padova
- Fantham, E., H.P. Foley, N.B. Kampen, S.B. Pomeroy, and H.A. Shapiro 1995 *Women in the Classical World: Image and text*. Oxford University Press, Oxford
- Featherstone, M. 1990 Global culture: An introduction. In Featherstone, M. (ed.), *Global Culture: Nationalism, globalization, and modernity. A theory, culture, and society special issue*: 1-14. Sage, London
- Featherstone, M. and S. Lash 1995 Globalization, modernity and the spatialization of social theory: An introduction. In Featherstone, M., S. Lash, and R. Robertson (eds.), *Global Modernities*: 1-24. Sage, London

- Fentress, E., S. Fontana, R.B. Hitchner, and P. Perkins 2004 Accounting for ARS: Fineware and sites in Sicily and Africa. In Alcock, S.E. and J.F. Cherry (eds.), *Side-by-Side Survey: Comparative regional studies in the Mediterranean world*: 147-62. Oxbow, Oxford
- Ferguson, R. 2009 The consumer inside: At its heart, all marketing speaks to human beings. *Journal of Consumer Marketing* **26**(3): 214-18
- Ferraro, R., J.R. Bettman, and T.L. Chartrand 2009 The power of strangers: The effect of incidental consumer brand encounters on brand choice. *Journal of Consumer Research* **35**: 729-41
- Ferris, I. 1995 Shoppers' paradise: Consumers in Roman Britain, *Theoretical Roman Archaeology: Second Conference Proceedings*: 132-40. Oxbow Books, Oxford
- Fincham, G. 2002 Consumer theory and Roman North Africa: A post-colonial approach to the ancient economy. In Carruthers, M., C. van Driel-Murray, A. Gardner, J. Lucas, L. Revell, and E. Swift (eds.), *TRAC 2001. Proceedings of the Eleventh Annual Theoretical Roman Archaeology Conference, Glasgow 2001*: 34-44. Oxbow Books, Oxford
- Fine, B. 2000 *Consumption for Historians: An economist's gaze*. Department of Economics, School of Oriental and African Studies, University of London. Working Paper 91
- Fine, B., N. Foster, J. Simister, and J. Wright 1992a *Consumption Norms for Durables: Evidence from the General Household Survey*. Department of Economics, School of Oriental and African Studies, University of London. Working Paper 23

- Fine, B., N. Foster, J. Simister, and J. Wright 1992b *Consumption Norms, Diffusion, and the Video/Microwave Syndrome*. Department of Economics, School of Oriental and African Studies, University of London. Working Paper 19
- Fine, B., N. Foster, J. Simister, and J. Wright 1992c *Consumption Norms: A definition and an empirical investigation of how they have changed, 1975-1990*. Department of Economics, School of Oriental and African Studies, University of London. Working Paper 22
- Finley, M.I. 1965 Technical innovation and economic progress in the ancient world. *Economic History Review* **18**: 29-45
- Finley, M.I. 1985 *The Ancient Economy* (2nd ed.). Penguin, London
- Fiske, J. 1989 *Reading the Popular*. Routledge, London
- Fiske, S.T. and S.E. Taylor 1991 *Social Cognition* (2nd ed.). McGraw-Hill, New York
- Fleming, S.J. 1997 *Roman Glass: Reflections of everyday life*. University of Pennsylvania Press, Philadelphia
- Flouri, E. 1999 An Integrated Model of Consumer Materialism: Can economic socialization and maternal values predict materialistic attitudes in adolescents? *Journal of Socio-Economics* **28**: 707-24
- Fournier, S. 1998 Consumers and their brands: Developing relationship theory in consumer research. *Journal of Consumer Research* **24**(4): 343-53
- Fowler, W.W. 1965 *Social Life at Rome in the Age of Cicero*. Macmillan, New York
- Foxall, G.R., R.E. Goldsmith, and S. Brown 1998 *Consumer Psychology for Marketing* (2nd ed.). Thomas Learning, London
- Foxhall, L. 1998 Cargoes of the heart's desire: The character of trade in the archaic Mediterranean world. In Fisher, N.R.E. and H. van Wees (eds.), *Archaic Greece: New approaches and new evidence*: 295-309. Duckworth, London

- Frank, T. 1940 *An Economic Survey of Ancient Rome, Volume 5: Rome and Italy of the Empire*. The John Hopkins Press, New York
- Frank, T. 1959 *An Economic Survey of Ancient Rome, Volume 1: Rome and Italy of the Republic*. Pageant Books, Paterson
- Frankenberg, E., J.P. Smith, and D. Thomas 2003 Economic shocks, wealth, and welfare. *The Journal of Human Resources* **38**: 280-321
- Frederiksen, M.W. 1975 Theory, evidence and the ancient economy. *Journal of Roman Studies* **65**: 164-71
- Freeman, P.W.M. 1993 'Romanisation' and Roman material culture. Review of M. Millett's *The Romanization of Britain: An essay in archaeological interpretation* Cambridge 1990. *Journal of Roman Archaeology* **6**: 438-45
- Friedberg, A. 2002 Window shopping: Cinema and the postmodern. In Dear, M.J. and S. Flusty (eds.), *The Spaces of Postmodernity: Readings in human geography*: 442-54. Blackwell, London
- Friedman, J. 1990 Being in the world: Globalization and localization. In Featherstone, M. (ed.), *Global Culture: Nationalism, globalization, and modernity. A theory, culture, and society special issue*: 311-28. Sage, London
- Friedman, J. 1994 *Cultural Identity and Global Process*. Sage, London
- Funari, P.P.A. 2002 The consumption of olive oil in Roman Britain and the role of the army. In Erdkamp, P.P.M. (ed.), *The Roman Army and the Economy*: 235-63. J.C. Gieben, Amsterdam
- Furby, L. 1980 The origins and early development of possessive behavior. *Political Psychology* **2**(1): 30-42

- Furby, L. 1991 Understanding the psychology of possessions and ownership: A personal memoir and an appraisal of our progress. *Journal of Social Behavior and Personality* **6**(6): 457-63
- Gallivan, P. and P. Wilkins 1997 Familial structures in Roman Italy: A regional approach. In Rawson, B. and P. Weaver (eds.), *The Roman family in Italy: Status, sentiment, space*: 239-80. Oxford University Press, Oxford
- Gentry, J.W. 1997 Life-event transitions and consumer vulnerability. *Advances in Consumer Research* **24**(1): 29-31
- George, E. and S. George 2002 *Bristol Probate Inventories. Part 1: 1542-1650*. Bristol Record Society's Publication. Vol. 54, Bristol
- George, M. 1997 Repopulating the Roman House. In Rawson, B. and P. Weaver (eds.), *The Roman Family in Italy. Status, Sentiment, Space*: 299-320. Oxford University Press, Oxford
- Ger, G. and R. Belk 1996 Cross-cultural differences in materialism. *Journal of Economic Psychology* **17**: 55-77
- Geraghty, R.Y. 2007 The impact of globalization in the Roman Empire, 200 BC - AD 100. *Journal of Economic History* **67**(4): 1036-61
- Gero, J.M. 2007 Honoring ambiguity/problematising certitude. *Journal of Archaeological Method and Theory* **14**: 311-27
- Gibb 1996 *The Archaeology of Wealth: Consumer behaviour in English America*. Plenum Press, London
- Giddens, A. 1990 *The Consequences of Modernity*. Polity Press, Cambridge
- Giddens, A. 1991 *Modernity and Self-Identity: Self and society in the Late Modern Age*. Polity Press, Cambridge

- Gilboa, A., A. Karasik, I. Sharon, and U. Smilansky 2004 Towards computerized typology and classification of ceramics. *Journal of Archaeological Science* **31**: 681- 94
- Gilbraith, J.K. 1984 *The Affluent Society* (4th ed.). Houghton Mifflin, New York
- Godfrey, R., G. Jack, and C. Jones 2004 Sucking, bleeding, breaking: On the dialectics of vampirism, capital, and time. *Culture and Organization* **10**(1): 25-36
- Going, C.J. 1992 Economic 'long waves' in the Roman period? A reconnaissance of the Romano-British ceramic evidence. *Oxford Journal of Archaeology* **11**(1): 93-117
- Goldberg, M.Y. 1999 Spatial and behavioural negotiation in Classical Athenian city houses. In Allison, P.M. (ed.), *The Archaeology of Household Activities*: 142-61. Routledge, London
- Gosden, C. and Y. Marshall 1999 The cultural biography of objects. *World Archaeology* **31**(2): 169-78
- Gowers, E. 1993 *The Loaded Table: Representations of food in Roman literature*. Clarendon Press, Oxford
- Grahame, M. 1996 Towards a theory of Roman urbanism: Beyond economics and ideal-types. In Meadows, K., C. Lemke, and J. Heron (Eds.), *TRAC 96 Proceedings of the 6th Annual Theoretical Roman Archaeology Conference*: 151-62, Sheffield
- Graves, J. 1999 'When things go wrong... Inside the inside': A psychoanalytical history of a jug. *Journal of Design History* **12**(4): 357-67
- Greenacre, M.J. 1984 *Theory and Applications of Correspondence Analysis*. Academic Press, London

- Greenacre, M.J. 2001 Tying up the Loose Ends in Simple Correspondence Analysis.
Available at SSRN: <http://ssrn.com/abstract=1001889>, Social Sciences Research Network, Working Paper Series
- Greenacre, M.J. 2007 *Correspondence Analysis in Practice* (2nd ed.). Chapman and Hall, Boca Raton
- Greene, E.S., M.L. Lawall, and M.E. Polzer 2008 Inconspicuous consumption: The sixth-century B.C.E. shipwreck at Pabuç Burnu, Turkey. *American Journal of Archaeology* **112**(4): 685-711
- Greene, K. 1982 Terra sigillata: Imitations and alternatives. *Rei Cretariae Romanae Fautores Acta* **21/22**: 71-78
- Greene, K. 1986 *The Archaeology of the Roman Economy*. Batsford, London
- Greene, K. 1992 How was technology transferred in the western provinces? In Wood, M. and F. Queiroga (eds.), *Current Research on the Romanization of the Western Provinces*: 101-05. BAR Int. Ser. S575, Oxford
- Greene, K. 1994 Technology and innovation in context: The Roman background to Mediaeval and later developments. *Journal of Roman Archaeology* **7**: 22-33
- Greene, K. 1997 Defining the Romano-British economy: The significance of pottery and the army. *Acta Rei Cretariae Rom Fautorum* **35**: 27-32
- Greene, K. 2000 Technological innovation and economic progress in the ancient world: M.I. Finley reconsidered. *Economic History Review* **53**: 29-59
- Greene, K. 2005 Roman pottery: Models, proxies and economic interpretation. *Journal of Roman Archaeology* **18**: 34-56
- Greene, K. 2006 Archaeological data and economic interpretation. In Bang, P.F., M. Ikeguchi, and H.G. Ziche (eds.), *Ancient Economies Modern Methodologies*.

- Archaeology, comparative history, models and institutions*: 109-36. Edipuglia, Bari
- Greene, K. 2007 Late Hellenistic and early Roman invention and innovation: The case of lead-glazed pottery. *American Journal of Archaeology* **111**(4): 653-71
- Greene, K. 2008 Learning to consume: Consumption and consumerism in the Roman Empire. *Journal of Roman Archaeology* **21**: 64-82
- Gregory, C.A. 1982 *Gifts and Commodities*. Academic Press, London
- Griffin, J. 1976 Augustan poetry and the life of luxury. *Journal of Roman Studies* **66**: 87-105
- Guerdjikova, A. and A. Zimper 2006 Flexibility of Choice Versus Reduction of Ambiguity, *Center for Analytical Economics Working Paper #06-14*. Cornell University
- Gunasti, K. and W.T. Ross Jr. 2009 How inferences about missing attributes decrease the tendency to defer choice and increase purchase probability. *Journal of Consumer Research* **35**(5): 823-37
- Guo, L. and X. Meng 2008 Consumer knowledge and its consequences: An international comparison. *International Journal of Consumer Studies* **32**: 260-68
- Hales, S. 2003 *The Roman House and Social Identity*. Cambridge University Press, Cambridge
- Harl, K.W. 1996 *Coinage in the Roman Economy, 300 B.C. to A.D. 700*. The Johns Hopkins University Press, Baltimore
- Harper, S. 2002 Zombies, malls, and the consumerism debate: George Romero's *Dawn of the Dead*. *The Journal of American Popular Culture* **1**(2): http://www.americanpopularculture.com/journal/articles/fall_2002/harper.htm

- Harris, W.V. 1993 Between archaic and modern: Some current problems in the history of the Roman economy. In Harris, W.V. (ed.), *The Inscribed Economy*: 11-29. *Journal of Roman Archaeology Supplement 6*, Ann Arbor
- Hawkes, G. 2001 An archaeology of food: A case study from Roman Britain. In Davies, G., A. Gardner, and K. Lockyear (eds.), *TRAC 2000. Proceedings of the Tenth Annual Theoretical Roman Archaeology Conference, London 2000*: 94-103. Oxbow Books, Oxford
- Heberling, P.M. 1987 Status indicators: another strategy for interpretation of settlement pattern in a nineteenth-century industrial village. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 199-216. Plenum Press, London
- Henry, S.L. 1987 Factors Influencing Consumer Behavior in Turn-of-the-Century Phoenix, Arizona. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 359-81. Plenum Press, London
- Henry, S.L. 1991 Consumers, commodities, and choices: A general model of consumer behaviour. *Historical Archaeology* **25**(2): 3-14
- Hetherington, K. 1992 Stonehenge and its festival. In Shields, R. (ed.), *Lifestyle Shopping. The subject of consumption*: 82-98. Routledge, London
- Hilton, M. 2004 The legacy of luxury: moralities of consumption since the 18th Century. *Journal of Consumer Culture* 4: 101-23
- Hingley, R. 2003 Recreating coherence without reinventing Romanization. *Digressus Supplement 1*: 111-19
- Hingley, R. 2005 *Globalizing Roman Culture: Unity, diversity and Empire*. Routledge, London

- Hinton, D. 1990 The Medieval gold, silver, and copper-alloy objects from Winchester. In Biddle, M. (ed.), *Object and Economy in Medieval Winchester*, Vol. 1: 29-35. Clarendon Press, Oxford
- Hodder, I. 1982 *Symbols in Action: Ethnoarchaeological studies of material culture*. Cambridge University Press, Cambridge
- Holt, D.B. 1995 How consumers consume: A typology of consumption practices. *Journal of Consumer Research* **22**(1): 1-16
- Hopkins, K. 1980 Taxes and trade in the Roman Empire. *Journal of Roman Studies* **70**: 101-25
- Hopkins, K. 1983 Introduction. In Garnsey, P., K. Hopkins, and C.R. Whittaker (eds.), *Trade in the Ancient Economy*: ix-xxv. Chatto and Windus, London
- Hopkins, K. 2002 Rome, taxes, rents and trade. In Scheidel, W. and S. von Reden (eds.), *The Ancient Economy*: 190-230. Edinburgh University Press, Edinburgh. Originally published as 'Rome, taxes, rents and trade' *Kodai: Journal of Ancient History* VI/VII (1995/1996), 41-75
- Horden, P. and N. Purcell 2000 *The Corrupting Sea: A study of Mediterranean history*. Blackwell, London
- Hornblower, S. and A. Spawforth (eds.) 1996 *The Oxford Classical Dictionary* (3rd ed.). Oxford University Press, Oxford
- Horowitz, D. 1984 *The Morality of Spending*. Baltimore: Johns Hopkins University Press
- Hoskins, J. 1998 *Biographical Objects: How things tell the stories of people's lives*. Routledge, London
- Howard, J.A. 2000 Social psychology of identities. *Annual Review of Sociology* **26**: 367-93

- Howell, M.C. 1996 Fixing movables: Gifts by testament in Late Medieval Douai. *Past and Present* **150**: 3-45
- Hudson, K. 1983 *The Archaeology of the Consumer Society. The second industrial revolution in Britain*. Heinemann, London
- Hunt, A. 1995 Moralizing luxury: The discourses of the governance of consumption. *Journal of Historical Sociology* **8**(4): 352-74
- Hunt, A. 1996 *Governance of the Consuming Passions: A history of sumptuary regulation*. Macmillan, London
- Hunt, J.M., J.B. Kernan, and D.J. Mitchell 1996 Materialism as social cognition: People, possessions, and perception. *Journal of Consumer Psychology* **5**(1): 65-83
- Hurcombe, L.M. 2007a *Archaeological Artefacts as Material Culture*. Routledge, London
- Hurcombe, L.M. 2007b A sense of materials and sensory perception in concepts of materiality. *World Archaeology* **39**(4): 532-45
- IMF 2003 Fund Assistance for Countries Facing Exogenous Shocks. International Monetary Fund: Report available at: www.imf.org
- Ingold, T. 1993 The temporality of the landscape. *World Archaeology* **25**: 152-74
- Ingold, T. 2000 *The Perception of the Environment: Essays in livelihood, dwelling and skill*. Routledge, Abingdon
- Inomata, T. and P. Sheets 2000. Mesoamerican households viewed from rapidly abandoned sites: An introduction. *Mayab* **13**: 5-10
- Jacoby, J., G.V. Johar, and M. Morrin 1998 Consumer behavior: A quadrennium. *Annual Review of Psychology* **49**(1): 319-44

- Jardine, L. 1997 *Wordly Goods: A new history of the Renaissance*. Papermac, New York
- Jashemski, W.M.F. 1979 *The Gardens of Pompeii: Herculaneum and the villas destroyed by Vesuvius. Volume 1*. Caratzas Brothers
- Jashemski, W.M.F. 1993 *The Gardens of Pompeii: Herculaneum and the villas destroyed by Vesuvius. Volume 2*. Caratzas Brothers
- Johnson, P. 1988 Conspicuous consumption and working-class culture in late-Victorian and Edwardian Britain. *Transactions of the Royal Historical Society. 5th Series* **38**: 27-42
- Johnston, P.A. 1980 *Poenulus* I, 2 and Roman women. *Transactions of the American Philological Association* **110**: 143-59
- Jones, A.H. 1982 Estimating wealth of the living from a probate sample. *Journal of Interdisciplinary History* **13**(2): 273-300
- Jones, A.H.M. 1974 *The Roman Economy: Studies in ancient economic and administrative history*. Basil Blackwell, Oxford
- Jongman, W. 2007 Gibbon was right: The decline and fall of the Roman economy. In Hekster, O., G. de Kleijn, and D. Slootjes (eds.), *Crises and the Roman Empire. Proceedings of the Seventh Workshop of the International Network Impact of Empire (Nijmegen, June 20–24, 2006)*: 183-99. Brill, Leiden
- Kaplan, E.A. 2008 Global trauma and public feelings: Viewing images of catastrophe. *Consumption, Markets and Culture* **11**(1): 3-24
- Karni, E. and Z. Safra 1990 Behaviorally consistent optimal stopping rules. *Journal of Economic Theory* **519**: 391-402

- Kassarjian, H.H. and T.S. Robertson 1973 Social Class. In Kassarjian, H.H. and T.S. Robertson (eds.), *Perspectives in Consumer Behavior*: 390-400. Scott and Foresman, Glenview
- Keay, S. and N. Terrenato (eds.) 2001 *Italy and the West. Comparative issues in Romanization*. Oxbow Books, Oxford
- Keegan, W.F. 1995 Modeling dispersal in the Prehistoric West Indies. *World Archaeology* **26**(3): 400-20
- Kehoe, D.P. 1992 *Management and Investment on Estates in Roman Egypt During the Early Empire*. Dr Rudolf Habelt GMBH, Bonn
- Kehoe, D.P. 1994 Approaches to profit and management in Roman agriculture: The evidence of the Digest. In Carlsen, J., P. Ørsted, and J.E. Skydsgaard (eds.), *Landuse in the Roman Empire. Volume 22 of Analecta Romana Instituti Danici*: 45-58. L'Erma di Bretschneider, Roma
- Keller, D. 2005 Social and economic aspects of glass recycling. In Bruhn, J., B. Croxford, and D. Grigoropoulos (eds.), *TRAC 2004. Proceedings of the Fourteenth Annual Theoretical Roman Archaeology Conference, Durham 2004*: 65-78. Oxbow, Oxford
- Klein, T.H. and C.H. LeeDecker 1991 Models for the study of consumer behaviour. *Historical Archaeology* **25**(2): 1-2
- Kleine, R.E., III and J.B. Kernan 1991 Contextual influences on the meanings ascribed to ordinary consumption objects. *Journal of Consumer Research* **18**(3): 311-24
- Kleine, R.E., III, S.S. Kleine, and J.B. Kernan 1993 Mundane consumption and the self: A social-identity perspective. *Journal of Consumer Psychology* **2**(3): 209-35

- Koch, A.M. and R. Elmore 2006 Simulation and symbolic exchange: Jean Baudrillard's augmentation of Marx's theory of value. *Politics and Policy* **34**(3): 556-75
- Kopytoff, I. 1986 The cultural biography of things: Commoditization as process. In Appadurai, A. (ed.), *The Social Life of Things: Commodities in cultural perspective*: 64-93. Cambridge University Press, Cambridge
- Lamarche, P. 2007 The use value of G. A. M. V. Bataille. In Winnubst, S. (ed.), *Reading Bataille Now*: 54-74. Indiana University Press, Bloomington
- Lapavistas, C. 2004 Commodities and gifts: Why commodities represent more than market relations. *Science and Society* **68**(1): 33-56
- Laurence, R. 1994 *Roman Pompeii: Space and society* (first ed.). Routledge, London
- Laurence, R. 2007 *Roman Pompeii: Space and society* (second ed.). Routledge, London
- Leach, W. 1993 *Land of Desire: Merchants, power, and the rise of a new American culture*. Pantheon Books, New York
- Lee, E., G.P. Moschis, and A. Mathur 2007 Stress, coping and consumer preferences: A two-way transitional event history analysis. *International Journal of Consumer Studies* **31**: 428-35
- Lee, M. 1993 *Consumer Culture Reborn: The cultural politics of consumption*. Routledge, London
- LeeDecker, C.H., T.H. Klein, C.A. Holt, and A. Friedlander 1987 Nineteenth-century households and consumer behaviour in Wilmington, Delaware. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 233-60. Plenum Press, London

- Leone, M.P. and C.A. Crosby 1987 *Epilogue: Middle-range theory in historical archaeology*. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 397-410. Plenum Press, London
- Lewis, N. and M. Reinhold (eds.) 1990 *Roman Civilization: Selected readings. Volume II: The Empire* (3rd ed.). Columbia University Press, New York
- Lindert, P.H. 1981 An algorithm for probate sampling. *Journal of Interdisciplinary History* **11**(4): 649-68
- Ling, R. 1991 *Roman Painting*. Cambridge University Press, Cambridge
- Ling, R. 1997 *The Insula of the Menander at Pompeii. Volume I: The Structures*. Clarendon Press, Oxford
- Ling, R. and L. Ling 2005 *The Insula of the Menander at Pompeii. Volume II: the decorations*. Clarendon Press, Oxford
- Loewenstein, G. and O'Donoghue 2004 Animal Spirits: Affective and deliberative processes in economic behaviour, *Center for Analytical Economics Working Paper*. Cornell University
- Loudermilk, A. 2003 Eating 'Dawn' in the dark: Zombie desire and commodified identity in George A. Romero's 'Dawn of the Dead'. *Journal of Consumer Culture* **3**(1): 83-108
- Lumsden, C.J. and E.O. Wilson 1981 *Genes, Mind and Culture: The coevolutionary process*. Harvard University Press, Cambridge
- Mackensen, M. and G. Scheider 2002 Production centres of African red slip ware (3rd-7th c.) in northern and central Tunisia: Archaeological provenance and reference groups based on chemical analysis. *Journal of Roman Archaeology* **15**: 121-58

- MacKinnon, M. 2004 *Production and Consumption of Animals in Roman Italy: Integrating the zooarchaeological and textual evidence*. Journal of Roman Archaeology Supplementary Series 54, Portsmouth, Rhode Island
- Marsh, G. 1981 London's samian supply and its relationship to the development of the Gallic samian industry. In Anderson, A.C. and A.S. Anderson (eds.), *Roman Pottery Research in Britain and North-West Europe. Part i*: 173-238. BAR International Series, Oxford
- Martins, C.B. 2003 Becoming consumers: Looking beyond wealth as an explanation for villa variability. In Carr, G., E. Swift, and J. Weekes (eds.), *TRAC 2002. Proceedings of the Twelfth Annual Theoretical Roman Archaeology Conference, Canterbury 2002*: 84-100. Oxbow Books, Oxford
- Martins, C.B. 2005 *Becoming Consumers: Looking beyond wealth as an explanation of villa variability. Perspectives from the east of England*. BAR British Series 403, Oxford
- Marx, K. 1961 *Capital: A critical analysis of capitalist production. Vol. I* (Moore, S. and E. Aveling, Trans.). Edited by F. Engels. Foreign Languages Publications House, Moscow
- Mathur, A., G.P. Moschis, and E. Lee 2008 A longitudinal study of the effects of life status changes on changes in consumer preferences. *Journal of Academy of Marketing Science* **36**: 234-46
- Matthews, J. 2006 *The Journey of Theophanes: Travel, business, and daily life in the Roman East*. Yale University Press, London
- Mattingly, D.J. 1988 Oil for export: A comparison of Spanish, African, and Tripolitanian olive oil production. *Journal of Roman Archaeology* **1**: 33-56

- Mattingly, D.J. 1990 Paintings, presses and perfume production at Pompeii. *Oxford Journal of Archaeology* **9**(1): 71-90
- Mattingly, D.J. 1997 Introduction: Dialogues of power and experience in the Roman Empire. In Mattingly, D.J. (ed.), *Dialogues in Roman Imperialism: Power, discourse, and discrepant experience in the Roman Empire: 7-24*. Journal of Roman Archaeology Supplementary Series 23, Portsmouth, Rhode Island
- Mattingly, D.J. 2002 Vulgar and weak 'Romanization', or time for a paradigm shift. *Journal of Roman Archaeology* **15**: 536-40
- Mattingly, D.J. and J. Salmon 2001 The productive past. Economies beyond agriculture. In Mattingly, D.J. and J. Salmon (eds.), *Economies Beyond Agriculture in the Classical World: 3-14*. Routledge, London
- McCallum, M. forthcoming, 2009 The evidence for the pottery industry at Pompeii. In Cole, K., M. Flohr, and E. Poehler (eds.), *Pompeii: Cultural standards, practical needs*. Oxbow Books, Oxford
- McCallum, M. and J.T. Peña forthcoming, 2009 A reassessment of the two pottery workshops at Pompeii: 1.20.2-3 and the Via Superior. *Rei Cretariae Romanae Fautores Acta* **41**
- McClure, S.M., D.I. Laibson, G. Loewenstein, and J.D. Cohen 2004 Separate neural systems value immediate and delayed monetary rewards. *Science* **306**: 503-07
- McCracken, G. 1986 Culture and consumption: A theoretical account of the structure and movement of the cultural meaning of consumer goods. *Journal of Consumer Research* **13**: 71-84
- McFadyen, L. 2006 Material culture as architecture. *Journal of Iberian Archaeology* **8**: 91-102

- McKee, B.R. 1999 Household archaeology and cultural formation processes: examples from the Cerén site, El Salvador. In Allison, P.M. (ed.), *The Archaeology of Household Activities*: 30-42. Routledge, London
- McKendrick, N., J. Brewer, and J.H. Plumb 1982 *The Birth of a Consumer Society: The commercialization of eighteenth-century England*. Indiana University Press, Bloomington
- Meikle, S. 2002 Modernism, economics, and the ancient economy. In Scheidel, W. and S. von Reden (eds.), *The Ancient Economy*: 233-50. Edinburgh University Press, Edinburgh. Originally published as 'Modernism, economics, and the ancient economy' *Proceedings of the Cambridge Philological Society* 41 (1995), 174-191
- Mellers, B.A., A. Schwartz, and A.D.J. Cooke 1998 Judgment and decision making. *Annual Review of Psychology* **49**: 447-77
- Michalos, A.C. 1980 Satisfaction and happiness. *Social Indicators Research* **8**: 385-422
- Michalos, A.C. 1985 Multiple Discrepancies Theory (MDT). *Social Indicators Research* **16**(4): 347-413
- Michalos, A.C. 1986 An application of Multiple Discrepancies Theory (MDT) to seniors. *Social Indicators Research* **18**(4): 349-73
- Miles, S., A. Anderson, and K. Meethan (eds.) 2002a *The Changing Consumer: Markets and meanings*. Routledge, London
- Miles, S., K. Meethan, and A. Anderson 2002b Introduction: The meaning of consumption; the meaning of change? In Miles, S., A. Anderson, and K. Meethan (eds.), *The Changing Consumer: Markets and meanings*: 1-9. Routledge, London

- Miller, D. 1985 *Artefacts as Categories: A study of ceramic variability in Central India*. Cambridge University Press, Cambridge
- Miller, G.L. 1980 Classification and economic scaling of 19th century ceramics. *Historical Archaeology* **14**(1): 1-40
- Miller, G.L. and S.D. Hurry 1983 Ceramic supply in an economically isolated frontier community: Portage County of the Ohio Western Reserve, 1800-1825. *Historical Archaeology* **17**(2): 80-92
- Millett, M. 1990a *The Romanization of Britain: An essay in archaeological interpretation*. Cambridge University Press, Cambridge
- Millett, M. 1990b Romanization: Historical issues and archaeological interpretations. In Blagg, T. and M. Millett (eds.), *The Early Roman Empire in the West*: 35-41, Oxford
- Millett, P. 2001 Productive to some purpose? The problem of ancient economic growth. In Mattingly, D.J. and J. Salmon (eds.), *Economies Beyond Agriculture in the Classical World*: 17-48. Routledge, London
- Monaghan, J. 1995 Roman pottery research for the 1990s, *Theoretical Roman Archaeology: Second Conference Proceedings*: 148-57. Oxbow Books, Oxford
- Monat, J.P. 2009 Why customers buy. *Marketing Research* **21**(1): 20-24
- Monteil, G. 2004 Samian and consumer choice in Roman London. In Croxford, B., H. Eckardt, J. Meade, and J. Weekes (eds.), *TRAC 2003. Proceedings of the Thirteenth Annual Theoretical Roman Archaeology Conference, Leicester 2003*: 1-15. Oxbow, Oxford
- Moore Morison, M. 2006 Romanization in southern Epirus: A ceramic perspective. In Croxford, B., H. Goodchild, J. Lucas, and N. Ray (eds.), *TRAC 2005*:

*Proceedings of the Fifteenth Annual Theoretical Roman Archaeology
Conference: 12-24. Oxbow, Oxford*

- Morel, J.-P. 1979 La ceramica e il vetro. In Zevi, F. (ed.), *Pompei 79*: 241-64. Gaitano Macchiaroli, Naples
- Morley, N. 2007 *Trade in Classical Antiquity*. Cambridge University Press, Cambridge
- Mouritsen, H. 2001 Roman freedmen and the urban economy: Pompeii in the first century AD. In Senatore, F. (ed.), *Pompei tra Sorrento e Sarno*: 1-27. Bardi, Roma
- Mozumder, P., A.K. Bohara, R.P. Berrens, and N. Halim 2009 Private transfers to cope with a natural disaster: Evidence from Bangladesh. *Environment and Development Economics* **14**: 187-210
- Nederveen Pieterse, J. 1995 Globalization as hybridization. In Featherstone, M., S. Lash, and R. Robertson (eds.), *Global Modernities*: 45-68. Sage, London
- Nenadic, O. and M.J. Greenacre 2007 Correspondence analysis in R, with two- and three-dimensional graphics: The ca package. *Journal of Statistical Software* **20**(3): 1-13
- Novak, T.P. and D.L. Hoffman 2009 The fit of thinking style and situation: New measures of situation-specific experiential and rational cognition. *Journal of Consumer Research* **36**(1): 56-72
- Osterhammel, J. and N.P. Petersson 2003 *Globalization: A short history* (Geyer, D., Trans.). Princeton University Press, Oxford
- Otto, J.S. 1977 Artifacts and status differences: A comparison from planter, overseer, and slave sites on an Antebellum plantation. In South, S. (ed.), *Research Strategies in Historical Archaeology*: 91-118. Academic Press, New York

- Otto, J.S. 1980 Race and class on Antebellum plantations. In Schuyler, R.L. (ed.), *Archaeological Perspectives on Ethnicity in America*: 3-13. Baywood Publishing, New York
- Painter, K.S. 2001 *The Insula of the Menander at Pompeii. Volume IV: the silver treasure*. Clarendon Press, Oxford
- Panagopoulou, K. 2007 Between necessity and extravagance: Silver as a commodity in the Hellenistic Period. *The Annual of the British School at Athens* **102**: 315-44
- Parkins, H. 1998 Time for change? Shaping the future of the ancient economy. In Parkins, H. and C. Smith (eds.), *Trade, Traders and the Ancient City*: 1-15. Routledge, London
- Paterson, J. 1997 Production and consumption. In P.Jones and K.Sidwell (eds.), *The World of Rome: An introduction to Roman culture*, Vol. 181-207, Cambridge
- Paterson, M. 2006 *Consumption and Everyday Life*. Routledge, London
- Peacock, D.P.S. and D.F. Williams 1986 *Amphorae and the Roman Economy: An introductory guide*. Longman, London
- Peña, J.T. 1999 *The Urban Economy during the Early Dominate: Pottery evidence from the Palatine Hill*. BAR International Series 784. Archeopress, Oxford
- Peña, J.T. 2007a *Roman Pottery in the Archaeological Record*. Cambridge University Press, Cambridge
- Peña, J.T. 2007b Two groups of *tituli picti* from Pompeii and environs: Sicilian wine, not flour and hand-picked olives. *Journal of Roman Archaeology* **20**(1): 233-54

- Peña, J.T. and M. McCallum 2009a The production and distribution of pottery at Pompeii: A review of the evidence; part 1, production. *American Journal of Archaeology* **113**(1): 57-79
- Peña, J.T. and M. McCallum 2009b The production and distribution of pottery at Pompeii: A review of the evidence; part 2, the material basis for production and distribution. *American Journal of Archaeology* **113**(2): 165-201
- Persky, J. 1993 Consumer sovereignty. *Journal of Economic Perspectives* **7**(1): 183-91
- Pitts, M. 2004 'I drink, therefore I am?' Pottery consumption and identity at Elms Farm, Heybridge, Essex. In Croxford, B., H. Eckardt, J. Meade, and J. Weekes (eds.), *TRAC 2003. Proceedings of the Thirteenth Annual Theoretical Roman Archaeology Conference, Leicester 2003*: 16-27. Oxbow, Oxford
- Pitts, M. 2005a Pots and pits: Drinking and deposition in late Iron Age south-east Britain. *Oxford Journal of Archaeology* **24**(2): 143-61
- Pitts, M. 2005b Regional identities and the social use of ceramics:. In Bruhn, J., B. Croxford, and D. Grigoropoulos (eds.), *TRAC 2003. Proceedings of the Fourteenth Annual Theoretical Roman Archaeology Conference, Durham 2004*: 143-61. Oxbow, Oxford
- Pitts, M. 2007a Consumption, deposition and social practice: A ceramic approach to intra-site analysis in late Iron Age to Roman Britain. *Internet Archaeology* **21**: <http://intarch.ac.uk>
- Pitts, M. 2007b The Emperor's new clothes? The utility of identity in Roman archaeology. *American Journal of Archaeology* **111**: 693-713
- Pitts, M. 2008 Globalizing the local in Roman Britain: An anthropological approach to social change. *Journal of Anthropological Archaeology* **27**: 493-506

- Pitts, M., D. Dorling, and C. Pattie 2007 Oil for food: the global story of edible lipids. *Journal of World-Systems Research* **13**(1): 12-32
- Pitts, M. and D. Perring 2006 The making of Britain's first urban landscapes: the case of Late Iron Age and Roman Essex. *Britannia* **37**: 189-212
- Poblome, J., O. Bounegru, P. Degryse, W. Viaene, M. Waelkens, and S. Erdemgil 2001 The sigillata manufactories of Pergamon and Sagalassos. *Journal of Roman Archaeology* **14**: 143-65
- Polanyi, K. 1957 The Economy as Instituted Process. In Polanyi, K., C.M. Arensberg, and H.W. Pearson (eds.), *Trade and Market in the Early Empires: Economies in History and Theory*: 243-70. The Free Press, Glencoe
- Polanyi, K. 1975 Traders and trade. In Sabloff, J.A. and C.C. Lamberg-Karlovsky (eds.), *Ancient Civilization and Trade*: 133-54. School of American Research, Santa Fe
- Polanyi, K. 1977 *The Livelihood of Man*. Edited by H.W. Pearson. Academic Press, New York.
- Potts, C.R. 2009 The art of piety and profit at Pompeii: A new interpretation of the painted shop façade at IX.7.1-2. *Greece and Rome* **56**(1): 55-70
- Pym, J. (ed.) 2004 *Time Out Film Guide* (Thirteenth ed.). Penguin, Harmondsworth
- R Development Core Team 2007 R: A language and environment for statistical computing (version 2.6.1). R Foundation for Statistical Computing, Vienna. <http://www.R-project.org>
- Ram, U. 2004 Glocommodification: How the global consumes the local – McDonald's in Israel. *Current Sociology* **52**(1): 11-31
- Rasmussen, T. 2006 Natural disasters and their macroeconomic implications. In Sahay, R., D.O. Robinson, and P. Cashin (eds.), *The Caribbean: From*

- vulnerability to sustained growth: 181-205.* International Monetary Fund, Washington
- Rathbone, D. 1991 *Economic rationalism and rural society in third-century A.D. Egypt: The Heroninos Archive and the Appianus Estate.* Cambridge University Press, Cambridge
- Ray, N.M. 2006 Consumption and Roman Archaeology: Beyond Pompeii. In Croxford, B., H. Goodchild, J. Lucas, and N. Ray (eds.), *TRAC 2005: Proceedings of the Fifteenth Annual Theoretical Roman Archaeology Conference: 25-41.* Oxbow, Oxford
- Read, D.W. 2007 *Artifact Classification: A conceptual and methodological approach.* Left Coast Press, Walnut Creek
- Reece, R. 1979 *Roman Coins.* Ernest Benn, London
- Rhodes, M. 1989 Roman Pottery Lost *en route* from the Kiln Site to the User - A Gazetteer. *Journal of Roman Pottery Studies* 2: 44-58
- Richards, J.D. and N.S. Ryan 1985 *Data Processing in Archaeology.* Cambridge University Press, Cambridge
- Richardson, C. 2003 Household objects and domestic ties. In Beattie, C., A. Maslakovic, and S. Rees Jones (eds.), *The Medieval Household in Christian Europe, c. 850-c.1550: Managing wealth, power and the body: 433-47.* Turnhout, Brehols
- Richardson, C. 2006 *Domestic Life and Domestic Tragedy: The material life of the household.* Manchester University Press, Manchester
- Richins, M.L. 1994a Special possessions and the expression of material values. *Journal of Consumer Research* 21: 522-33

- Richins, M.L. 1994b Valuing things: The public and private meanings of possessions. *Journal of Consumer Research* **21**: 504-21
- Richins, M.L. 2004 The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research* **31**: 209-19
- Richins, M.L. and S. Dawson 1990 Measuring material values: A preliminary report of scale development. *Advances in Consumer Research* **17**: 169-75
- Richins, M.L. and S. Dawson 1992 A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research* **19**: 303-16
- Ringrose, T.J. 1992 Bootstrapping and correspondence analysis in archaeology. *Journal of Archaeological Science* **19**: 615-29
- Riordan, T.B. and W.H. Adams 1985 Commodity flows and national market access. *Historical Archaeology* **19**(2): 5-18
- Roberts, C.H. 1952 *Vol. IV Catalogue of the Greek and Latin Papyri in the John Rylands Library at the University of Manchester*. University Press, Manchester
- Roberts, M.L. 1998 Gender, consumption, and commodity culture. *The American Historical Review* **103**(3): 817-44
- Roberts, P. 1997 Mass-production of Roman finewares. In Freestone, I. and D. Gaimster (eds.), *Pottery in the Making: World ceramic traditions*: 189-93. British Museum Press, London
- Robertson, R. 1990 Mapping the global condition: Globalization as the central concept. In Featherstone, M. (ed.), *Global Culture: Nationalism, Globalization, and Modernity. A theory, culture, and society special issue*: 15-30. Sage, London

- Robertson, R. 1992 *Globalization: Social theory and global culture*. Sage, London
- Robertson, R. 1995 Glocalization: Time-space and homogeneity-heterogeneity. In Featherstone, M., S. Lash, and R. Robertson (eds.), *Global Modernities*: 25-44. Sage, London
- Robertson, R. and K.E. White 2005 Globalization: Sociology and cross-disciplinarity. In Calhoun, C., C. Rojek, and B. Turner (eds.), *The SAGE Handbook of Sociology*: 345-66. SAGE, London
- Robertson, T.S. 1970 *Consumer Behaviour*. Scott, Glenview
- Rocco, T. 2003a Herculaneum. In Guzzo, P.G. (ed.), *Tales From an Eruption: Pompeii, Herculaneum, Oplontis*: 48-71. Electa, Roma
- Rocco, T. 2003b Moregine: The Building of the Triclinia. In Guzzo, P.G. (ed.), *Tales From an Eruption: Pompeii, Herculaneum, Oplontis*: 169-79. Electa, Roma
- Roll, E. 1961 *A History of Economic Thought*. Faber and Faber, London
- Romero, G. 1978 *Dawn of the Dead*. Dir. G. Romero. Perf. D. Emge and K. Foree. Laurel
- Romero, G. 1985 *Day of the Dead*. Dir. G. Romero. Perf. L. Cardille and T. Alexander. Dead Films Inc. and Laurel
- Rook, D. 1985 The ritual dimension of consumption. *Journal of Consumer Research* **12**: 251-164
- Rostovtzeff, M. 1957 *The Social and Economic History of the Roman Empire*. Clarendon Press, London
- Rostovtzeff, M. 1967 *A Large Estate in Egypt in the Third Century B.C.: A study in economic history*. L'Erma di Bretschneider, Roma
- Roth, R.E. 2003 Towards a ceramic approach to social identity in the Roman world: Some theoretical considerations. *Digressus Supplement 1*: 35-45

- Roth, R.E. 2007 *Styling Romanisation: Pottery and society in Central Italy*.
Cambridge University Press, Cambridge
- Rowan, Y. and U. Baram (eds.) 2004 *Marketing Heritage: Archaeology and the consumption of the past*. Altamira Press, Oxford
- Russell, J.M. 1998 The program of the Palace of Assurnasirpal II at Nimrud: Issues in the research and presentation of Assyrian art. *American Journal of Archaeology* **102**: 655-715
- Ryan, L. and S. Dziurawiec 2001 Materialism and its relationship to life satisfaction. *Social Indicators Research* **55**: 185-97
- Sahdev, A. and P. Gautama 2007 Are consumer perceptions of brand affected by materialism? *International Marketing Conference on Marketing & Society*: 459-62. <http://dspace.iimk.ac.in/bitstream/2259/339/1/459-462.pdf>
- Said, E.W. 1993 *Culture and Imperialism*. Vintage, London
- Salter, E.E. 2003 Some differences in the cultural production of household consumption in three north Kent communities, c. 1450-1550. In Beattie, C., A. Maslakovic, and S. Rees Jones (eds.), *The Medieval Household in Christian Europe, c. 850-c.1550: Managing wealth, power and the body*: 391-407. Tumhout, Brehols
- Salza Prina Ricotti, E. 1978/1980 Cucine e quartieri servilil in epoca Romana. *Rendiconti. Atti della Pontificia accademia Romana di archeologia* **51-2**: 237-94
- Sandlin, J.A. and J.L. Callahan 2009 Deviance, dissonance, and détournement. Cultural jammers' use of emotion in consumer resistance. *Journal of Consumer Culture* **9**(1): 79-115

- Scheidel, W. n.d. Prices and Other Monetary Valuations in Roman History: Ancient literary evidence and modern scholarship. www.stanford.edu/~scheidel/NumIntro.htm
- Scheidel, W. and S. von Reden 2002 Introduction. In Scheidel, W. and S. von Reden (eds.), *The Ancient Economy*: 1-8. Edinburgh University Press, Edinburgh
- Schiffer, M.B. 1985 Is there a Pompeii premise? *Journal of Anthropological Research* **41**: 18-41
- Schifman, L.G. and L.L. Kanuk 1987 *Consumer Behaviour* (3rd ed.). Prentice-Hall, New Jersey
- Schoep, I. 2004 Assessing the role of architecture in conspicuous consumption in the Middle Minoan I-II periods. *Oxford Journal of Archaeology* **23**(3): 243-69
- Schor, J.B. 1998 *The Overspent American*. Basic, New York
- Schroeder, J.E. 2003 Guest editor's introduction: Consumption, gender and identity. *Consumption, Markets and Culture* **6**(1): 1-4
- Schwartz, B., A. Ward, J. Monterosso, S. Lyubomirsky, K. White, and D.R. Lehman 2002 Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology* **83**(5): 1178-97
- Scott, J.C. 1990 *Domination and the Arts of Resistance: Hidden transcripts*, New Haven
- Scullard, H.H. 1980 *A History of the Roman World, 753 to 146 BC* (4th ed.). Routledge, London
- Sear, D.R. 1970 *Roman Coins and their Values*. Seaby, London
- Sehrawet, M. and S.C. Kundu 2007 Buying behaviour of rural and urban consumers in India: the impact of packaging. *International Journal of Consumer Studies* **31**: 630-38

- Seidman, G.W. 2000 Adjusting the Lens: What do globalizations, transnationalism, and the anti-apartheid movement mean for social movement theory? In Guidry, A., M.D. Kennedy, and M.N. Zald (eds.), *Globalizations and Social Movements: Culture, power, and the transnational public sphere*: 339-57. University of Michigan Press, Ann Arbor
- Shammas, C. 1993 Changes in English and Anglo-American consumption from 1550-1800. In Brewer, J. and R. Porter (eds.), *Consumption and the World of Goods*: 177-205. Routledge, London
- Shankar, A., R. Elliott, and J.A. Fitchett 2009 Identity, consumption and narratives of socialization. *Marketing Theory* 9(1): 75-94
- Shaw, B.D. 1981 Rural markets in North Africa and the political economy of the Roman Empire. *Antiquités africaines* 17: 37-83
- Shennan, S. 1997 *Quantifying Archaeology* (2nd ed.). Edinburgh University Press, Edinburgh
- Shennan, S. 2002 *Genes, Memes and Human History: Darwinian archaeology and cultural evolution*. Thames & Hudson, London
- Shephard, S.J. 1987 Status variation in Antebellum Alexandria. An archaeological study of ceramic tableware. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 163-98. Plenum Press, London
- Sijpesteijn, P.J. 1987 *Customs Duties in Graeco-Roman Egypt*. Terra Publishing Co., Zutphen
- Simon, H.A. 1982a A behavioural model of rational choice, *Models of Bounded Rationality Vol. 2: Behavioural Economics and Business Organisation*: 239-58. The MIT Press, London

- Simon, H.A. 1982b From substantive to procedural rationality, *Models of Bounded Rationality Vol. 2: Behavioural economics and business organisation*: 424-43. The MIT Press, London
- Simon, H.A. 1982c Rational choice and the structure of the environment, *Models of Bounded Rationality Vol. 2: Behavioural economics and business organisation*: 259-68. The MIT Press, London
- Simon, H.A. 1982d Rationality, *Models of Bounded Rationality Vol. 2: Behavioural economics and business organisation*: 405-07. The MIT Press, London
- Simon, H.A. 1982e Rationality as process and as product of thought, *Models of Bounded Rationality Vol. 2: Behavioural economics and business organisation*: 444-59. The MIT Press, London
- Simon, H.A. 1982f Theories of bounded rationality, *Models of Bounded Rationality Vol. 2: Behavioural economics and business organisation*: 408-23. The MIT Press, London
- Simon, H.A. 1983 *Reason in Human Affairs*. Basil Blackwell, Oxford
- Simon, H.A. 1997 *Models in Bounded Rationality Vol. 3: Empirically grounded economic reason*. The MIT Press, London
- Sirivianou, M.G. (ed.) 1989 *The Oxyrhynchus Papyri, Volume LVI*. Graeco-Roman Memoirs, No. 76. Egypt Exploration Society, London
- Smith, A. 1976 [1776] *An Inquiry into the Nature and Causes of the Wealth of Nations*. edited by R.H. Campbell and A.S. Skinner. Clarendon Press, Oxford
- Smith, M.L. 1999 The role of ordinary goods in premodern exchange. *Journal of Archaeological Method and Theory* 6(2): 109-35
- Spencer-Wood, S.M. 1987a Introduction. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 1-24. Plenum Press, London

- Spencer-Wood, S.M. 1987b Miller's Indices and Consumer-Choice Profiles. Status-Related Behaviors and White Ceramics. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 321-258. Plenum Press, London
- Spencer-Wood, S.M. and S.D. Heberling 1987 Consumer choices in white ceramics. A comparison of eleven nineteenth-century sites. In Spencer-Wood, S.M. (ed.), *Consumer Choice in Historical Archaeology*: 55-84. Plenum Press, London
- Spradley, K. 2001 Small finds: Problems and possibilities. In Davies, G., A. Gardner, and K. Lockyear (eds.), *TRAC 2000. Proceedings of the Tenth Annual Theoretical Roman Archaeology Conference, London 2000*: 104-11. Oxbow Books, Oxford
- SPSS 2005 SPSS 14.0 for Windows. SPSS Inc.
- StatSoft, I. 2007 *Electronic Statistics Textbook*. StatSoft. Web: <http://www.statsoft.com/textbook/stathome.html>, Tulsa [Printed Version: Hill, T. and Lewicki, P. 2007 *Statistics: Methods and applications*. StatSoft, Tulsa]
- Steinberg, J.M. 1998 Monumental Labor: Consumption or investment?, *63rd Annual Meeting of the Society for American Archaeology*, Seattle. <http://tyr.ioa.ucla.edu/MLCI/MLCI.htm>
- Stern, E.M. 1999 Roman glassblowing in a cultural context. *American Journal of Archaeology* **103**(3): 441-84
- Stigler, G. 1961 The economics of information. *Journal of Political Economy* **69**: 213-25
- Strocka, V.M. 2007 Domestic decoration: Painting and the "four styles". In Dobbins, J.J. and P.W. Foss (eds.), *The World of Pompeii*: 302-22. Routledge, London

- Sutherland, C.H.V. 1987 *Roman History and Coinage 44 BC-AD 69: Fifty points of relation from Julius Caesar to Vespasian*. Clarendon Press, Oxford
- Sweetman, R. 2007 Identification of space through a study of mosaics: A case study, Knossos, Crete. In Westgate, R., N. Fisher, and J. Whitley (eds.), *Building Communities: House, settlement and society in the Aegean and beyond: 363-72*. British School at Athens, London
- Temin, P. 2001 A market economy in the early Roman Empire. *Journal of Roman Studies* **91**: 169-81
- Thoits, P.A. 1995. Stress, coping, and social support processes: where are we? what next? *Journal of Health and Social Behavior* **35**, Extra Issue: Forty Years of Medical Sociology: the state of the art and directions for the future: 53-79
- Thomas, D. and E. Frankenberg 2006 *Household responses to the financial crisis in Indonesia: Longitudinal evidence on poverty, resources and well-being*. California Center for Population Research On-Line Working Paper Series, CCPR-056-05, University of California, Los Angeles
- Tomber, R. 2008 Using and re-using Roman pottery: Identificatiton and implications. *Journal of Roman Archaeology* **21**(2): 498-501
- Trigg, A.B. 2001 Veblen, Bourdieu, and conspicuous consumption. *Journal of Economic Issues* **35**(1): 99-115
- Trigg, A.B. 2004 Deriving the Engel curve: Pierre Bourdieu and the social critique of Maslow's hierarchy of needs. *Review of Social Economy* **62**(3): 393-406
- Trigger, B.G. 1990 Monumental architecture: A thermodynamic explanation of symbolic behaviour. *World Archaeology* **22**(2): 119-32
- Twede, D. 2002a Commercial amphoras: The earliest consumer packages? *Journal of Macromarketing* **22**: 98-108

- Twede, D. 2002b The packaging technology and science of ancient transport amphoras. *Packaging Technology and Science* **15**: 181-95
- van der Veen, M. 1998 A life of luxury in the desert? The food and fodder supply to Mons Claudianus. *Journal of Roman Archaeology* **11**: 101-16
- van der Veen, M. (ed.) 2003 *World Archaeology, volume 34*
- van der Veen, M. 2008 Food as embodied culture: Diversity and change in plant food consumption in Roman Britain. *Journal of Roman Archaeology* **21**: 83-110
- Vaughn, K.J. 2004 Households, crafts, and feasting in the ancient Andes: The village context of early Nasca craft consumption. *Latin American Antiquity* **15**(1): 61-88
- Veblen, T. 1970 The folly of conspicuous consumption. In Brewer, T.B. (ed.), *The Robber Barons. Saints or sinners?*: 47-53. Holt, Rinehart and Winston, London
- Veblen, T. 1994 [1899] *The Theory of the Leisure Class*. Dover Publications, New York
- Vionis, A.K. 2005 Domestic material culture and post-Medieval archaeology in Greece: A case study from the Cyclades Islands. *Post-Medieval Archaeology* **39**(1): 172-85
- Vriend, N.J. 1996 Rational behavior and economic theory. *Journal of Economic Behavior and Organization* **29**: 263-85
- Wallace-Hadrill, A. 1990 The social spread of Roman luxury: Sampling Pompeii and Herculaneum. *Papers of the British School at Rome* **58**: 145-92
- Wallace-Hadrill, A. 1994 *Houses and Society in Pompeii and Herculaneum*. Princeton University Press, Princeton

- Wang, X.T. 2001 Introduction: Bounded rationality of economic man: new frontiers in evolutionary psychology and bioeconomics. *Journal of Bioeconomics* **3**: 83-89
- Warde, A. 2002 Setting the scene: Changing conceptions of consumption. In Miles, S., A. Anderson, and K. Meethan (eds.), *The Changing Consumer: Markets and meanings*: 10-24. Routledge, London
- Weatherill, L. 1986 A possession of one's own: Women and consumer behaviour in England, 1660-1740. *Journal of British Studies* **25**: 131-56
- Weatherill, L. 1988 *Consumer Behaviour and Material Culture in Britain 1660-1760*. Routledge, London
- Weatherill, L. 1993 The meaning of consumer behaviour in late seventeenth- and early eighteenth-century England. In Brewer, J. and R. Porter (eds.), *Consumption and the World of Goods*: 206-27. Routledge, London
- Webb, J.M. 1998 Lithic technology and discard at Marki, Cyprus: Consumer behaviour and site formation in the Prehistoric Bronze Age. *Antiquity* **72**: 796-
- Webster, J. 2001 Creolizing the Roman provinces. *American Journal of Archaeology* **105**: 209-25
- Wells, H.G. 2005 [1909] *Tono-Bungay*. Penguin Classics, London
- Werbner, P. 1990 Economic rationality and hierarchical gift economies: Value and ranking among British Pakistanis. *Man* **25**(2): 266-85
- Whalen, T. 1991 Review of *Jean Baudrillard: From Marxism to postmodernism and beyond*. *Modern Language Studies* **21**(2): 116-18
- Whittaker, C.R. 1995 Do theories of the ancient city matter? In Cornell, T.J. and K. Lomas (eds.), *Urban Society in Roman Italy*: 9-26. UCL Press, London

- Whittaker, C.R. 2002 Supplying the army: Evidence from Vindolanda. In Erdkamp, P.P.M. (ed.), *The Roman Army and the Economy*: 204-34. J.C. Gieben, Amsterdam
- Wilford, W. 2008 Out of rubble: Natural disaster and the materiality of the house. *Environment and Planning D: Society and Space* **26**: 647-62
- Wilk, R. 2001 Consuming Morality. *Journal of Consumer Culture* **1**(2): 245–60
- Will, E.L. 1977 The ancient commercial amphorae. *Archaeology* **30**: 264-70
- Will, E.L. 2001 Truth in Roman labelling? *American Journal of Archaeology* **105**: 263
- Willigan, J.D. and K.A. Lynch 1982 *Sources and Methods of Historical Demography*. Academic Press, New York
- Williams, R. 1988 *Keywords: A vocabulary of culture and society* (2nd ed.). Fontana Press, London
- Willis, S. 1995 Roman imports into late Iron Age British societies. Towards a critique of existing models. In Cottam, S., D. Dungworth, S. Scott, and J. Taylor (Eds.), *TRAC 96 Proceedings of the 6th Annual Theoretical Roman Archaeology Conference*: 151-62, Sheffield
- Willis, S. 1997 The English Heritage Samian Project. Report on the results of phase 1: the pilot survey. English Heritage
- Willis, S. 1998 Samian pottery in Britain: Exploring its distribution and archaeological potential. *Archaeological Journal* **155**: 82-133
- Wilson, A. 2001 Timgad and textile production. In Mattingly, D.J. and J. Salmon (eds.), *Economies Beyond Agriculture in the Classical World*: 271-95. Routledge, London

- Wilson, A. 2002a Machines, power and the ancient economy. *Journal of Roman Studies* **92**: 1-32
- Wilson, A. 2002b Urban production in the Roman World: The view from North Africa. *Papers of the British School at Rome* **70**: 231-73
- Winnubst, S. 2007 Introduction. In Winnubst, S. (ed.), *Reading Bataille Now*: 1-14. Indiana University Press, Bloomington
- Witcher, R. 2000 Globalisation and Roman imperialism: Perspectives on identities in Roman Italy. In Lomas, E.H.K. (ed.), *The Emergence of State Identities in Italy in the First Millennium BC*: 213-25. Accordia Research Institute, University of London, London
- Wolf, G. 1998 *Becoming Roman: The origins of provincial civilization in Gaul*. Cambridge University Press, Cambridge
- Woolgar, C.M. (ed.) 1992 *Household Accounts from Medieval England, Part 1*. Records of Social and Economic History, New Series XVII. Oxford University Press, Oxford
- Yamano, N., Y. Kajitani, and Y. Shumuta 2007 Modeling the regional economic loss of natural disasters: The search for economic hotspots. *Economic Systems Research* **19**(2): 163-81
- Young, R.J.C. 1995 *Colonial Desire: Hybridity in theory, culture and race*. Routledge, London
- Zanco, A. and G. Galetti 2001 'Terra sigillata imitations' from Nyon (SW Switzerland): One of Fronto's workshops? *Journal of Cultural Heritage* **2**(2): 109-16

Zauberman, G., R.K. Ratner, and B.K. Kim 2009 Memories as assets: Strategic memory protection in choice over time. *Journal of Consumer Research* **35**: 715-28

Zell, M. 1984 The social parameters of probate records in the sixteenth century. *Bulletin of the Institute of Historical Research* **57**: 107-13

Introduction to the Statistical Tables

The output of Correspondence Analysis is computed from a two-way table, referred to as a *contingency table*. These were formulated within a Microsoft Excel spreadsheet and subsequently entered into the ‘R’ console window, and reproduced in ‘R’ by the command: `print(JRA1)`. This is the first section of data presented in each table in Appendices C and D.

The statistical measures that result from the analysis include *mass* and *inertia*. The biplot illustrates the first two dimensions, which are the ones with the strongest relative contribution to the analysis. The dimensions display the *inertia*, which is a measure of the variation in the data (or the dispersion of row/column points in a spatial plot), with the first dimension representing as much of this as possible and successive dimensions ‘explaining’ less and less. Therefore, after the first dimension, the second displays as much of the remaining inertia as possible, then the third, and so on (SPSS 2005; StatSoft 2007).

The *singular value* is analogous to the Pearson Correlation Coefficient (r) and represents the correlation between the row and column values. For each dimension displayed the *eigenvalue* is exhibited, which represents the inertia, therefore indicating the importance of the dimension (Greenacre 2007; SPSS 2005; StatSoft 2007). The eigenvalues for the data analyses in this thesis are depicted in the second section of data in each table in Appendices C and D, and are produced in ‘R’ by the command: `ca(JRA1)`.

The Correspondence Analysis solution also provides row and column profiles, which display the row and column proportions for each cell based upon the variables’ marginal frequencies; the marginal frequencies being the cumulative total for the

APPENDIX C: STATISTICAL TABLES

variable category. These profiles indicate the proportions of row categories in the column categories (and vice versa), forming the basis for computing the distances between the plotted points in the biplot (SPSS 2005; StatSoft 2007).

Mass is a measure of the influence an object has based on its marginal frequency, the total of the values for that variable category (SPSS 2005; StatSoft 2007). This attribute affects the centroid, which is the weighted mean row or column profile, with points possessing a large mass exerting a strong ‘pull’ on the centroid’s location.

Both the mass and the distance from the origin dictate the contribution that a plotted point will have on the inertia of the dimensions (Greenacre 2007; SPSS 2005; StatSoft 2007). The mass values are indicated in the third and fourth sections of the data presented in the tables in Appendices C and D, and are also produced in ‘R’ by the command: `ca(JRA1)`.

Finally, the fifth section of the data tables provides a detailed summary of the dispersion of the data, depicting minimum and maximum values, median and quartile values, as well as mean values. These are produced in ‘R’ by the command: `summary(JRA1)`.

As an example, consider *table AppC.1*. The mass for ME is 0.00056 and represents (along with WC) the lowest such value for any of the artefact categories. This means that the category has a very small representation in the data population and, consequently, an insignificant influence on the centroid and surrounding data points.

In addition, ME also possesses the smallest inertia value in the population, 0.0006. In comparison, CV (ceramic vessels) has a much larger mass (0.126) and inertia (0.035, the third highest).

APPENDIX C: STATISTICAL TABLES

Table AppC.1: Statistical tables for Figures 6.5 and 6.6

Correspondence Analysis biplot for Functional Categories after removal of O (organics), M (miscellaneous), and BS (buildings and services).

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
PAD	0	14	1	9	18	8	123	76	14	1	18	13
TSP	0	7	1	0	2	0	14	30	4	1	8	3
MWT	0	20	6	5	23	1	19	22	58	4	0	11
HU	16	14	3	4	53	5	126	54	22	18	10	60
HF	40	375	55	59	294	68	526	397	79	112	189	433
RP	4	10	0	0	4	0	22	10	21	0	53	20
WM	0	14	0	2	13	1	11	22	3	11	3	15
WC	0	0	0	0	0	0	0	2	0	0	2	0
OT	0	0	0	0	0	0	59	11	0	0	1	6
T	0	9	0	1	12	1	16	41	7	5	3	0
FF	12	25	20	1	21	24	118	164	23	12	5	237
AHA	0	7	0	0	14	1	36	10	3	4	0	2
ME	0	0	0	0	1	0	2	1	0	0	0	0
RBP	0	1	1	1	5	1	10	3	0	2	0	2
CV	63	40	5	32	91	21	212	90	54	33	14	327
OV	2	45	8	9	57	4	248	110	6	18	42	203
C	6	21	15	4	8	17	222	150	16	9	83	75

```
> ca(JRA1)
```

Principal inertias (eigenvalues):							
	1	2	3	4	5	6	7
Value	0.086462	0.078624	0.051113	0.044908	0.033165	0.010975	0.006521
Percentage	27.14%	24.68%	16.04%	14.1%	10.41%	3.44%	2.05%
	8	9	10	11			
Value	0.003465	0.00143	0.001383	0.000545			
Percentage	1.09%	0.45%	0.43%	0.17%			

51.82% explanation from first two dimensions

Rows:									
	PAD	TSP	MWT	HU	HF	RP	WM		
Mass	0.041608	0.009873	0.023836	0.054302	0.370522	0.020310	0.013399		
ChiDist	0.610271	0.834973	1.546052	0.399897	0.278765	1.427737	0.672273		
Inertia	0.015496	0.006883	0.056976	0.008684	0.028793	0.041401	0.006056		
Dim. 1	-1.175390	-1.931488	-0.747330	0.322125	-0.258889	-2.861116	-0.033126		
Dim. 2	0.882940	0.332301	-4.564325	-0.050491	-0.404900	-1.080702	-0.860228		
	WC	OT	T	FF	AHA	ME	RBP		
Mass	0.000564	0.010860	0.013399	0.093371	0.010860	0.000564	0.003667		
ChiDist	2.144360	1.230622	0.864655	0.582528	0.765368	1.046716	0.756158		
Inertia	0.002594	0.016447	0.010018	0.031684	0.006362	0.000618	0.002097		
Dim. 1	-5.016008	-0.712482	-1.278858	1.167734	-0.572175	-0.697266	0.083032		
Dim. 2	1.286631	2.939992	-0.522578	0.569243	0.238362	1.230178	0.360578		
	CV	OV	C						
Mass	0.138505	0.106065	0.088293						
ChiDist	0.554953	0.356198	0.566833						
Inertia	0.042656	0.013457	0.028369						
Dim. 1	1.644808	0.290291	-1.255533						
Dim. 2	-0.282183	0.933884	1.264457						

APPENDIX C: STATISTICAL TABLES

Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.020169	0.084908	0.016220	0.017913	0.086883	0.021439	0.248801
ChiDist	0.989334	0.575207	0.591651	0.586641	0.466543	0.451376	0.386093
Inertia	0.019741	0.028093	0.005678	0.006165	0.018911	0.004368	0.037088
Dim. 1	2.236407	-0.566734	-0.168926	0.584543	0.242582	0.323043	-0.286517
Dim. 2	-0.569087	-1.084983	-0.366534	-1.006620	-1.018506	0.161822	0.957008

	H8	H9	H10	H11	H12
Mass	0.168265	0.043724	0.032440	0.060790	0.198449
ChiDist	0.392912	1.180598	0.524545	0.956426	0.487148
Inertia	0.025977	0.060942	0.008926	0.055608	0.047094
Dim. 1	-0.489656	-0.596933	0.355495	-2.460198	1.436553
Dim. 2	0.484256	-3.320920	-0.744149	0.237287	0.241523

> summary(JRA1)

H1		H2		H3		H4	
Min.	: 0.000	Min.	: 0.00	Min.	: 0.000	Min.	: 0.00
1st Qu.	: 0.000	1st Qu.	: 7.00	1st Qu.	: 0.000	1st Qu.	: 0.00
Median	: 0.000	Median	: 14.00	Median	: 1.000	Median	: 1.00
Mean	: 8.412	Mean	: 35.41	Mean	: 6.765	Mean	: 7.47
3rd Qu.	: 6.000	3rd Qu.	: 21.00	3rd Qu.	: 6.000	3rd Qu.	: 5.00
Max.	: 63.000	Max.	: 375.00	Max.	: 55.000	Max.	: 59.00

H5		H6		H7		H8	
Min.	: 0.00	Min.	: 0.000	Min.	: 0.0	Min.	: 1.00
1st Qu.	: 4.00	1st Qu.	: 0.000	1st Qu.	: 14.0	1st Qu.	: 10.00
Median	: 13.00	Median	: 1.000	Median	: 36.0	Median	: 30.00
Mean	: 36.24	Mean	: 8.941	Mean	: 103.8	Mean	: 70.18
3rd Qu.	: 23.00	3rd Qu.	: 8.000	3rd Qu.	: 126.0	3rd Qu.	: 90.00
Max.	: 294.00	Max.	: 68.000	Max.	: 526.0	Max.	: 397.00

H9		H10		H11		H12	
Min.	: 0.00	Min.	: 0.00	Min.	: 0.00	Min.	: 0.00
1st Qu.	: 3.00	1st Qu.	: 1.00	1st Qu.	: 1.00	1st Qu.	: 2.00
Median	: 7.00	Median	: 4.00	Median	: 5.00	Median	: 13.00
Mean	: 18.24	Mean	: 13.53	Mean	: 25.35	Mean	: 82.76
3rd Qu.	: 22.00	3rd Qu.	: 12.00	3rd Qu.	: 18.00	3rd Qu.	: 75.00
Max.	: 79.00	Max.	: 112.00	Max.	: 189.00	Max.	: 433.00

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Table AppC.2: Statistical tables for Figure 6.8

Correspondence Analysis biplot for Functional Categories (after removal of O and M) displaying the state of house occupation in 79 CE

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
PAD	0	14	1	9	18	8	123	76	14	1	18	13
TSP	0	7	1	0	2	0	14	30	4	1	8	3
MWT	0	20	6	5	23	1	19	22	58	4	0	11
HU	16	14	3	4	53	5	126	54	22	18	10	60
HF	40	375	55	59	294	68	526	397	79	112	189	433
RP	4	10	0	0	4	0	22	10	21	0	53	20
WM	0	14	0	2	13	1	11	22	3	11	3	15
WC	0	0	0	0	0	0	0	2	0	0	2	0
OT	0	0	0	0	0	0	59	11	0	0	1	6
BS	2	3	14	7	22	16	39	10	14	6	12	33
T	0	9	0	1	12	1	16	41	7	5	3	0
FF	12	25	20	1	21	24	118	164	23	12	5	237
AHA	0	7	0	0	14	1	36	10	3	4	0	2
ME	0	0	0	0	1	0	2	1	0	0	0	0
RBP	0	1	1	1	5	1	10	3	0	2	0	2
CV	63	40	5	32	91	21	212	90	54	33	14	327
OV	2	45	8	9	57	4	248	110	6	18	42	203
C	6	21	15	4	8	17	222	150	16	9	83	75

```
> ca(JRA1)
```

```
Principal inertias (eigenvalues):
```

	1	2	3	4	5	6	7
Value	0.084592	0.077157	0.05003	0.043822	0.032374	0.017674	0.010229
Percentage	26.05%	23.76%	15.4%	13.49%	9.97%	5.44%	3.15%

	8	9	10	11
Value	0.004825	0.002189	0.001386	0.000496
Percentage	1.49%	0.67%	0.43%	0.15%

49.81% explanation from first two dimensions

```
Rows:
```

	PAD	TSP	MWT	HU	HF	RP	WM
Mass	0.040589	0.009631	0.023253	0.052972	0.361447	0.019813	0.013071
ChiDist	0.613148	0.845539	1.527527	0.399677	0.279349	1.423214	0.677168
Inertia	0.015259	0.006886	0.054256	0.008462	0.028206	0.040132	0.005994
Dim. 1	-1.245245	-2.000179	-0.486106	0.324979	-0.256196	-2.783304	-0.034014
Dim. 2	0.856984	0.307558	-4.556246	0.005111	-0.418536	-1.257494	-0.812119

	WC	OT	BS	T	FF	AHA	ME
Mass	0.000550	0.010594	0.024491	0.013071	0.091084	0.010594	0.000550
ChiDist	2.147550	1.234262	0.774661	0.873783	0.580828	0.766008	1.047546
Inertia	0.002538	0.016140	0.014697	0.009980	0.030728	0.006216	0.000604
Dim. 1	-5.125248	-0.880597	0.291781	-1.311041	1.144668	-0.614672	-0.796051
Dim. 2	1.014117	2.965766	-0.801093	-0.499036	0.665399	0.246562	1.253932

	RBP	CV	OV	C
Mass	0.003577	0.135113	0.103467	0.086131
ChiDist	0.745307	0.554192	0.360452	0.567611
Inertia	0.001987	0.041497	0.013443	0.027750
Dim. 1	0.060185	1.680381	0.233237	-1.329045
Dim. 2	0.330237	-0.160113	0.983597	1.203659

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Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.019950	0.083242	0.017749	0.018437	0.087782	0.023115	0.248074
ChiDist	0.990281	0.593113	0.762084	0.590864	0.460634	0.616820	0.382901
Inertia	0.019565	0.029283	0.010308	0.006437	0.018626	0.008794	0.036371
Dim. 1	2.288067	-0.555451	-0.050835	0.640691	0.290647	0.360680	-0.336360
Dim. 2	-0.402340	-1.088160	-0.603670	-1.019129	-1.011616	-0.057501	0.944842

	H8	H9	H10	H11	H12
Mass	0.165520	0.044579	0.032471	0.060952	0.198129
ChiDist	0.408155	1.150070	0.517622	0.942276	0.482029
Inertia	0.027574	0.058963	0.008700	0.054118	0.046036
Dim. 1	-0.544045	-0.371450	0.376957	-2.437286	1.424309
Dim. 2	0.515161	-3.277629	-0.719924	0.048226	0.328739

> summary(JRA1)

H1		H2		H3		H4	
Min. :	0.000	Min. :	0.00	Min. :	0.000	Min. :	0.000
1st Qu. :	0.000	1st Qu. :	4.00	1st Qu. :	0.000	1st Qu. :	0.000
Median :	0.000	Median :	12.00	Median :	1.000	Median :	1.500
Mean :	8.056	Mean :	33.61	Mean :	7.167	Mean :	7.444
3rd Qu. :	5.500	3rd Qu. :	20.75	3rd Qu. :	7.500	3rd Qu. :	6.500
Max. :	63.000	Max. :	375.00	Max. :	55.000	Max. :	59.000

H5		H6		H7		H8	
Min. :	0.00	Min. :	0.000	Min. :	0.0	Min. :	1.00
1st Qu. :	4.25	1st Qu. :	0.250	1st Qu. :	14.5	1st Qu. :	10.00
Median :	13.50	Median :	1.000	Median :	37.5	Median :	26.00
Mean :	35.44	Mean :	9.333	Mean :	100.2	Mean :	66.83
3rd Qu. :	22.75	3rd Qu. :	14.000	3rd Qu. :	125.2	3rd Qu. :	86.50
Max. :	294.00	Max. :	68.000	Max. :	526.0	Max. :	397.00

H9		H10		H11		H12	
Min. :	0.00	Min. :	0.00	Min. :	0.00	Min. :	0.00
1st Qu. :	3.00	1st Qu. :	1.00	1st Qu. :	1.25	1st Qu. :	2.25
Median :	10.50	Median :	4.50	Median :	6.50	Median :	14.00
Mean :	18.00	Mean :	13.11	Mean :	24.61	Mean :	80.00
3rd Qu. :	21.75	3rd Qu. :	11.75	3rd Qu. :	17.00	3rd Qu. :	71.25
Max. :	79.00	Max. :	112.00	Max. :	189.00	Max. :	433.00

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Table AppC.3: Statistical tables for Figures 6.9 and 6.10

Correspondence analysis biplot of functional categories, with MWT (manufacture or working of textiles) omitted, by state of occupancy

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
PAD	0	14	1	9	18	8	123	76	14	1	18	13
TSP	0	7	1	0	2	0	14	30	4	1	8	3
HU	16	14	3	4	53	5	126	54	22	18	10	60
HF	40	375	55	59	294	68	526	397	79	112	189	433
RP	4	10	0	0	4	0	22	10	21	0	53	20
WM	0	14	0	2	13	1	11	22	3	11	3	15
WC	0	0	0	0	0	0	0	2	0	0	2	0
OT	0	0	0	0	0	0	59	11	0	0	1	6
T	0	9	0	1	12	1	16	41	7	5	3	0
FF	12	25	20	1	21	24	118	164	23	12	5	237
AHA	0	7	0	0	14	1	36	10	3	4	0	2
ME	0	0	0	0	1	0	2	1	0	0	0	0
RBP	0	1	1	1	5	1	10	3	0	2	0	2
CV	63	40	5	32	91	21	212	90	54	33	14	327
OV	2	45	8	9	57	4	248	110	6	18	42	203
C	6	21	15	4	8	17	222	150	16	9	83	75

```
> ca(JRA1)
```

Principal inertias (eigenvalues):							
	1	2	3	4	5	6	7
Value	0.086803	0.062983	0.048143	0.034459	0.018219	0.006704	0.003593
Percentage	32.59%	23.65%	18.08%	12.94%	6.84%	2.52%	1.35%
	8	9	10	11			
Value	0.002746	0.001434	0.001081	0.000152			
Percentage	1.03%	0.54%	0.41%	0.06%			

56.24% explanation from first two dimensions

Rows:								
	PAD	TSP	HU	HF	RP	WM	WC	
Mass	0.042624	0.010114	0.055628	0.379569	0.020806	0.013726	0.000578	
ChiDist	0.609001	0.836896	0.408836	0.281390	1.442151	0.674355	2.119454	
Inertia	0.015808	0.007084	0.009298	0.030054	0.043273	0.006242	0.002596	
Dim. 1	-1.255175	-1.943271	0.326619	-0.215701	-2.658630	0.056440	-5.087520	
Dim. 2	1.295414	0.383068	0.327343	-1.022118	-0.920935	-1.673036	-0.173654	
	OT	T	FF	AHA	ME	RBP	CV	
Mass	0.011126	0.013726	0.095651	0.011126	0.000578	0.003757	0.141887	
ChiDist	1.217389	0.876149	0.575528	0.765604	1.044218	0.755521	0.554196	
Inertia	0.016488	0.010537	0.031683	0.006521	0.000630	0.002144	0.043578	
Dim. 1	-1.048526	-1.195999	1.070737	-0.588776	-0.827311	0.037901	1.649775	
Dim. 2	3.705670	-0.359760	0.951431	0.259980	1.394851	-0.023261	0.120682	
	OV	C						
Mass	0.108655	0.090449						
ChiDist	0.339224	0.555149						
Inertia	0.012503	0.027876						
Dim. 1	0.167946	-1.386823						
Dim. 2	0.800061	1.303846						

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Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.020662	0.084092	0.015749	0.017628	0.085681	0.021818	0.252131
ChiDist	0.965202	0.584466	0.585544	0.594202	0.470132	0.434588	0.376008
Inertia	0.019249	0.028726	0.005400	0.006224	0.018938	0.004121	0.035647
Dim. 1	2.249242	-0.448710	-0.119556	0.725186	0.374188	0.284848	-0.399446
Dim. 2	-0.303380	-2.053734	-0.292049	-1.105141	-1.323097	-0.226036	1.096432

	H8	H9	H10	H11	H12
Mass	0.169195	0.036411	0.032654	0.062274	0.201705
ChiDist	0.393888	0.605637	0.525714	0.932261	0.473695
Inertia	0.026250	0.013355	0.009025	0.054123	0.045260
Dim. 1	-0.550276	-0.114045	0.431281	-2.447523	1.380171
Dim. 2	0.530465	-0.409741	-1.491240	-0.617627	0.283717

> summary(JRA1)

H1		H2		H3		H4	
Min.	: 0.000	Min.	: 0.00	Min.	: 0.000	Min.	: 0.000
1st Qu.	: 0.000	1st Qu.	: 5.50	1st Qu.	: 0.000	1st Qu.	: 0.000
Median	: 0.000	Median	: 12.00	Median	: 1.000	Median	: 1.000
Mean	: 8.938	Mean	: 36.38	Mean	: 6.812	Mean	: 7.625
3rd Qu.	: 7.500	3rd Qu.	: 22.00	3rd Qu.	: 5.750	3rd Qu.	: 5.250
Max.	: 63.000	Max.	: 375.00	Max.	: 55.000	Max.	: 59.000

H5		H6		H7		H8	
Min.	: 0.00	Min.	: 0.000	Min.	: 0.00	Min.	: 1.00
1st Qu.	: 3.50	1st Qu.	: 0.000	1st Qu.	: 13.25	1st Qu.	: 10.00
Median	: 12.50	Median	: 1.000	Median	: 47.50	Median	: 35.50
Mean	: 37.06	Mean	: 9.438	Mean	: 109.06	Mean	: 73.19
3rd Qu.	: 29.00	3rd Qu.	: 10.250	3rd Qu.	: 147.50	3rd Qu.	: 95.00
Max.	: 294.00	Max.	: 68.000	Max.	: 526.00	Max.	: 397.00

H9		H10		H11		H12	
Min.	: 0.00	Min.	: 0.00	Min.	: 0.00	Min.	: 0.00
1st Qu.	: 2.25	1st Qu.	: 0.75	1st Qu.	: 1.75	1st Qu.	: 2.00
Median	: 6.50	Median	: 4.50	Median	: 6.50	Median	: 14.00
Mean	: 15.75	Mean	: 14.12	Mean	: 26.94	Mean	: 87.25
3rd Qu.	: 21.25	3rd Qu.	: 13.50	3rd Qu.	: 24.00	3rd Qu.	: 107.00
Max.	: 79.00	Max.	: 112.00	Max.	: 189.00	Max.	: 433.00

APPENDIX C: STATISTICAL TABLES

*Table AppC.4: Statistical tables for Figure 6.13
Correspondence Analysis plot of functional categories with C (Coins) removed.*

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
PAD	0	14	1	9	18	8	123	76	14	1	18	13
TSP	0	7	1	0	2	0	14	30	4	1	8	3
MWT	0	20	6	5	23	1	19	22	58	4	0	11
HU	16	14	3	4	53	5	126	54	22	18	10	60
HF	40	375	55	59	294	68	526	397	79	112	189	433
RP	4	10	0	0	4	0	22	10	21	0	53	20
WM	0	14	0	2	13	1	11	22	3	11	3	15
WC	0	0	0	0	0	0	0	2	0	0	2	0
OT	0	0	0	0	0	0	59	11	0	0	1	6
T	0	9	0	1	12	1	16	41	7	5	3	0
FF	12	25	20	1	21	24	118	164	23	12	5	237
AHA	0	7	0	0	14	1	36	10	3	4	0	2
ME	0	0	0	0	1	0	2	1	0	0	0	0
RBP	0	1	1	1	5	1	10	3	0	2	0	2
CV	63	40	5	32	91	21	212	90	54	33	14	327
OV	2	45	8	9	57	4	248	110	6	18	42	203

```
> ca(JRA1)
```

Principal inertias (eigenvalues):

	1	2	3	4	5	6	7
Value	0.091092	0.068417	0.051953	0.045829	0.035257	0.011691	0.00611
Percentage	28.8%	21.63%	16.42%	14.49%	11.15%	3.7%	1.93%

	8	9	10	11
Value	0.003044	0.00145	0.001043	0.000423
Percentage	0.96%	0.46%	0.33%	0.13%

50.43% explanation from first two dimensions

Rows:

	PAD	TSP	MWT	HU	HF	RP	WM
Mass	0.045637	0.010829	0.026145	0.059561	0.406405	0.022277	0.014697
ChiDist	0.646560	0.876588	1.505477	0.390366	0.261471	1.517703	0.641443
Inertia	0.019078	0.008321	0.059256	0.009076	0.027785	0.051314	0.006047
Dim. 1	-0.421201	-1.402380	-2.584586	0.276120	-0.498187	-3.253750	-0.506455
Dim. 2	1.283131	1.153323	-4.180480	-0.108186	0.301261	-0.169769	0.136639

	WC	OT	T	FF	AHA	ME	RBP
Mass	0.000619	0.011912	0.014697	0.102413	0.011912	0.000619	0.004022
ChiDist	2.278828	1.272885	0.879085	0.580392	0.766743	1.048717	0.747154
Inertia	0.003214	0.019300	0.011358	0.034498	0.007003	0.000681	0.002245
Dim. 1	-4.009588	1.076944	-1.184747	1.233256	-0.215709	0.203722	0.317990
Dim. 2	3.108799	2.626503	0.493966	-0.432499	1.137408	1.903384	0.974243

	CV	OV
Mass	0.151918	0.116337
ChiDist	0.521688	0.368385
Inertia	0.041346	0.015788
Dim. 1	1.152163	0.643156
Dim. 2	-1.186514	0.769008

APPENDIX C: STATISTICAL TABLES

Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.021194	0.089882	0.015470	0.019028	0.094059	0.020885	0.238552
ChiDist	0.972493	0.537740	0.628862	0.543645	0.371174	0.476987	0.396167
Inertia	0.020044	0.025991	0.006118	0.005624	0.012959	0.004752	0.037440
Dim. 1	1.454632	-1.117635	-0.265523	-0.080572	-0.377658	0.400710	0.353963
Dim. 2	-1.918873	0.288315	-0.529804	-0.676070	-0.197506	-0.097676	0.849526

	H8	H9	H10	H11	H12
Mass	0.161355	0.045483	0.034189	0.053837	0.206064
ChiDist	0.404194	1.181474	0.491987	1.044184	0.475332
Inertia	0.026361	0.063488	0.008276	0.058699	0.046558
Dim. 1	-0.084322	-2.017751	-0.154617	-2.335985	1.234605
Dim. 2	0.489898	-3.435111	-0.043653	1.136416	-0.624665

> summary(JRA1)

H1		H2		H3		H4	
Min.	: 0.000	Min.	: 0.00	Min.	: 0.00	Min.	: 0.000
1st Qu.	: 0.000	1st Qu.	: 5.50	1st Qu.	: 0.00	1st Qu.	: 0.000
Median	: 0.000	Median	: 12.00	Median	: 1.00	Median	: 1.000
Mean	: 8.562	Mean	: 36.31	Mean	: 6.25	Mean	: 7.688
3rd Qu.	: 6.000	3rd Qu.	: 21.25	3rd Qu.	: 5.25	3rd Qu.	: 6.000
Max.	: 63.000	Max.	: 375.00	Max.	: 55.00	Max.	: 59.000

H5		H6		H7		H8	
Min.	: 0.0	Min.	: 0.000	Min.	: 0.00	Min.	: 1.00
1st Qu.	: 3.5	1st Qu.	: 0.000	1st Qu.	: 13.25	1st Qu.	: 10.00
Median	: 13.5	Median	: 1.000	Median	: 29.00	Median	: 26.00
Mean	: 38.0	Mean	: 8.438	Mean	: 96.38	Mean	: 65.19
3rd Qu.	: 30.5	3rd Qu.	: 5.750	3rd Qu.	: 123.75	3rd Qu.	: 79.50
Max.	: 294.0	Max.	: 68.000	Max.	: 526.00	Max.	: 397.00

H9		H10		H11		H12	
Min.	: 0.00	Min.	: 0.00	Min.	: 0.00	Min.	: 0.00
1st Qu.	: 2.25	1st Qu.	: 0.75	1st Qu.	: 0.75	1st Qu.	: 2.00
Median	: 6.50	Median	: 4.00	Median	: 4.00	Median	: 12.00
Mean	: 18.38	Mean	: 13.81	Mean	: 21.75	Mean	: 83.25
3rd Qu.	: 22.25	3rd Qu.	: 13.50	3rd Qu.	: 15.00	3rd Qu.	: 95.75
Max.	: 79.00	Max.	: 112.00	Max.	: 189.00	Max.	: 433.00

>

APPENDIX C: STATISTICAL TABLES

Table AppC.5: Statistical tables for Figures 7.7 and 7.8
Correspondence Analysis biplot for CV (ceramic vessel) artefact type component categories with PD (pottery dolium) excluded

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
PAFL	0	1	0	0	0	0	1	0	0	2	0	1
PAAH	28	3	3	15	27	15	97	16	11	9	10	94
PBV	1	8	0	0	13	1	5	28	2	3	0	21
PCP	0	0	0	0	0	0	2	0	0	0	0	2
PCB	1	3	0	5	0	0	6	4	0	0	1	12
PJV	1	6	0	3	9	1	42	6	22	1	0	70
PJ	1	5	0	1	2	0	11	10	2	10	0	4
P Bw	0	2	0	0	3	0	4	1	1	0	0	14
PPD	0	4	0	2	3	1	19	0	1	0	0	52
Ppt	2	6	0	3	11	2	2	4	2	3	1	0
PVB	0	0	0	0	0	0	0	3	1	0	0	22
PVL	0	0	0	1	21	0	12	9	4	2	0	19
SPJ	0	1	1	1	2	0	0	0	1	0	0	5
TSB	0	1	1	0	0	0	7	2	3	2	1	2
TSF	0	0	0	0	0	0	3	0	1	1	0	0
TSP	0	0	0	0	0	0	1	7	2	0	0	2
UPV	0	0	0	0	0	0	0	0	0	0	0	2

```
> ca(JRA1)
```

Principal inertias (eigenvalues):

	1	2	3	4	5	6	7
Value	0.209508	0.141761	0.088179	0.060151	0.056226	0.035616	0.023822
Percentage	32.83%	22.21%	13.82%	9.43%	8.81%	5.58%	3.73%

	8	9	10	11
Value	0.012043	0.007768	0.002554	0.000553
Percentage	1.89%	1.22%	0.4%	0.09%

55.04% explanation from first two dimensions

Rows:

	PAFL	PAAH	PBV	PCP	PCB	PJV	PJ
Mass	0.005297	0.347458	0.086864	0.004237	0.033898	0.170551	0.048729
ChiDist	2.194618	0.465866	0.988534	0.919852	0.884080	0.533033	1.218197
Inertia	0.025510	0.075409	0.084884	0.003585	0.026495	0.048458	0.072314
Dim. 1	-1.930499	0.426650	-1.783340	1.382344	0.131003	0.647981	-1.974485
Dim. 2	1.586224	0.992688	-1.211440	-0.185626	-0.032136	-0.604536	0.724225

	P Bw	PPD	Ppt	PVB	PVL	SPJ	TSB
Mass	0.026483	0.086864	0.038136	0.027542	0.072034	0.011653	0.020127
ChiDist	0.615684	0.718220	1.232808	1.124724	0.795990	1.450134	1.141769
Inertia	0.010039	0.044808	0.057959	0.034841	0.045641	0.024504	0.026238
Dim. 1	0.481841	1.140640	-1.787075	0.959499	-0.653425	0.319335	-0.431132
Dim. 2	-1.193310	-0.925945	1.054720	-2.308161	-0.544220	-0.456620	1.078545

	TSF	TSP	UPV
Mass	0.005297	0.012712	0.002119
ChiDist	1.568348	1.782204	1.389848
Inertia	0.013028	0.040376	0.004093
Dim. 1	-0.277008	-2.203300	1.735406
Dim. 2	1.879397	-1.987194	-2.309313

APPENDIX C: STATISTICAL TABLES

```

Columns:
      H1      H2      H3      H4      H5      H6      H7
Mass   0.036017  0.042373  0.005297  0.032839  0.096398  0.021186  0.224576
ChiDist 1.049253  1.047570  2.335850  0.956441  0.879217  0.976393  0.435412
Inertia 0.039652  0.046500  0.028899  0.030040  0.074518  0.020198  0.042576
Dim. 1  0.346551 -1.410074  0.510421  0.254429 -0.904017  0.309236  0.471124
Dim. 2  2.248259 -0.290156  1.912288  1.195328 -0.001057  1.893415  0.729702

      H8      H9      H10     H11     H12
Mass   0.095339  0.056144  0.034958  0.013771  0.341102
ChiDist 1.130910  0.834097  1.586223  1.151822  0.509583
Inertia 0.121934  0.039060  0.087957  0.018270  0.088576
Dim. 1 -2.048658  0.089431 -2.136765  0.366245  0.794331
Dim. 2 -1.035855 -0.359080  1.708046  2.457381 -0.869482

```

```
> summary(JRA1)
```

```

      H1      H2      H3      H4
Min.   : 0   Min.   :0.000   Min.   :0.0000   Min.   : 0.000
1st Qu.: 0   1st Qu.:0.000   1st Qu.:0.0000   1st Qu.: 0.000
Median : 0   Median :1.000   Median :0.0000   Median : 0.000
Mean   : 2   Mean   :2.353   Mean   :0.2941   Mean   : 1.824
3rd Qu.: 1   3rd Qu.:4.000   3rd Qu.:0.0000   3rd Qu.: 2.000
Max.   :28   Max.   :8.000   Max.   :3.0000   Max.   :15.000

      H5      H6      H7      H8
Min.   : 0.000   Min.   : 0.000   Min.   : 0.00   Min.   : 0.000
1st Qu.: 0.000   1st Qu.: 0.000   1st Qu.: 1.00   1st Qu.: 0.000
Median : 2.000   Median : 0.000   Median : 4.00   Median : 3.000
Mean   : 5.353   Mean   : 1.176   Mean   :12.47   Mean   : 5.294
3rd Qu.: 9.000   3rd Qu.: 1.000   3rd Qu.:11.00   3rd Qu.: 7.000
Max.   :27.000   Max.   :15.000   Max.   :97.00   Max.   :28.000

      H9      H10     H11     H12
Min.   : 0.000   Min.   : 0.000   Min.   : 0.0000   Min.   : 0.00
1st Qu.: 1.000   1st Qu.: 0.000   1st Qu.: 0.0000   1st Qu.: 2.00
Median : 1.000   Median : 1.000   Median : 0.0000   Median : 5.00
Mean   : 3.118   Mean   : 1.941   Mean   : 0.7647   Mean   :18.94
3rd Qu.: 2.000   3rd Qu.: 2.000   3rd Qu.: 0.0000   3rd Qu.:21.00
Max.   :22.000   Max.   :10.000   Max.   :10.0000   Max.   :94.00

```

APPENDIX C: STATISTICAL TABLES

Table AppC.6: Statistical tables for Figure 7.9

Correspondence Analysis biplot for CV (ceramic vessel) artefact type component categories with PD (pottery dolium,), PAAH (pottery amphora/amphoretta/hydria), and PAFL (pottery amphora fragment/lid) excluded

```
> print(JRA1)
      H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12
PBV   1  8  0  0 13  1  5 28  2  3  0 21
PCP   0  0  0  0  0  0  2  0  0  0  0  2
PCB   1  3  0  5  0  0  6  4  0  0  1 12
PJV   1  6  0  3  9  1 42  6 22  1  0 70
PJ    1  5  0  1  2  0 11 10  2 10  0  4
PlBw  0  2  0  0  3  0  4  1  1  0  0 14
PPD   0  4  0  2  3  1 19  0  1  0  0 52
PPt   2  6  0  3 11  2  2  4  2  3  1  0
PVB   0  0  0  0  0  0  0  3  1  0  0 22
PVL   0  0  0  1 21  0 12  9  4  2  0 19
SPJ   0  1  1  1  2  0  0  0  1  0  0  5
TSB   0  1  1  0  0  0  7  2  3  2  1  2
TSF   0  0  0  0  0  0  3  0  1  1  0  0
TSP   0  0  0  0  0  0  1  7  2  0  0  2
UPV   0  0  0  0  0  0  0  0  0  0  0  2
```

```
> ca(JRA1)
```

```
Principal inertias (eigenvalues):
Value      1      2      3      4      5      6      7
Percentage 35.41% 17.61% 14.41% 10.72%  9.22%  5.89%  3.14%

Value      8      9     10     11
Percentage  1.86%  1.32%  0.38%  0.04%
```

53.02% explanation from first two dimensions

```
> summary(JRA1)
```

	H1	H2	H3	H4	H5
Min.	:0.0	Min. :0.0	Min. :0.0000	Min. :0.000	Min. : 0.000
1st Qu.	:0.0	1st Qu.:0.0	1st Qu.:0.0000	1st Qu.:0.000	1st Qu.: 0.000
Median	:0.0	Median :1.0	Median :0.0000	Median :0.000	Median : 2.000
Mean	:0.4	Mean :2.4	Mean :0.1333	Mean :1.067	Mean : 4.267
3rd Qu.	:1.0	3rd Qu.:4.5	3rd Qu.:0.0000	3rd Qu.:1.500	3rd Qu.: 6.000
Max.	:2.0	Max. :8.0	Max. :1.0000	Max. :5.000	Max. :21.000

	H6	H7	H8	H9
Min.	:0.0000	Min. : 0.0	Min. : 0.000	Min. : 0.0
1st Qu.	:0.0000	1st Qu.: 1.5	1st Qu.: 0.000	1st Qu.: 1.0
Median	:0.0000	Median : 4.0	Median : 3.000	Median : 1.0
Mean	:0.3333	Mean : 7.6	Mean : 4.933	Mean : 2.8
3rd Qu.	:0.5000	3rd Qu.: 9.0	3rd Qu.: 6.500	3rd Qu.: 2.0
Max.	:2.0000	Max. :42.0	Max. :28.000	Max. :22.0

	H10	H11	H12
Min.	: 0.000	Min. :0.0	Min. : 0.00
1st Qu.	: 0.000	1st Qu.:0.0	1st Qu.: 2.00
Median	:0.000	Median :0.0	Median : 5.00
Mean	: 1.467	Mean :0.2	Mean :15.13
3rd Qu.	: 2.000	3rd Qu.:0.0	3rd Qu.:20.00
Max.	:10.000	Max. :1.0	Max. :70.00

```
>
```

APPENDIX C: STATISTICAL TABLES

Rows :								
	PBV	PCP	PCB	PJV	PJ	P1Bw	PPD	
Mass	0.134206	0.006547	0.052373	0.263502	0.075286	0.040917	0.134206	
ChiDist	0.799885	1.006389	1.037193	0.482737	1.158358	0.513699	0.682924	
Inertia	0.085867	0.006631	0.056341	0.061405	0.101019	0.010797	0.062592	
Dim. 1	-1.078079	1.280938	0.059302	0.709230	-1.480927	0.702219	1.157931	
Dim. 2	1.309505	-0.870666	-0.418496	-0.412996	-1.440231	0.534899	0.099191	
	PPT	PVB	PVL	SPJ	TSB	TSF	TSP	
Mass	0.058920	0.042553	0.111293	0.018003	0.031097	0.008183	0.019640	
ChiDist	1.353821	1.028878	0.717502	1.724125	1.405938	1.619348	1.525018	
Inertia	0.107990	0.045046	0.057295	0.053517	0.061467	0.021459	0.045676	
Dim. 1	-1.852840	1.274698	-0.398310	0.321489	-0.440000	-0.314560	-1.155560	
Dim. 2	-0.214162	1.351637	0.742694	-0.508144	-2.808655	-3.576539	1.424144	
	UPV							
Mass	0.003273							
ChiDist	1.300627							
Inertia	0.005537							
Dim. 1	1.860114							
Dim. 2	1.271562							
Columns :								
	H1	H2	H3	H4	H5	H6	H7	
Mass	0.009820	0.058920	0.003273	0.026187	0.104746	0.008183	0.186579	
ChiDist	1.448289	0.754151	4.574477	1.419544	0.994263	1.569540	0.551966	
Inertia	0.020598	0.033510	0.068497	0.052769	0.103548	0.020159	0.056844	
Dim. 1	-1.740106	-0.886248	-0.112564	-0.282119	-0.982941	-1.108089	0.369422	
Dim. 2	-0.624184	-0.268862	-4.466517	-0.838491	1.033244	0.305619	-1.118676	
	H8	H9	H10	H11	H12			
Mass	0.121113	0.068740	0.036007	0.004910	0.371522			
ChiDist	1.046315	0.787375	1.672974	2.565235	0.564575			
Inertia	0.132591	0.042616	0.100777	0.032310	0.118421			
Dim. 1	-1.436057	0.212431	-2.148648	-1.414296	0.979200			
Dim. 2	1.196721	-0.928636	-2.355109	-3.089461	0.472126			

APPENDIX C: STATISTICAL TABLES

Table AppC.7: Statistical tables for Figure 7.13

Correspondence Analysis biplot for the form of ceramic vessels according for artefact type, excluding PD (pottery dolium) but including CL

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
PAFL	0	1	0	0	0	0	1	0	0	2	0	1
PAAH	28	3	3	15	27	15	97	16	11	9	10	94
PBV	1	8	0	0	13	1	5	28	2	3	0	21
PCP	0	0	0	0	0	0	2	0	0	0	0	2
PCB	1	3	0	5	0	0	6	4	0	0	1	12
PJV	1	6	0	3	9	1	42	6	22	1	0	70
PJ	1	5	0	1	2	0	11	10	2	10	0	4
P1Bw	0	2	0	0	3	0	4	1	1	0	0	14
PPD	0	4	0	2	3	1	19	0	1	0	0	52
PPT	2	6	0	3	11	2	2	4	2	3	1	0
PVB	0	0	0	0	0	0	0	3	1	0	0	22
PVL	0	0	0	1	21	0	12	9	4	2	0	19
SPJ	0	1	1	1	2	0	0	0	1	0	0	5
TSB	0	1	1	0	0	0	7	2	3	2	1	2
TSF	0	0	0	0	0	0	3	0	1	1	0	0
TSP	0	0	0	0	0	0	1	7	2	0	0	2
UPV	0	0	0	0	0	0	0	0	0	0	0	2
CL	0	2	2	1	35	1	44	13	10	9	1	28

```
> ca(JRA1)
```

Principal inertias (eigenvalues):

Value	1	2	3	4	5	6	7
Percentage	0.188333	0.130017	0.081813	0.070613	0.051097	0.030978	0.019129
	31.6%	21.82%	13.73%	11.85%	8.57%	5.2%	3.21%
Value	8	9	10	11			
Percentage	0.013628	0.007378	0.002355	0.000621			
	2.29%	1.24%	0.4%	0.1%			

53.42% explanation from first two dimensions

Rows:

	PAFL	PAAH	PBV	PCP	PCB	PJV	PJ
Mass	0.004587	0.300917	0.075229	0.003670	0.029358	0.147706	0.042202
ChiDist	2.117867	0.501932	0.987897	0.918164	0.959181	0.543476	1.174970
Inertia	0.020575	0.075812	0.073419	0.003094	0.027010	0.043628	0.058262
Dim. 1	-1.870934	0.528314	-1.707845	1.450086	0.346347	0.724178	-1.970297
Dim. 2	0.935860	1.079928	-1.382032	-0.260913	-0.124888	-0.674153	0.361760
	P1Bw	PPD	PPT	PVB	PVL	SPJ	TSB
Mass	0.022936	0.075229	0.033028	0.023853	0.062385	0.010092	0.017431
ChiDist	0.648784	0.764766	1.209031	1.181626	0.689808	1.362093	1.080509
Inertia	0.009654	0.043999	0.048278	0.033305	0.029685	0.018723	0.020351
Dim. 1	0.626683	1.336031	-1.766539	1.282566	-0.665956	0.396785	-0.543165
Dim. 2	-1.303450	-1.041197	1.088500	-2.501745	-0.485877	-0.535189	0.884032
	TSF	TSP	UPV	CL			
Mass	0.004587	0.011009	0.001835	0.133945			
ChiDist	1.504318	1.788204	1.454058	0.551240			
Inertia	0.010381	0.035204	0.003879	0.040701			
Dim. 1	-0.466887	-2.171931	2.121595	-0.591160			
Dim. 2	1.684497	-2.197656	-2.495754	0.275777			

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Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.031193	0.038532	0.006422	0.029358	0.115596	0.019266	0.234862
ChiDist	1.194095	1.101619	1.847397	1.040282	0.802441	1.030868	0.403144
Inertia	0.044476	0.046761	0.021918	0.031771	0.074434	0.020474	0.038171
Dim. 1	0.586379	-1.302832	0.084350	0.458754	-0.965358	0.455682	0.337882
Dim. 2	2.495639	-0.583169	1.640295	1.243801	0.201743	2.054151	0.711755

	H8	H9	H10	H11	H12
Mass	0.094495	0.057798	0.038532	0.012844	0.321101
ChiDist	1.062086	0.757517	1.359848	1.163851	0.528079
Inertia	0.106593	0.033166	0.071253	0.017398	0.089545
Dim. 1	-1.921719	-0.019005	-2.007723	0.449109	0.920716
Dim. 2	-1.109408	-0.327593	1.229291	2.559917	-0.899914

> summary(JRA1)

H1		H2		H3		H4	
Min.	: 0.000	Min.	:0.000	Min.	:0.0000	Min.	: 0.000
1st Qu.	: 0.000	1st Qu.	:0.000	1st Qu.	:0.0000	1st Qu.	: 0.000
Median	: 0.000	Median	:1.500	Median	:0.0000	Median	: 0.500
Mean	: 1.889	Mean	:2.333	Mean	:0.3889	Mean	: 1.778
3rd Qu.	: 1.000	3rd Qu.	:3.750	3rd Qu.	:0.0000	3rd Qu.	: 1.750
Max.	:28.000	Max.	:8.000	Max.	:3.0000	Max.	:15.000

H5		H6		H7		H8	
Min.	: 0.0	Min.	: 0.000	Min.	: 0.00	Min.	: 0.000
1st Qu.	: 0.0	1st Qu.	: 0.000	1st Qu.	: 1.25	1st Qu.	: 0.000
Median	: 2.0	Median	: 0.000	Median	: 4.50	Median	: 3.500
Mean	: 7.0	Mean	: 1.167	Mean	:14.22	Mean	: 5.722
3rd Qu.	:10.5	3rd Qu.	: 1.000	3rd Qu.	:11.75	3rd Qu.	: 8.500
Max.	:35.0	Max.	:15.000	Max.	:97.00	Max.	:28.000

H9		H10		H11		H12	
Min.	: 0.00	Min.	: 0.000	Min.	: 0.0000	Min.	: 0.00
1st Qu.	: 1.00	1st Qu.	: 0.000	1st Qu.	: 0.0000	1st Qu.	: 2.00
Median	: 1.50	Median	: 1.000	Median	: 0.0000	Median	: 8.50
Mean	: 3.50	Mean	: 2.333	Mean	: 0.7778	Mean	:19.44
3rd Qu.	: 2.75	3rd Qu.	: 2.750	3rd Qu.	: 0.7500	3rd Qu.	:21.75
Max.	:22.00	Max.	:10.000	Max.	:10.0000	Max.	:94.00

>

APPENDIX C: STATISTICAL TABLES

Table AppC.8: Statistical tables for Figure 7.14

Correspondence Analysis biplot for ceramic vessel forms (including ceramic lamps, CL), with state of occupation indicated

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
A	28	4	3	15	27	15	98	16	11	11	10	95
CB	1	6	1	5	3	0	17	7	4	2	2	28
DP	0	4	0	2	3	1	20	7	3	0	0	54
JJ	3	20	1	5	26	2	58	44	27	14	1	100
PP	2	6	0	3	11	2	4	4	2	3	1	3
CL	0	2	2	1	35	1	44	13	10	9	1	28

```
> ca(JRA1)
```

```
Principal inertias (eigenvalues):
Value      1      2      3      4      5
Percentage 42.73% 34.5% 14.78% 5.02% 2.98%
```

77.23% explanation from first two dimensions

Rows:

	A	CB	DP	JJ	PP	CL
Mass	0.336024	0.076690	0.094854	0.303734	0.041372	0.147326
ChiDist	0.439384	0.419591	0.631054	0.355053	0.956145	0.580063
Inertia	0.064872	0.013502	0.037774	0.038289	0.037823	0.049571
Dim. 1	-1.355295	0.327015	0.611082	1.018877	0.100066	0.398859
Dim. 2	0.152245	0.817380	1.845671	0.155824	-2.244364	-1.652026

Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.034309	0.042381	0.007064	0.031282	0.105954	0.021191	0.243189
ChiDist	1.067172	0.802476	0.658791	0.631620	0.661333	0.898193	0.230612
Inertia	0.039073	0.027292	0.003066	0.012480	0.046340	0.017096	0.012933
Dim. 1	-3.144358	1.537794	-0.854315	-1.172021	0.230302	-2.530523	-0.490442
Dim. 2	0.107835	-0.062468	-0.926919	0.274282	-2.187996	-0.280228	-0.099122

	H8	H9	H10	H11	H12
Mass	0.091826	0.057518	0.039354	0.015136	0.310797
ChiDist	0.431831	0.426206	0.446987	0.840651	0.346991
Inertia	0.017124	0.010448	0.007863	0.010697	0.037421
Dim. 1	1.206730	1.087842	0.311101	-2.360450	0.270273

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> summary(JRA1)

H1	H2	H3	H4	H5
Min. : 0.000	Min. : 2	Min. : 0.000	Min. : 1.000	Min. : 3.00
1st Qu.: 0.250	1st Qu.: 4	1st Qu.: 0.250	1st Qu.: 2.250	1st Qu.: 5.00
Median : 1.500	Median : 5	Median : 1.000	Median : 4.000	Median : 18.50
Mean : 5.667	Mean : 7	Mean : 1.167	Mean : 5.167	Mean : 17.50
3rd Qu.: 2.750	3rd Qu.: 6	3rd Qu.: 1.750	3rd Qu.: 5.000	3rd Qu.: 26.75
Max. : 28.000	Max. : 20	Max. : 3.000	Max. : 15.000	Max. : 35.00

H6	H7	H8	H9	H10
Min. : 0.0	Min. : 4.00	Min. : 4.00	Min. : 2.00	Min. : 0.00
1st Qu.: 1.0	1st Qu.: 17.75	1st Qu.: 7.00	1st Qu.: 3.25	1st Qu.: 2.25
Median : 1.5	Median : 32.00	Median : 10.00	Median : 7.00	Median : 6.00
Mean : 3.5	Mean : 40.17	Mean : 15.17	Mean : 9.50	Mean : 6.50
3rd Qu.: 2.0	3rd Qu.: 54.50	3rd Qu.: 15.25	3rd Qu.: 10.75	3rd Qu.: 10.50
Max. : 15.0	Max. : 98.00	Max. : 44.00	Max. : 27.00	Max. : 14.00

H11	H12
Min. : 0.00	Min. : 3.00
1st Qu.: 1.00	1st Qu.: 28.00
Median : 1.00	Median : 41.00
Mean : 2.50	Mean : 51.33
3rd Qu.: 1.75	3rd Qu.: 84.75
Max. : 10.00	Max. : 100.00

>

APPENDIX C: STATISTICAL TABLES

Table AppC.9: Statistical tables for Figure 7.21

Correspondence Analysis biplot of ceramic vessels by type function. Garden/courtyard apparatus is omitted because $n = 1$.

```
> print(JRA1)
      H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12
DVF  5 25  1 11 52  3 40 59 13  18  2  99
FPV  0  0  0  0  0  0  2  0  0  0  0  3
SGT  0  5  1  2  3  1 30  9  7  3  1  56
ST  58 10  3 19 36 17 140 22 34  12  10 169
```

```
> ca(JRA1)
Principal inertias (eigenvalues):
      1      2      3
Value  0.143416 0.030879 0.000918
Percentage 81.85%  17.62%  0.52%
```

99.47% explanation from first two dimensions

```
Rows:
      DVF      FPV      SGT      ST
Mass    0.334353 0.005097 0.120285 0.540265
ChiDist 0.522423 0.905747 0.451655 0.319762
Inertia 0.091254 0.004181 0.024537 0.055241
Dim. 1  -1.372153 0.984605 0.081976 0.821641
Dim. 2   0.305854 -4.097297 -2.559797 0.419287
```

```
Columns:
      H1      H2      H3      H4      H5      H6      H7
Mass    0.064220 0.040775 0.005097 0.032620 0.092762 0.021407 0.216106
ChiDist 0.766577 0.643339 0.344262 0.196000 0.524708 0.541171 0.312422
Inertia 0.037738 0.016876 0.000604 0.001253 0.025539 0.006269 0.021094
Dim. 1  1.709864 -1.695097 0.620406 0.056233 -1.205007 1.249053 0.804286
Dim. 2  2.334829 -0.136543 -1.133690 1.104586 1.458295 1.486547 -0.377257

      H8      H9      H10      H11      H12
Mass    0.091743 0.055046 0.033639 0.013252 0.333333
ChiDist 0.692144 0.216365 0.450889 0.463913 0.169891
Inertia 0.043951 0.002577 0.006839 0.002852 0.009621
Dim. 1  -1.823273 0.521842 -1.167712 1.128159 0.085264
Dim. 2   0.267564 0.033017 0.492756 0.982655 -0.948483
```

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```
> summary(JRA1)
      H1          H2          H3          H4          H5
Min.   : 0.00    Min.   : 0.00    Min.   :0.00    Min.   : 0.0    Min.   : 0.00
1st Qu.: 0.00    1st Qu.: 3.75    1st Qu.:0.75    1st Qu.: 1.5    1st Qu.: 2.25
Median : 2.50    Median : 7.50    Median :1.00    Median : 6.5    Median :19.50
Mean   :15.75    Mean   :10.00    Mean   :1.25    Mean   : 8.0    Mean   :22.75
3rd Qu.:18.25    3rd Qu.:13.75    3rd Qu.:1.50    3rd Qu.:13.0   3rd Qu.:40.00
Max.   :58.00    Max.   :25.00    Max.   :3.00    Max.   :19.0   Max.   :52.00

      H6          H7          H8          H9          H10
Min.   : 0.00    Min.   : 2      Min.   : 0.00    Min.   : 0.00    Min.   : 0.00
1st Qu.: 0.75    1st Qu.: 23    1st Qu.: 6.75    1st Qu.: 5.25    1st Qu.: 2.25
Median : 2.00    Median : 35    Median :15.50    Median :10.00    Median : 7.50
Mean   : 5.25    Mean   : 53    Mean   :22.50    Mean   :13.50    Mean   : 8.25
3rd Qu.: 6.50    3rd Qu.: 65    3rd Qu.:31.25    3rd Qu.:18.25    3rd Qu.:13.50
Max.   :17.00    Max.   :140    Max.   :59.00    Max.   :34.00    Max.   :18.00

      H11          H12
Min.   : 0.00    Min.   : 3.00
1st Qu.: 0.75    1st Qu.: 42.75
Median : 1.50    Median : 77.50
Mean   : 3.25    Mean   : 81.75
3rd Qu.: 4.00    3rd Qu.:116.50
Max.   :10.00    Max.   :169.00
>
```

APPENDIX C: STATISTICAL TABLES

Table AppC.10: Statistical tables for Figure 7.30

Correspondence Analysis for glass vessels by artefact type, with state of occupation in 79 CE indicated. UGV (unidentified glass vessel/lid/fragment) and House 6 omitted ($n = 1$).

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H7	H8	H9	H10	H11	H12
GBC	0	0	1	0	4	3	5	0	0	3	4
GBF	0	2	0	2	0	7	22	2	7	5	10
GJV	0	6	0	0	1	7	1	0	1	0	6
GJ	0	0	0	0	0	1	0	0	0	1	2
GLB	0	0	0	0	1	0	2	0	0	0	0
GPT	0	0	0	0	6	0	0	0	1	0	14
GSB	0	1	0	0	1	3	1	0	0	0	16
SGB	1	8	7	1	6	16	17	1	1	11	20
SGJ	1	2	0	0	2	3	4	0	0	5	16

```
> ca(JRA1)
```

```
Principal inertias (eigenvalues):
Value      1      2      3      4      5      6      7      8
Percentage 42.4%  22.88% 17.6%  10.1%  3.19%  2.08%  1.74%  0.01%
```

65.28% explanation from first two dimensions

```
Rows:
```

	GBC	GBF	GJV	GJ	GLB	GPT	GSB
Mass	0.073801	0.210332	0.081181	0.014760	0.011070	0.077491	0.081181
ChiDist	0.667921	0.839897	1.034057	0.933179	1.658343	1.218026	0.906494
Inertia	0.032924	0.148374	0.086805	0.012853	0.030444	0.114964	0.066709
Dim. 1	0.032245	-1.441646	0.248867	0.716419	-0.879730	1.937980	1.455756
Dim. 2	-0.518068	-0.879836	2.134916	0.480716	-2.313012	-1.720856	-0.189954

	SGB	SGJ
Mass	0.328413	0.121771
ChiDist	0.396224	0.574076
Inertia	0.051559	0.040131
Dim. 1	-0.228418	0.710070
Dim. 2	0.680329	-0.050675


```
Columns:
```

	H1	H2	H3	H4	H5	H7	H8
Mass	0.007380	0.070111	0.029520	0.011070	0.077491	0.147601	0.191882
ChiDist	1.346947	0.972638	1.242177	1.204735	1.062457	0.494048	0.702180
Inertia	0.013389	0.066327	0.045550	0.016067	0.087473	0.036027	0.094609
Dim. 1	0.483644	-0.036100	-0.393289	-2.083049	1.207962	-0.235645	-1.261063
Dim. 2	0.860652	2.331029	1.450323	-0.983544	-1.143588	1.221665	-0.697358

	H9	H10	H11	H12
Mass	0.011070	0.036900	0.092251	0.324723
ChiDist	1.204735	1.269775	0.641624	0.586716
Inertia	0.016067	0.059495	0.037978	0.111781
Dim. 1	-2.083049	-1.633343	-0.430357	1.046471
Dim. 2	-0.983544	-1.384487	0.192190	-0.355235

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```

> summary(JRA1)
      H1          H2          H3          H4
Min.   :0.0000   Min.   :0.000   Min.   :0.0000   Min.   :0.0000
1st Qu.:0.0000   1st Qu.:0.000   1st Qu.:0.0000   1st Qu.:0.0000
Median :0.0000   Median :1.000   Median :0.0000   Median :0.0000
Mean   :0.2222   Mean   :2.111   Mean   :0.8889   Mean   :0.3333
3rd Qu.:0.0000   3rd Qu.:2.000   3rd Qu.:0.0000   3rd Qu.:0.0000
Max.   :1.0000   Max.   :8.000   Max.   :7.0000   Max.   :2.0000

      H5          H7          H8          H9
Min.   :0.000   Min.   : 0.000   Min.   : 0.000   Min.   :0.0000
1st Qu.:1.000   1st Qu.: 1.000   1st Qu.: 1.000   1st Qu.:0.0000
Median :1.000   Median : 3.000   Median : 2.000   Median :0.0000
Mean   :2.333   Mean   : 4.444   Mean   : 5.778   Mean   :0.3333
3rd Qu.:4.000   3rd Qu.: 7.000   3rd Qu.: 5.000   3rd Qu.:0.0000
Max.   :6.000   Max.   :16.000   Max.   :22.000   Max.   :2.0000

      H10         H11         H12
Min.   :0.000   Min.   : 0.000   Min.   : 0.000
1st Qu.:0.000   1st Qu.: 0.000   1st Qu.: 4.000
Median :0.000   Median : 1.000   Median :10.000
Mean   :1.111   Mean   : 2.778   Mean   : 9.778
3rd Qu.:1.000   3rd Qu.: 5.000   3rd Qu.:16.000
Max.   :7.000   Max.   :11.000   Max.   :20.000

```

↳

APPENDIX C: STATISTICAL TABLES

Table AppC.11: Statistical tables for Figure 7.31

Correspondence Analysis for glass vessels by form. UGV (unidentified glass vessel/lid/fragment) and House 6 omitted.

```
> print(JRA1)
```

	H1	H2	H3	H4	H5	H7	H8	H9	H10	H11	H12
BtF	1	10	7	3	6	23	39	3	8	16	30
CB	0	1	1	0	6	6	8	0	0	3	20
JJV	1	8	0	0	3	11	5	0	1	6	24
P1T	0	0	0	0	6	0	0	0	1	0	14

```
> ca(JRA1)
```

```
Principal inertias (eigenvalues):
Value      1      2      3
Percentage 72.33% 22.92% 4.75%
```

99.25% explanation from first two dimensions

```
Rows:
      BtF      CB      JJV      P1T
Mass  0.538745  0.166052  0.217712  0.077491
ChiDist 0.361655  0.441393  0.486741  1.218026
Inertia 0.070465  0.032351  0.051580  0.114964
Dim. 1 -0.781086  0.821189  0.377103  2.611240
Dim. 2 -0.423702 -0.399669  1.836262 -1.356850
```

```
Columns:
      H1      H2      H3      H4      H5      H7      H8
Mass  0.007380  0.070111  0.029520  0.011070  0.077491  0.147601  0.191882
ChiDist 0.782526  0.587508  0.717790  0.925292  0.889001  0.310736  0.478641
Inertia 0.004519  0.024200  0.015210  0.009478  0.061243  0.014252  0.043960
Dim. 1 -0.457634 -0.473732 -1.315868 -1.769633  1.838308 -0.503515 -0.958845
Dim. 2  2.842313  2.129387 -1.693033 -1.705122 -1.451167  0.810475 -0.815736

      H9      H10      H11      H12
Mass  0.011070  0.036900  0.092251  0.324723
ChiDist 0.925292  0.602433  0.334028  0.441644
Inertia 0.009478  0.013392  0.010293  0.063337
Dim. 1 -1.769633 -0.738666 -0.704259  0.993751
Dim. 2 -1.705122 -1.171166  0.489253  0.199843
```

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```
> summary(JRA1)
      H1      H2      H3      H4      H5
Min.   :0.0   Min.   : 0.00   Min.   :0.0   Min.   :0.00   Min.   :3.00
1st Qu.:0.0   1st Qu.: 0.75   1st Qu.:0.0   1st Qu.:0.00   1st Qu.:5.25
Median :0.5   Median : 4.50   Median :0.5   Median :0.00   Median :6.00
Mean   :0.5   Mean   : 4.75   Mean   :2.0   Mean   :0.75   Mean   :5.25
3rd Qu.:1.0   3rd Qu.: 8.50   3rd Qu.:2.5   3rd Qu.:0.75   3rd Qu.:6.00
Max.   :1.0   Max.   :10.00   Max.   :7.0   Max.   :3.00   Max.   :6.00

      H7      H8      H9      H10     H11
Min.   : 0.0   Min.   : 0.00   Min.   :0.00   Min.   :0.00   Min.   : 0.00
1st Qu.: 4.5   1st Qu.: 3.75   1st Qu.:0.00   1st Qu.:0.75   1st Qu.: 2.25
Median : 8.5   Median : 6.50   Median :0.00   Median :1.00   Median : 4.50
Mean   :10.0   Mean   :13.00   Mean   :0.75   Mean   :2.50   Mean   : 6.25
3rd Qu.:14.0   3rd Qu.:15.75   3rd Qu.:0.75   3rd Qu.:2.75   3rd Qu.: 8.50
Max.   :23.0   Max.   :39.00   Max.   :3.00   Max.   :8.00   Max.   :16.00

      H12
Min.   :14.0
1st Qu.:18.5
Median :22.0
Mean   :22.0
3rd Qu.:25.5
Max.   :30.0
>
```

APPENDIX C: STATISTICAL TABLES

Table AppC.12: Statistical tables for Figure 7.40

Correspondence Analysis for bronze vessels by artefact type with BL (bronze lid) omitted. Houses 1, 3 and 6 all yielded no bronze vessels.

```
> print(JRA1)
```

	H2	H4	H5	H7	H8	H9	H10	H11	H12
Abz	0	1	2	3	2	0	0	0	4
BBF	0	0	1	0	1	0	0	0	0
BB	0	0	0	5	0	0	1	1	1
BC	2	0	4	10	5	1	0	2	0
BCPB	0	1	1	4	2	1	0	3	2
BCP	2	0	2	0	3	0	0	1	0
BFF	0	0	4	3	1	0	0	0	0
BJV	1	0	1	1	0	0	0	0	0
BJJ	4	2	0	13	15	0	3	6	14
BKU	0	0	2	0	0	0	0	0	2
BrP	1	1	1	1	0	0	0	0	0
BrP1	2	0	1	1	1	1	0	2	4
BrRV	8	0	1	3	4	0	0	1	7
BSJV	1	0	1	0	2	0	0	0	0
EBF	0	0	0	1	1	0	1	1	0
SSBF	0	0	0	0	0	0	0	0	2

```
> ca(JRA1)
```

```
Principal inertias (eigenvalues):
      1          2          3          4          5          6          7          8
Value  0.237355  0.19623  0.122554  0.083967  0.07056  0.065881  0.03565  0.00353
Percentage 29.1%  24.06%  15.02%  10.29%  8.65%  8.08%  4.37%  0.43%
```

53.16% explanation from first two dimensions

```
Rows:
      Abz      BBF      BB      BC      BCPB      BCP      BFF
Mass   0.063158  0.010526  0.042105  0.126316  0.073684  0.042105  0.042105
ChiDist 0.712855  1.595521  1.224807  0.676480  0.795960  1.013762  1.391363
Inertia 0.032095  0.026797  0.063164  0.057805  0.046683  0.043272  0.081511
Dim. 1  0.188227  2.536126 -0.963644  0.749634 -0.267726  1.196576  2.528466
Dim. 2 -0.131407 -0.030496  2.041984  0.931299  0.853066 -0.782203  0.990251

      BJV      BJJ      BKU      BrP      BrP1      BrRV      BSJV
Mass   0.015789  0.300000  0.021053  0.021053  0.063158  0.126316  0.021053
ChiDist 1.216437  0.462679  1.606658  1.664284  0.846066  0.835461  1.189427
Inertia 0.023364  0.064222  0.054344  0.058312  0.045210  0.088168  0.029784
Dim. 1  1.855526 -0.826196  1.611656  1.300842 -0.365107 -0.230306  1.394411
Dim. 2 -0.358817  0.092157 -1.208009 -0.051353 -0.872099 -1.615747 -0.987889

      EBF      SSBF
Mass   0.021053  0.010526
ChiDist 1.630449  2.068279
Inertia 0.055966  0.045029
Dim. 1 -1.435266 -1.858302
Dim. 2  2.103850 -2.508142
```

APPENDIX C: STATISTICAL TABLES

Columns:

	H2	H4	H5	H7	H8	H9	H10
Mass	0.110526	0.026316	0.110526	0.236842	0.194737	0.015789	0.026316
ChiDist	1.029424	1.615402	1.264064	0.605554	0.546612	1.773929	1.746425
Inertia	0.117126	0.068672	0.176605	0.086849	0.058184	0.049687	0.080263
Dim. 1	0.250782	-0.176952	2.475717	-0.014513	-0.004561	0.079915	-2.002294
Dim. 2	-1.655611	0.385852	0.040809	1.137958	-0.067827	0.686464	1.996622

	H11	H12
Mass	0.089474	0.189474
ChiDist	0.722978	0.833311
Inertia	0.046768	0.131572
Dim. 1	-0.775627	-0.905348
Dim. 2	0.661090	-1.111054

> summary(JRA1)

H2		H4		H5		H7	
Min.	:0.000	Min.	:0.0000	Min.	:0.000	Min.	: 0.000
1st Qu.	:0.000	1st Qu.	:0.0000	1st Qu.	:0.750	1st Qu.	: 0.000
Median	:0.500	Median	:0.0000	Median	:1.000	Median	: 1.000
Mean	:1.312	Mean	:0.3125	Mean	:1.312	Mean	: 2.812
3rd Qu.	:2.000	3rd Qu.	:0.2500	3rd Qu.	:2.000	3rd Qu.	: 3.250
Max.	:8.000	Max.	:2.0000	Max.	:4.000	Max.	:13.000

H8		H9		H10		H11	
Min.	: 0.000	Min.	:0.0000	Min.	:0.0000	Min.	:0.000
1st Qu.	: 0.000	1st Qu.	:0.0000	1st Qu.	:0.0000	1st Qu.	:0.000
Median	: 1.000	Median	:0.0000	Median	:0.0000	Median	:0.500
Mean	: 2.312	Mean	:0.1875	Mean	:0.3125	Mean	:1.062
3rd Qu.	: 2.250	3rd Qu.	:0.0000	3rd Qu.	:0.0000	3rd Qu.	:1.250
Max.	:15.000	Max.	:1.0000	Max.	:3.0000	Max.	:6.000

H12	
Min.	: 0.00
1st Qu.	: 0.00
Median	: 0.50
Mean	: 2.25
3rd Qu.	: 2.50
Max.	:14.00

>

APPENDIX C: STATISTICAL TABLES

Table AppC.13: Statistical tables for Figure 7.41

Correspondence Analysis for bronze vessels by form. Houses 1, 3 and 6 all yielded no bronze vessels.

```
> print(JRA1)
```

	H2	H4	H5	H7	H8	H9	H10	H11	H12
A	0	1	2	3	2	0	0	0	4
BtF	0	0	1	0	1	0	0	0	0
CB	2	0	8	3	4	0	0	1	2
JJV	14	2	4	17	22	0	3	7	21
FP	0	0	0	1	1	0	1	1	2
PC	3	2	6	20	7	2	1	6	3
P1	2	0	1	1	1	1	0	2	4

```
> ca(JRA1)
```

Principal inertias (eigenvalues):

	1	2	3	4	5	6
Value	0.148902	0.101777	0.047909	0.031001	0.029018	0.004548
Percentage	41%	28.03%	13.19%	8.54%	7.99%	1.25%

69.03% explanation from first two dimensions

Rows:

	A	BtF	CB	JJV	FP	PC	P1
Mass	0.062500	0.010417	0.104167	0.468750	0.031250	0.260417	0.062500
ChiDist	0.713233	1.563642	0.931379	0.336061	1.109889	0.548927	0.854432
Inertia	0.031794	0.025469	0.090361	0.052939	0.038495	0.078469	0.045628
Dim. 1	0.338094	2.932849	2.064976	-0.730768	-1.631600	0.629890	-0.596507
Dim. 2	0.400348	2.660975	1.417561	0.447694	-0.105266	-1.532512	-0.126056

Columns:

	H2	H4	H5	H7	H8	H9	H10
Mass	0.109375	0.026042	0.114583	0.234375	0.197917	0.015625	0.026042
ChiDist	0.508640	0.771838	0.994586	0.447729	0.309469	1.576212	1.096175
Inertia	0.028297	0.015514	0.113346	0.046983	0.018955	0.038819	0.031292
Dim. 1	-0.666894	0.070663	2.401673	0.296918	-0.138224	0.572954	-1.655450
Dim. 2	0.634852	-1.109185	1.036087	-1.241077	0.661745	-3.334206	-0.184747

	H11	H12
Mass	0.088542	0.187500
ChiDist	0.453259	0.525404
Inertia	0.018190	0.051759
Dim. 1	-0.319466	-0.980688
Dim. 2	-0.922118	0.742351

APPENDIX C: STATISTICAL TABLES

```
> summary(JRA1)
      H2          H4          H5          H7
Min.   : 0.0   Min.   :0.0000   Min.   :0.000   Min.   : 0.000
1st Qu.: 0.0   1st Qu.:0.0000   1st Qu.:1.000   1st Qu.: 1.000
Median : 2.0   Median :0.0000   Median :2.000   Median : 3.000
Mean   : 3.0   Mean   :0.7143   Mean   :3.143   Mean   : 6.429
3rd Qu.: 2.5   3rd Qu.:1.5000   3rd Qu.:5.000   3rd Qu.:10.000
Max.   :14.0   Max.   :2.0000   Max.   :8.000   Max.   :20.000

      H8          H9          H10         H11
Min.   : 1.000   Min.   :0.0000   Min.   :0.0000   Min.   :0.000
1st Qu.: 1.000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.500
Median : 2.000   Median :0.0000   Median :0.0000   Median :1.000
Mean   : 5.429   Mean   :0.4286   Mean   :0.7143   Mean   :2.429
3rd Qu.: 5.500   3rd Qu.:0.5000   3rd Qu.:1.0000   3rd Qu.:4.000
Max.   :22.000   Max.   :2.0000   Max.   :3.0000   Max.   :7.000

      H12
Min.   : 0.000
1st Qu.: 2.000
Median : 3.000
Mean   : 5.143
3rd Qu.: 4.000
Max.   :21.000
>
```

APPENDIX C: STATISTICAL TABLES

Table AppC.14: Statistical tables for Figure 7.48
Correspondence Analysis biplot of vessel artefact types for 'occupied houses', with material indicated

```
> print(JRA1)
```

	H2	H6	H7	H8	H9	H10	H11	H12
A	0	0	3	2	0	0	0	4
BBF	0	0	0	1	0	0	0	0
BB	0	0	5	0	0	1	1	1
BC	2	0	10	5	1	0	2	0
BCPB	0	0	4	2	1	0	3	2
BCP	2	0	0	3	0	0	1	0
BFF	0	0	3	1	0	0	0	0
BJV	1	0	1	0	0	0	0	0
BJJ	4	0	13	15	0	3	6	14
BKU	0	0	0	0	0	0	0	2
BrP	1	0	1	0	0	0	0	0
BrP1	2	0	1	1	1	0	2	4
BrRV	8	0	3	4	0	0	1	7
BSJV	1	0	0	2	0	0	0	0
EBF	0	0	1	1	0	1	1	0
GBC	0	0	3	5	0	0	3	4
GBF	2	0	7	22	2	7	5	10
GJV	6	0	7	1	0	1	0	6
GJ	0	0	1	0	0	0	1	2
GLB	0	0	0	2	0	0	0	0
GPT	0	0	0	0	0	1	0	14
GSB	1	0	3	1	0	0	0	16
MBF	0	0	0	1	0	1	0	0
MPT	0	0	0	0	0	1	0	1
SSBF	0	0	0	0	0	0	0	2
SAA	0	0	3	0	0	0	0	0
SCB	0	1	42	0	0	0	0	0
SJ	0	0	5	0	0	0	0	0
SPC	5	2	37	0	0	0	0	0
SVF	0	0	39	0	0	0	0	0
SVFp	0	0	7	0	0	0	0	0
SGB	8	1	16	17	1	1	11	20
SGJ	2	0	3	4	0	0	5	16
UGV	0	0	30	18	0	0	0	78
WUV	0	0	0	1	0	1	0	0
PAFL	1	0	1	0	0	2	0	1
PAAH	3	15	97	16	11	9	10	94
PBV	8	1	5	28	2	3	0	21
PCP	0	0	2	0	0	0	0	2
PCB	3	0	6	4	0	0	1	12
PD	0	1	0	0	1	0	0	4
PJV	6	1	42	6	22	1	0	70
PJ	5	0	11	10	2	10	0	4
P1Bw	2	0	4	1	1	0	0	14
PPD	4	1	19	0	1	0	0	52
Ppt	6	2	2	4	2	3	1	0
PVB	0	0	0	3	1	0	0	22
PVL	0	0	12	9	4	2	0	19
SPJ	1	0	0	0	1	0	0	5
TSB	1	0	7	2	3	2	1	2
TSF	0	0	3	0	1	1	0	0
TSP	0	0	1	7	2	0	0	2
UPV	0	0	0	0	0	0	0	2

```
> ca(JRA1)
```

Principal inertias (eigenvalues):							
	1	2	3	4	5	6	7
Value	0.277829	0.237079	0.104282	0.092062	0.065492	0.060101	0.033969
Percentage	31.9%	27.22%	11.98%	10.57%	7.52%	6.9%	3.9%

APPENDIX C: STATISTICAL TABLES

Rows :							
	A	BBF	BB	BC	BCPB	BCP	BFF
Mass	0.006148	0.000683	0.005464	0.013661	0.008197	0.004098	0.002732
ChiDist	0.513405	2.521266	1.072794	0.868832	1.211583	1.868774	1.118041
Inertia	0.001620	0.004342	0.006289	0.010312	0.012032	0.014313	0.003415
Dim. 1	0.032654	2.546799	-1.093592	-0.340913	0.107997	2.033496	-1.314031
Dim. 2	0.335434	-2.205284	-1.007308	-1.397720	-0.750340	-2.259811	-1.179772
	BJV	BJJ	BKU	BrP	BrP1	BrRV	BSJV
Mass	0.001366	0.037568	0.001366	0.001366	0.007514	0.015710	0.002049
ChiDist	2.025225	0.630558	1.329468	2.025225	1.050722	1.291153	2.045338
Inertia	0.005603	0.014937	0.002415	0.005603	0.008295	0.026190	0.008573
Dim. 1	-0.561310	0.657120	0.750803	-0.561310	0.855139	0.916113	2.190651
Dim. 2	-1.578745	-0.807722	2.485819	-1.578745	-0.149870	-0.643242	-2.243375
	EBF	GBC	GBF	GJV	GJ	GLB	GPT
Mass	0.002732	0.010246	0.037568	0.014344	0.002732	0.001366	0.010246
ChiDist	1.765352	1.098295	1.029630	1.033111	1.246764	2.521266	1.240310
Inertia	0.008515	0.012359	0.039828	0.015310	0.004247	0.008684	0.015762
Dim. 1	0.862789	0.849726	1.276421	-0.018267	0.126125	2.546799	0.827513
Dim. 2	-2.349458	-0.700576	-1.320739	-0.529713	0.457451	-2.205284	2.050050
	GSB	MBF	MPT	SSBF	SAA	SCB	SJ
Mass	0.014344	0.001366	0.001366	0.001366	0.002049	0.029372	0.003415
ChiDist	0.852767	2.831195	2.620752	1.329468	1.477365	1.438045	1.477365
Inertia	0.010431	0.010950	0.009383	0.002415	0.004473	0.060740	0.007454
Dim. 1	0.392146	2.224130	1.326132	0.750803	-2.600975	-2.573947	-2.600975
Dim. 2	1.558784	-3.128000	-0.782448	2.485819	-0.837934	-0.820429	-0.837934
	SPC	SVF	SVFp	SGB	SGJ	UGV	WUV
Mass	0.030055	0.026639	0.004781	0.051230	0.020492	0.086066	0.001366
ChiDist	1.262503	1.477365	1.477365	0.712757	0.875073	0.625391	2.831195
Inertia	0.047905	0.058143	0.010436	0.026026	0.015692	0.033661	0.010950
Dim. 1	-2.084588	-2.600975	-2.600975	0.625616	0.845773	0.209331	2.224130
Dim. 2	-0.972086	-0.837934	-0.837934	-0.646898	0.409319	1.024291	-3.128000
	PAFL	PAAH	PBV	PCP	PCB	PD	PJV
Mass	0.003415	0.174180	0.046448	0.002732	0.017760	0.004098	0.101093
ChiDist	2.126002	0.438925	0.925485	0.698229	0.449244	1.591992	0.677449
Inertia	0.015437	0.033557	0.039784	0.001332	0.003584	0.010387	0.046395
Dim. 1	0.686222	-0.477418	1.334572	-0.925086	0.370381	0.309579	-0.173136
Dim. 2	-1.754620	0.223731	-0.634304	0.823942	0.258404	1.759390	0.830346
	PJ	PlBw	PPD	Ppt	PVB	PVL	SPJ
Mass	0.028689	0.015027	0.052596	0.013661	0.017760	0.031421	0.004781
ChiDist	1.259843	0.658699	0.718610	1.555070	1.056170	0.457288	1.123140
Inertia	0.045535	0.006520	0.027160	0.033036	0.019811	0.006570	0.006031
Dim. 1	0.639356	0.268359	-0.072845	0.943608	0.940427	0.238040	0.789345
Dim. 2	-1.715124	1.150164	1.359437	-1.882213	1.875786	0.261293	1.543974
	TSB	TSF	TSP	UPV			
Mass	0.012295	0.003415	0.008197	0.001366			
ChiDist	0.879657	1.506643	1.510001	1.329468			
Inertia	0.009514	0.007753	0.018689	0.002415			
Dim. 1	-0.213741	-1.121683	1.442859	0.750803			
Dim. 2	-0.885251	-1.173247	-0.825560	2.485819			
Columns :							
	H2	H6	H7	H8	H9	H10	H11
Mass	0.058060	0.017077	0.314208	0.135929	0.040984	0.034836	0.037568
ChiDist	1.338424	1.518239	0.755396	1.012670	1.232884	1.818836	1.520092
Inertia	0.104008	0.039362	0.179294	0.139395	0.062295	0.115243	0.086808
Dim. 1	0.779233	-0.758376	-1.370960	1.342404	0.154463	1.002250	0.845392
Dim. 2	-1.129410	-0.041493	-0.407997	-1.073770	0.339999	-1.972325	-1.121786
	H12						
Mass	0.361339						
ChiDist	0.632176						
Inertia	0.144408						
Dim. 1	0.395744						
Dim. 2	1.210365						

APPENDIX C: STATISTICAL TABLES

> summary(JRA1)

H2		H6		H7		H8	
Min.	:0.000	Min.	: 0.0000	Min.	: 0.00	Min.	: 0.000
1st Qu.	:0.000	1st Qu.	: 0.0000	1st Qu.	: 0.00	1st Qu.	: 0.000
Median	:0.000	Median	: 0.0000	Median	: 3.00	Median	: 1.000
Mean	:1.604	Mean	: 0.4717	Mean	: 8.68	Mean	: 3.755
3rd Qu.	:2.000	3rd Qu.	: 0.0000	3rd Qu.	: 7.00	3rd Qu.	: 4.000
Max.	:8.000	Max.	:15.0000	Max.	:97.00	Max.	:28.000

H9		H10		H11		H12	
Min.	: 0.000	Min.	: 0.0000	Min.	: 0.000	Min.	: 0.000
1st Qu.	: 0.000	1st Qu.	: 0.0000	1st Qu.	: 0.000	1st Qu.	: 0.000
Median	: 0.000	Median	: 0.0000	Median	: 0.000	Median	: 2.000
Mean	: 1.132	Mean	: 0.9623	Mean	: 1.038	Mean	: 9.981
3rd Qu.	: 1.000	3rd Qu.	: 1.0000	3rd Qu.	: 1.000	3rd Qu.	:12.000
Max.	:22.000	Max.	:10.0000	Max.	:11.000	Max.	:94.000

APPENDIX C: STATISTICAL TABLES

Table AppC.15: Statistical tables for Figure 7.49

Correspondence Analysis biplot of vessel form for 'occupied houses', with material indicated

```
> print(JRA1)
```

	H2	H6	H7	H8	H9	H10	H11	H12
bA	0	0	3	2	0	0	0	4
bCB	2	0	3	4	0	0	1	2
bJJV	14	0	17	22	0	3	7	21
bFP	0	0	1	1	0	1	1	2
bPC	3	0	20	7	2	1	6	3
bP1	2	0	1	1	1	0	2	4
gBtF	10	1	23	39	3	8	16	30
gCB	1	0	6	8	0	0	3	20
gJJV	8	0	11	5	0	1	6	24
gP1T	0	0	0	0	0	1	0	14
cA	4	15	98	16	11	11	10	95
cCB	6	0	17	7	4	2	2	28
cDP	4	1	20	7	3	0	0	54
cJJ	20	2	58	44	27	14	1	100
cPP	6	2	4	4	2	3	1	3
cL	0	0	12	9	4	2	0	19
sAA	0	0	3	0	0	0	0	0
sCB	0	1	42	0	0	0	0	0
sJ	0	0	5	0	0	0	0	0
sPC	5	2	37	0	0	0	0	0
sVFp	0	0	7	0	0	0	0	0

```
> ca(JRA1)
```

Principal inertias (eigenvalues):

	1	2	3	4	5	6	7
Value	0.202613	0.115214	0.044208	0.031658	0.029417	0.011303	0.005256
Percentage	46.51%	26%	9.98%	7.14%	6.64%	2.55%	1.19%

72.51% explanation from first two dimensions

Rows:

	bA	bCB	bJJV	bFP	bPC	bP1	gBtF
Mass	0.007166	0.009554	0.066879	0.004777	0.033439	0.008758	0.103503
ChiDist	0.546456	0.802459	0.638729	0.991667	0.738683	0.943604	0.667038
Inertia	0.002140	0.006152	0.027285	0.004698	0.018246	0.007798	0.046053
Dim. 1	0.033763	0.477349	0.650506	0.785857	-0.656633	1.045447	0.768999
Dim. 2	0.517062	-1.971706	-1.483472	-0.877641	-1.706587	-0.996269	-1.506306

	gCB	gJJV	gP1T	cA	cCB	cDP	cJJ
Mass	0.030255	0.043790	0.011943	0.207006	0.052548	0.070860	0.211783
ChiDist	0.607891	0.585004	1.305884	0.426001	0.278654	0.601830	0.395828
Inertia	0.011180	0.014986	0.020366	0.037567	0.004080	0.025665	0.033182
Dim. 1	0.842292	0.564862	1.424662	-0.512083	0.283187	0.381840	0.453385
Dim. 2	0.223437	-0.395583	2.863789	0.674031	0.405816	1.472183	0.418468

	cPP	cL	sAA	sCB	sJ	sPC	sVFp
Mass	0.019904	0.036624	0.002389	0.034236	0.003981	0.035032	0.005573
ChiDist	1.027669	0.466024	1.495698	1.454855	1.495698	1.260156	1.495698
Inertia	0.021021	0.007954	0.005343	0.072463	0.008906	0.055630	0.012468
Dim. 1	0.407989	0.320262	-3.162401	-3.151026	-3.162401	-2.633178	-3.162401
Dim. 2	-1.220043	0.712230	-0.375933	-0.310009	-0.375933	-0.682081	-0.375933

APPENDIX C: STATISTICAL TABLES

```

Columns:
      H2      H6      H7      H8      H9      H10      H11
Mass    0.067675  0.019108  0.308917  0.140127  0.045382  0.037420  0.044586
ChiDist 0.807415  1.248565  0.656725  0.639848  0.816836  0.685230  1.079000
Inertia 0.044119  0.029788  0.133232  0.057369  0.030280  0.017570  0.051909
Dim. 1  0.589818 -1.213712 -1.435778  0.926101  0.503227  0.626448  0.727430
Dim. 2 -1.426954  0.834607 -0.127604 -1.144498  0.839031 -0.298873 -2.342114

      H12
Mass    0.336783
ChiDist 0.484074
Inertia 0.078918
Dim. 1  0.648273
Dim. 2  1.062844

```

```
> summary(JRA1)
```

```

      H2      H6      H7      H8
Min.   : 0.000  Min.   : 0.000  Min.   : 0.00  Min.   : 0.000
1st Qu.: 0.000  1st Qu.: 0.000  1st Qu.: 3.00  1st Qu.: 0.000
Median : 2.000  Median : 0.000  Median :11.00  Median : 4.000
Mean   : 4.048  Mean   : 1.143  Mean   :18.48  Mean   : 8.381
3rd Qu.: 6.000  3rd Qu.: 1.000  3rd Qu.:20.00  3rd Qu.: 8.000
Max.   :20.000  Max.   :15.000  Max.   :98.00  Max.   :44.000

```

```

      H9      H10      H11      H12
Min.   : 0.000  Min.   : 0.000  Min.   : 0.000  Min.   : 0.00
1st Qu.: 0.000  1st Qu.: 0.000  1st Qu.: 0.000  1st Qu.: 2.00
Median : 0.000  Median : 1.000  Median : 1.000  Median : 4.00
Mean   : 2.714  Mean   : 2.238  Mean   : 2.667  Mean   : 20.14
3rd Qu.: 3.000  3rd Qu.: 2.000  3rd Qu.: 3.000  3rd Qu.: 24.00
Max.   :27.000  Max.   :14.000  Max.   :16.000  Max.   :100.00

```

```
>
```

Table AppC.16: Statistical tables for Figure 8.1
Correspondence Analysis biplot of high-low materialism objects

```

> print(JRA1)

      H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12
Bg    0  0  0  0  0  0  1  1  0  1  1  1
Br    0  0  0  0  1  0  3  3  0  1  0  2
BLd   0  0  0  0  0  0  3  2  0  0  0  1
BSS   0  0  0  0  0  0  21 0  0  0  0  5
BSSv  0  3  0  0  0  0  6  0  0  2  0  0
BIL   0  3  0  1  0  0  3  4  0  0  1  3
CL    0  2  2  1  35 1  44 13 10  9  1  28
GRT   0  0  0  0  0  0  0  2  0  0  0  0
GG    0  0  0  0  4  0  1  1  0  0  0  1
GS    0  0  0  0  5  0  5  2  3  0  0  1
HF1   1  1  1  1  3  1  3  1  1  1  1  2
IL    0  0  0  0  0  0  0  2  0  0  0  0
LFE   0  0  0  0  0  0  0  0  1  2  0  1
LLC   0  2  0  0  2  0  7  2  1  0  2  7
LLF   0  1  0  0  0  1  7  1  0  0  1  0
Mr    0  1  0  0  0  0  2  2  2  0  0  1
OFF   0  0  0  0  1  1  5  3  1  0  0  1
Ps    0  0  0  0  0  0  0  1  0  1  0  0
SL    0  0  0  0  0  0  2  0  0  0  0  0
SR    0  0  0  0  0  0  1  0  0  0  0  2
Tr    0  0  0  1  1  0  2  1  0  0  0  0
UtH   0  0  0  0  0  0  2  8  0  1  0  0
VLS   1  0  0  0  0  0  8  0  2  0  1  0
WBk   0  0  0  0  0  1  0  0  1  0  0  2
BrSS  0  0  1  0  0  0  1  0  0  0  0  1
BBAB  0  1  0  0  2  0  10 4  1  1  4  2
HP    0  0  0  0  1  0  4  2  0  0  0  0
J     0  13 0  9  15  8  103 70 13  0  12  10
Pd    0  0  0  0  0  0  5  0  0  0  2  0
Ax    0  1  0  1  2  1  8  1  0  2  0  0
Ch    0  0  0  0  2  0  2  15 0  0  0  0
F     0  0  0  0  0  0  0  7  0  0  0  0
HM    0  0  0  0  1  0  0  4  1  1  0  0
KKH   0  5  0  0  1  0  3  6  3  1  2  0
PMT   0  0  0  0  1  0  1  0  0  0  0  0
PT    0  0  0  0  0  0  0  2  0  1  0  0
SSP   0  2  0  0  5  0  2  0  3  0  0  0
Wd    0  0  0  0  0  0  0  2  0  0  0  0
Wh    0  0  0  0  0  0  0  3  0  0  1  0
SAA   0  0  0  0  0  0  3  0  0  0  0  0
SCB   0  0  0  0  0  1  42 0  0  0  0  0
SJ    0  0  0  0  0  0  5  0  0  0  0  0
SPC   0  5  0  0  4  2  37 0  0  0  0  0
SVF   0  0  0  0  0  0  39 0  0  0  0  0
SVFp  0  0  0  0  0  0  7  0  0  0  0  0
BrBS  0  1  1  0  0  0  2  1  1  0  0  2
LS    0  0  0  0  10 1  2  1  0  0  2  2
MB    2  0  0  1  1  2  4  1  1  2  0  0
MSB   0  0  0  0  0  0  0  1  1  0  0  1
OS    0  0  0  0  15 2  1  0  2  0  3  2
>

> ca(JRA1)

Principal inertias (eigenvalues):
Value      1      2      3      4      5      6      7
Percentage 23.75% 21.08% 11.98% 10.4%  8.03%  7.37%  5.29%

Value      8      9      10     11
Percentage 4.77%  3.39%  2.14%  1.79%

```

APPENDIX C: STATISTICAL TABLES

Rows :								
	Bg	Br	BLd	BSS	BSSv	BIL	CL	
Mass	0.005203	0.010406	0.006243	0.027055	0.011446	0.015609	0.151925	
ChiDist	1.556847	0.820074	0.751234	0.997996	1.633330	1.157392	0.697857	
Inertia	0.012611	0.006998	0.003524	0.026947	0.030536	0.020909	0.073988	
Dim. 1	-0.823462	-0.636428	0.155811	1.393307	0.726461	-0.441425	-0.550358	
Dim. 2	-0.076234	-0.198868	-0.782532	0.374454	-0.041855	-0.655912	1.004168	
	GRT	GG	GS	HF1	IL	LFE	LLC	
Mass	0.002081	0.007284	0.016649	0.017690	0.002081	0.004162	0.023933	
ChiDist	2.164807	1.489102	0.953595	1.332748	2.164807	3.203392	0.946894	
Inertia	0.009753	0.016152	0.015140	0.031421	0.009753	0.042713	0.021459	
Dim. 1	-1.942143	-1.322192	-0.603621	-0.638843	-1.942143	-1.732980	-0.248058	
Dim. 2	-3.358362	1.547756	0.841761	1.038465	-3.358362	1.243703	0.616826	
	LLF	Mr	OFF	Ps	SL	SR	Tr	
Mass	0.011446	0.008325	0.012487	0.002081	0.002081	0.003122	0.005203	
ChiDist	0.889655	1.145870	0.594012	3.108373	1.166696	2.176726	1.584653	
Inertia	0.009060	0.010930	0.004406	0.020108	0.002833	0.014791	0.013065	
Dim. 1	1.022658	-0.511333	-0.050475	-2.015483	2.021699	-0.156729	-0.055495	
Dim. 2	-0.319883	-0.384282	-0.267412	-1.256370	-0.061975	1.450979	-0.303696	
	Uth	VLS	WBk	BrSS	BBAB	HP	J	
Mass	0.011446	0.012487	0.004162	0.003122	0.026015	0.007284	0.263267	
ChiDist	1.546351	1.571697	2.462020	4.689014	0.713706	0.640548	0.423249	
Inertia	0.027371	0.030846	0.025230	0.068637	0.013251	0.002989	0.047162	
Dim. 1	-1.234779	1.032341	-1.027866	-0.276012	-0.044827	0.311467	-0.017364	
Dim. 2	-2.376839	0.321571	1.592918	2.176598	-0.093675	-0.564690	-0.673888	
	Pd	Ax	Ch	F	HM	KKH	PMT	
Mass	0.007284	0.016649	0.019771	0.007284	0.007284	0.021852	0.002081	
ChiDist	1.584931	0.914631	1.632601	2.164807	1.481484	1.268603	1.317340	
Inertia	0.018298	0.013928	0.052698	0.034136	0.015987	0.035168	0.003612	
Dim. 1	1.197756	0.347152	-1.533328	-1.942143	-1.912567	-0.756373	-0.000270	
Dim. 2	-0.048242	0.193756	-2.340831	-3.358362	-1.214274	-0.773547	1.474910	
	PT	SSP	Wd	Wh	SAA	SCB	SJ	
Mass	0.003122	0.012487	0.002081	0.004162	0.003122	0.044745	0.005203	
ChiDist	2.373631	1.567680	2.164807	1.991266	1.166696	1.129716	1.166696	
Inertia	0.017588	0.030688	0.009753	0.016504	0.004249	0.057106	0.007082	
Dim. 1	-1.991036	-0.880594	-1.942143	-1.672133	2.021699	1.972096	2.021699	
Dim. 2	-1.957034	1.414736	-3.358362	-2.522250	-0.061975	-0.040053	-0.061975	
	SPC	SVF	SVFp	BrBS	LS	MB	MSB	
Mass	0.049948	0.040583	0.007284	0.008325	0.018730	0.014568	0.003122	
ChiDist	0.890352	1.166696	1.166696	1.920583	1.526706	2.498680	1.795913	
Inertia	0.039595	0.055240	0.009915	0.030707	0.043658	0.090955	0.010069	
Dim. 1	1.386575	2.021699	2.021699	-0.436240	-1.247137	-0.139715	-1.565473	
Dim. 2	0.178106	-0.061975	-0.061975	0.724970	1.772409	0.522778	-0.024931	
	OS							
Mass	0.026015							
ChiDist	1.728082							
Inertia	0.077686							
Dim. 1	-1.465169							
Dim. 2	2.136065							
Columns :								
	H1	H2	H3	H4	H5	H6	H7	
Mass	0.004162	0.042664	0.005203	0.015609	0.116545	0.022893	0.423517	
ChiDist	4.969810	1.328051	4.464601	1.535876	1.227227	1.343889	0.626246	
Inertia	0.102805	0.075247	0.103708	0.036820	0.175527	0.041345	0.166097	
Dim. 1	0.051573	0.007099	-0.886814	-0.197120	-1.118194	-0.061513	1.117895	
Dim. 2	1.154513	-0.309039	2.283835	-0.545894	1.568875	0.458739	-0.032283	
	H8	H9	H10	H11	H12			
Mass	0.175858	0.049948	0.027055	0.035380	0.081165			
ChiDist	1.106807	1.134917	2.154172	1.377000	1.181265			
Inertia	0.215430	0.064335	0.125548	0.067085	0.113257			
Dim. 1	-1.073905	-0.834031	-1.155011	-0.476697	-0.688942			
Dim. 2	-1.749407	0.560559	0.440494	-0.007247	1.149887			

APPENDIX C: STATISTICAL TABLES

> summary(JRA1)

H1	H2	H3	H4	H5
Min. :0.00	Min. : 0.00	Min. :0.0	Min. :0.0	Min. : 0.00
1st Qu.:0.00	1st Qu.: 0.00	1st Qu.:0.0	1st Qu.:0.0	1st Qu.: 0.00
Median :0.00	Median : 0.00	Median :0.0	Median :0.0	Median : 0.00
Mean :0.08	Mean : 0.82	Mean :0.1	Mean :0.3	Mean : 2.24
3rd Qu.:0.00	3rd Qu.: 1.00	3rd Qu.:0.0	3rd Qu.:0.0	3rd Qu.: 1.75
Max. :2.00	Max. :13.00	Max. :2.0	Max. :9.0	Max. :35.00

H6	H7	H8	H9	H10
Min. :0.00	Min. : 0.00	Min. : 0.00	Min. : 0.00	Min. :0.00
1st Qu.:0.00	1st Qu.: 1.00	1st Qu.: 0.00	1st Qu.: 0.00	1st Qu.:0.00
Median :0.00	Median : 2.50	Median : 1.00	Median : 0.00	Median :0.00
Mean :0.44	Mean : 8.14	Mean : 3.38	Mean : 0.96	Mean :0.52
3rd Qu.:0.00	3rd Qu.: 5.75	3rd Qu.: 2.00	3rd Qu.: 1.00	3rd Qu.:1.00
Max. :8.00	Max. :103.00	Max. :70.00	Max. :13.00	Max. :9.00

H11	H12
Min. : 0.00	Min. : 0.00
1st Qu.: 0.00	1st Qu.: 0.00
Median : 0.00	Median : 0.00
Mean : 0.68	Mean : 1.56
3rd Qu.: 1.00	3rd Qu.: 1.75
Max. :12.00	Max. :28.00

>

APPENDIX C: STATISTICAL TABLES

Table AppC.17: Statistical tables for Figure 8.2
Correspondence Analysis biplot of classifications of materialism

```
> print(JRA1)
```

	H2	H6	H10	H7	H8	H9	H11	H12
uT	9	1	5	16	41	7	3	0
uHU	14	5	18	126	54	22	10	60
uGSV	18	1	9	33	44	3	21	52
eMI	0	0	0	0	1	2	0	0
eGP	10	0	0	22	9	19	53	20
iGTW	2	0	9	22	31	2	10	54
iRBP	1	1	2	10	3	0	0	2
iBrS	0	0	0	1	0	0	0	1
fSvw	5	3	10	133	0	0	0	0
aPAj	1	0	1	18	6	1	6	1
aJw	13	8	0	103	70	13	12	10
aTSP	7	0	1	14	30	4	8	3


```
> ca(JRA1)
```

Principal inertias (eigenvalues):

	1	2	3	4	5	6	7
Value	0.248758	0.132879	0.113461	0.026944	0.012102	0.00546	0.002766
Percentage	45.86%	24.5%	20.92%	4.97%	2.23%	1.01%	0.51%

Rows:

	uT	uHU	uGSV	eMI	eGP	iGTW	iRBP
Mass	0.061194	0.230597	0.135075	0.002239	0.099254	0.097015	0.014179
ChiDist	0.844283	0.279058	0.536665	2.770105	1.201432	0.818064	0.667698
Inertia	0.043620	0.017957	0.038903	0.017179	0.143267	0.064925	0.006321
Dim. 1	-0.171635	0.236795	-0.784008	-1.316581	-1.672234	-0.852971	1.042766
Dim. 2	-0.460211	-0.378754	-0.767263	1.640690	2.296315	-1.568174	-0.461345

	iBrS	fSvw	aPAj	aJw	aTSP
Mass	0.001493	0.112687	0.025373	0.170896	0.050000
ChiDist	1.150190	1.113799	0.543118	0.468299	0.685082
Inertia	0.001975	0.139793	0.007484	0.037478	0.023467
Dim. 1	0.135821	2.061272	0.347838	0.484164	-0.507214
Dim. 2	-1.333798	0.737532	1.124791	0.207738	0.021323

Columns:

	H2	H6	H10	H7	H8	H9	H11
Mass	0.059701	0.014179	0.041045	0.371642	0.215672	0.054478	0.091791
ChiDist	0.487620	0.905585	0.692847	0.590308	0.607478	0.913876	1.194597
Inertia	0.014195	0.011628	0.019703	0.129504	0.079589	0.045498	0.130991
Dim. 1	-0.409253	1.195418	0.408660	1.124905	-0.330683	-0.819639	-1.759334
Dim. 2	0.129366	0.042147	-1.124192	0.383946	-0.748385	1.271303	2.099944

	H12
Mass	0.151493
ChiDist	0.856990
Inertia	0.111261
Dim. 1	-0.989423
Dim. 2	-1.356353

APPENDIX C: STATISTICAL TABLES

> summary(JRA1)

H2		H6		H10		H7	
Min.	: 0.000	Min.	:0.000	Min.	: 0.000	Min.	: 0.0
1st Qu.	: 1.000	1st Qu.	:0.000	1st Qu.	: 0.000	1st Qu.	: 13.0
Median	: 6.000	Median	:0.500	Median	: 1.500	Median	: 20.0
Mean	: 6.667	Mean	:1.583	Mean	: 4.583	Mean	: 41.5
3rd Qu.	:10.750	3rd Qu.	:1.500	3rd Qu.	: 9.000	3rd Qu.	: 50.5
Max.	:18.000	Max.	:8.000	Max.	:18.000	Max.	:133.0

H8		H9		H11		H12	
Min.	: 0.00	Min.	: 0.000	Min.	: 0.00	Min.	: 0.00
1st Qu.	: 2.50	1st Qu.	: 0.750	1st Qu.	: 0.00	1st Qu.	: 0.75
Median	:19.50	Median	: 2.500	Median	: 7.00	Median	: 2.50
Mean	:24.08	Mean	: 6.083	Mean	:10.25	Mean	:16.92
3rd Qu.	:41.75	3rd Qu.	: 8.500	3rd Qu.	:10.50	3rd Qu.	:28.00
Max.	:70.00	Max.	:22.000	Max.	:53.00	Max.	:60.00

>

APPENDIX C: STATISTICAL TABLES

Table AppC.18: Statistical tables for Figure 8.3

Correspondence Analysis of artefact components (Dimensional classification of materialism)

```
> print(JRA1)
```

	H2	H6	H10	H7	H8	H9	H11	H12
iWC	0	0	0	2	0	0	2	0
sRBP	1	1	2	10	3	0	0	2
sBrS	0	0	0	1	0	0	0	1
oT	9	1	5	16	41	7	3	0
oHU	14	5	18	126	54	22	10	60
oCL	2	1	9	44	13	10	1	28
oGSV	18	1	9	33	44	3	21	52
pJw	13	8	0	103	70	13	12	10
pSvw	5	3	10	133	0	0	0	0
pLF	0	0	5	2	2	0	3	3
rRP	10	0	0	22	10	21	53	20
nBed	0	6	0	34	2	2	0	32
nHef	1	1	1	3	1	1	1	2


```
> ca(JRA1)
```

Principal inertias (eigenvalues):

	1	2	3	4	5	6	7
Value	0.246636	0.128308	0.110016	0.045527	0.019461	0.010291	0.003258
Percentage	43.77%	22.77%	19.52%	8.08%	3.45%	1.83%	0.58%

Rows:

	iWC	sRBP	sBrS	oT	oHU	oCL	oGSV
Mass	0.003023	0.014361	0.001512	0.061980	0.233560	0.081633	0.136810
ChiDist	1.656961	0.578290	1.095553	0.959723	0.214045	0.478769	0.581086
Inertia	0.008301	0.004803	0.001814	0.057088	0.010701	0.018712	0.046195
Dim. 1	1.695964	-0.937717	-0.556027	0.307900	-0.236429	-0.339231	0.691834
Dim. 2	2.422691	-0.060247	1.536616	-2.552536	-0.033484	0.358139	-0.407311

	pJw	pSvw	pLF	rRP	nBed	nHef
Mass	0.173091	0.114135	0.011338	0.102797	0.057445	0.008314
ChiDist	0.489377	1.038166	1.544420	1.274477	0.968633	0.649195
Inertia	0.041454	0.123013	0.027043	0.166972	0.053898	0.003504
Dim. 1	-0.240009	-1.662620	0.675808	2.278193	-0.588583	0.195192
Dim. 2	-0.895932	1.134851	0.512764	1.273176	1.215847	0.330700

Columns:

	H2	H6	H10	H7	H8	H9	H11
Mass	0.055178	0.020408	0.044596	0.399849	0.181406	0.059713	0.080121
ChiDist	0.546641	0.965042	0.984488	0.519175	0.705616	0.734714	1.429731
Inertia	0.016488	0.019006	0.043223	0.107776	0.090321	0.032233	0.163778
Dim. 1	0.602473	-0.872824	-0.493848	-0.903278	0.246877	1.003661	2.587794
Dim. 2	-0.880640	0.106861	0.014886	0.491098	-1.932159	0.056790	1.244523

	H12
Mass	0.158730
ChiDist	0.755804
Inertia	0.090673
Dim. 1	0.351004
Dim. 2	0.609737

APPENDIX C: STATISTICAL TABLES

> summary(JRA1)

H2		H6		H10		H7	
Min.	: 0.000	Min.	:0.000	Min.	: 0.000	Min.	: 1.00
1st Qu.	: 0.000	1st Qu.	:0.000	1st Qu.	: 0.000	1st Qu.	: 3.00
Median	: 2.000	Median	:1.000	Median	: 2.000	Median	: 22.00
Mean	: 5.615	Mean	:2.077	Mean	: 4.538	Mean	: 40.69
3rd Qu.	:10.000	3rd Qu.	:3.000	3rd Qu.	: 9.000	3rd Qu.	: 44.00
Max.	:18.000	Max.	:8.000	Max.	:18.000	Max.	:133.00

H8		H9		H11		H12	
Min.	: 0.00	Min.	: 0.000	Min.	: 0.000	Min.	: 0.00
1st Qu.	: 1.00	1st Qu.	: 0.000	1st Qu.	: 0.000	1st Qu.	: 1.00
Median	: 3.00	Median	: 2.000	Median	: 2.000	Median	: 3.00
Mean	:18.46	Mean	: 6.077	Mean	: 8.154	Mean	:16.15
3rd Qu.	:41.00	3rd Qu.	:10.000	3rd Qu.	:10.000	3rd Qu.	:28.00
Max.	:70.00	Max.	:22.000	Max.	:53.000	Max.	:60.00

APPENDIX C: STATISTICAL TABLES

Table AppC.19: Statistical tables for Figure 8.4
Correspondence Analysis of Dimensional classification of materialism

> print(JRA1)

	H2	H6	H10	H7	H8	H9	H11	H12
Ins	0	0	0	2	0	0	2	0
Sym	1	1	2	11	3	0	0	3
Ord	42	8	41	219	152	42	35	140
Prs	18	11	15	238	72	13	15	13
Rec	10	0	0	22	10	21	53	20
Nec	1	7	1	37	3	3	1	34

> ca(JRA1)

Principal inertias (eigenvalues):

Value	1	2	3	4	5
Value	0.20262	0.084418	0.043149	0.001936	0.000748
Percentage	60.87%	25.36%	12.96%	0.58%	0.22%

Rows:

	Ins	Sym	Ord	Prs	Rec	Nec
Mass	0.003026	0.015885	0.513616	0.298790	0.102874	0.065809
ChiDist	1.656106	0.531478	0.244019	0.491555	1.274232	0.874025
Inertia	0.008299	0.004487	0.030583	0.072196	0.167034	0.050273
Dim. 1	2.587827	-0.965126	-0.089887	-0.681345	2.801682	-0.470668
Dim. 2	-3.006308	-0.102301	0.671779	-1.309011	-0.554791	1.730419

Columns:

	H2	H6	H10	H7	H8	H9	H11
Mass	0.054463	0.020424	0.044629	0.400151	0.181543	0.059758	0.080182
ChiDist	0.272539	0.913322	0.482952	0.366373	0.333553	0.591375	1.352200
Inertia	0.004045	0.017037	0.010409	0.053712	0.020198	0.020899	0.146608
Dim. 1	0.325261	-1.026338	-0.613997	-0.600804	-0.361099	1.259560	2.930537
Dim. 2	0.035026	0.380602	0.550310	-0.779069	0.103226	0.206429	-0.967885

	H12
Mass	0.158850
ChiDist	0.614399
Inertia	0.059964
Dim. 1	0.166024
Dim. 2	2.039879

> summary(JRA1)

	H2	H6	H10	H7
Min.	: 0.0	: 0.00	: 0.000	: 2.00
1st Qu.:	: 1.0	: 0.25	: 0.250	: 13.75
Median :	: 5.5	: 4.00	: 1.500	: 29.50
Mean :	: 12.0	: 4.50	: 9.833	: 88.17
3rd Qu.:	: 16.0	: 7.75	: 11.750	: 173.50
Max. :	: 42.0	: 11.00	: 41.000	: 238.00
	H8	H9	H11	H12
Min.	: 0.0	: 0.00	: 0.00	: 0.0
1st Qu.:	: 3.0	: 0.75	: 1.25	: 5.5
Median :	: 6.5	: 8.00	: 8.50	: 16.5
Mean :	: 40.0	: 13.17	: 17.67	: 35.0
3rd Qu.:	: 56.5	: 19.00	: 30.00	: 30.5
Max. :	: 152.0	: 42.00	: 53.00	: 140.0

APPENDIX C: STATISTICAL TABLES

Table AppC.20: Statistical tables for 8.6
Correspondence Analysis of artefact components (discretionary expenditure)

```
> print(JRA1)

      H2 H6  H7 H8 H9 H10 H11 H12
lJ    13  8 103 70 13  0  12  10
lPAD  1  0  20  6  1  1  6  3
lWC   0  0  0  2  0  0  2  0
lSV   5  3 133  0  0  0  0  0
aSty  1  5  9  3  4  2  6  6
aLF   0  0  5  2  2  0  3  3
iTSP  7  0 14 30  4  1  8  3
iRBP  1  1 10  3  0  2  0  2
iRP   10  0 22 10 21  0 53 20
uBV   21  0 45 38  3  5 17 36
uHU   6  0 36  9  0  3  2 11

> ca(JRA1)

Principal inertias (eigenvalues):
Value      1      2      3      4      5      6      7
Percentage 51.95% 22.43% 13.21%  9.2%  1.94%  0.66%  0.59%

Rows:
      lJ      lPAD      lWC      lSV      aSty      aLF      iTSP
Mass    0.249727 0.041439 0.004362 0.153762 0.039258 0.016358 0.073064
ChiDist 0.420866 0.332999 1.558318 1.047526 1.084102 0.645938 0.734672
Inertia 0.044234 0.004595 0.010593 0.168725 0.046140 0.006825 0.039436
Dim. 1  -0.289423 -0.179139 1.817915 -1.734585 0.530403 0.744513 0.517630
Dim. 2   0.650342 -0.401838 0.603538 -1.201611 -0.555230 -0.793685 1.565701

      iRBP      iRP      uBV      uHU
Mass    0.020720 0.148310 0.179935 0.073064
ChiDist 0.891259 1.053334 0.549198 0.526699
Inertia 0.016459 0.164551 0.054272 0.020269
Dim. 1  -0.728811 1.641953 0.421082 -0.499853
Dim. 2   0.570025 -1.492047 0.819514 0.256927

Columns:
      H2      H6      H7      H8      H9      H10      H11
Mass    0.070883 0.018539 0.432933 0.188659 0.052345 0.015267 0.118866
ChiDist 0.486676 1.568373 0.579471 0.696339 0.997277 1.426567 1.063013
Inertia 0.016789 0.045601 0.145373 0.091478 0.052060 0.031070 0.134318
Dim. 1  0.367642 -0.601683 -1.006298 0.281534 1.427402 0.071486 1.707579
Dim. 2  0.721099 -0.099521 -0.482823 1.741055 -1.064410 1.204422 -1.307115

      H12
Mass    0.102508
ChiDist 0.761274
Inertia 0.059407
Dim. 1  0.866859
Dim. 2  0.234086
>
```

APPENDIX C: STATISTICAL TABLES

> summary(JRA1)

H2		H6		H7		H8	
Min.	: 0.000	Min.	:0.000	Min.	: 0.00	Min.	: 0.00
1st Qu.	: 1.000	1st Qu.	:0.000	1st Qu.	: 9.50	1st Qu.	: 2.50
Median	: 5.000	Median	:0.000	Median	: 20.00	Median	: 6.00
Mean	: 5.909	Mean	:1.545	Mean	: 36.09	Mean	:15.73
3rd Qu.	: 8.500	3rd Qu.	:2.000	3rd Qu.	: 40.50	3rd Qu.	:20.00
Max.	:21.000	Max.	:8.000	Max.	:133.00	Max.	:70.00

H9		H10		H11		H12	
Min.	: 0.000	Min.	:0.000	Min.	: 0.00	Min.	: 0.000
1st Qu.	: 0.000	1st Qu.	:0.000	1st Qu.	: 2.00	1st Qu.	: 2.500
Median	: 2.000	Median	:1.000	Median	: 6.00	Median	: 3.000
Mean	: 4.364	Mean	:1.273	Mean	: 9.91	Mean	: 8.545
3rd Qu.	: 4.000	3rd Qu.	:2.000	3rd Qu.	:10.00	3rd Qu.	:10.500
Max.	:21.000	Max.	:5.000	Max.	:53.00	Max.	:36.000

>

Table AppC.21: Statistical tables for 8.7
Correspondence Analysis of discretionary expenditure

```
> print(JRA1)

      H2 H6  H7 H8 H9 H10 H11 H12
Lfst 19 11 256 78 14   1  20  13
Asp   1  5  14  5  6   2   9   9
Indg  18  1  46 43 25   3  61  25
Util  27  0  81 47  3   8  19  47

> ca(JRA1)

Principal inertias (eigenvalues):
Value      1      2      3
Percentage 63.05% 25.7% 11.24%

Rows:
      Lfst      Asp      Indg      Util
Mass    0.449291 0.055616 0.242094 0.252999
ChiDist 0.449683 0.824520 0.636397 0.477549
Inertia 0.090853 0.037810 0.098048 0.057697
Dim. 1  -1.032463 0.834636 1.367681 0.341307
Dim. 2  -0.380142 -0.912737 -0.843491 1.682859

Columns:
      H2      H6      H7      H8      H9      H10      H11
Mass    0.070883 0.018539 0.432933 0.188659 0.052345 0.015267 0.118866
ChiDist 0.439534 1.225385 0.409688 0.119953 0.778608 0.926615 0.781846
Inertia 0.013694 0.027837 0.072666 0.002715 0.031733 0.013109 0.072661
Dim. 1  0.546808 -0.807914 -0.963995 -0.020574 1.267749 1.260035 1.663299
Dim. 2  1.258576 -2.086132 -0.117233 0.184060 -2.067872 2.305447 -1.197649

      H12
Mass    0.102508
ChiDist 0.698367
Inertia 0.049995
Dim. 1  1.113461
Dim. 2  1.764694

> summary(JRA1)

      H2      H6      H7      H8      H9
Min.   :1.00   Min.   :0.00   Min.   :14.00   Min.   :5.00   Min.   :3.00
1st Qu.:13.75  1st Qu.:0.75   1st Qu.:38.00  1st Qu.:33.50  1st Qu.:5.25
Median :18.50  Median :3.00   Median :63.50  Median :45.00  Median :10.00
Mean   :16.25  Mean   :4.25   Mean   :99.25  Mean   :43.25  Mean   :12.00
3rd Qu.:21.00  3rd Qu.:6.50   3rd Qu.:124.75 3rd Qu.:54.75  3rd Qu.:16.75
Max.   :27.00  Max.   :11.00  Max.   :256.00  Max.   :78.00  Max.   :25.00

      H10      H11      H12
Min.   :1.00   Min.   :9.00   Min.   :9.0
1st Qu.:1.75  1st Qu.:16.50  1st Qu.:12.0
Median :2.50  Median :19.50  Median :19.0
Mean   :3.50  Mean   :27.25  Mean   :23.5
3rd Qu.:4.25  3rd Qu.:30.25  3rd Qu.:30.5
Max.   :8.00  Max.   :61.00  Max.   :47.0
>
```

APPENDIX C: STATISTICAL TABLES

Table AppC.22: Statistical tables for 8.9
Correspondence Analysis discretionary expenditure for all Houses

> print(JRA1)

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
lJ	0	13	0	9	15	8	103	70	13	0	12	10
lPAD	0	1	1	0	3	0	20	6	1	1	6	3
lWC	0	0	0	0	0	0	0	2	0	0	2	0
lSV	0	5	0	0	4	3	133	0	0	0	0	0
aSty	2	1	1	1	31	5	9	3	4	2	6	6
aLF	0	0	0	1	3	0	5	2	2	0	3	3
iTSP	0	7	1	0	2	0	14	30	4	1	8	3
iRBP	0	1	1	1	1	5	1	10	3	0	2	0
iRP	4	10	0	0	4	0	22	10	21	0	53	20
uBV	0	21	0	5	21	0	45	38	3	5	17	36
uHU	0	6	0	1	1	0	36	9	0	3	2	11

> ca(JRA1)

Principal inertias (eigenvalues):

	1	2	3	4	5	6	7
Value	0.297241	0.171768	0.131894	0.067293	0.025485	0.009376	0.005801
Percentage	41.67%	24.08%	18.49%	9.43%	3.57%	1.31%	0.81%
	8	9	10				
Value	0.003085	0.001104	0.000226				
Percentage	0.43%	0.15%	0.03%				

Rows:

	lJ	lPAD	lWC	lSV	aSty	aLF	iTSP
Mass	0.244681	0.040619	0.003868	0.140232	0.068665	0.018375	0.067698
ChiDist	0.448297	0.480843	1.692861	1.115827	1.429977	0.666927	0.807967
Inertia	0.049174	0.009392	0.011086	0.174599	0.140409	0.008173	0.044194
Dim. 1	0.332532	0.200586	-1.717860	1.832049	-0.826881	-0.657902	-0.404350
Dim. 2	0.059297	0.146674	1.562927	0.420354	-3.053725	-0.299309	0.494143
	iRBP	iRP	uBV	uHU			
Mass	0.025145	0.139265	0.184720	0.066731			
ChiDist	0.988693	1.124121	0.524516	0.610419			
Inertia	0.024580	0.175982	0.050820	0.024865			
Dim. 1	0.404277	-1.628604	-0.366486	0.611434			
Dim. 2	-1.715265	1.234081	-0.277234	0.280967			

Columns:

	H1	H2	H3	H4	H5	H6	H7
Mass	0.005803	0.062863	0.003868	0.017408	0.086074	0.016441	0.383946
ChiDist	1.951797	0.508312	2.204017	0.906293	1.199147	1.234731	0.642241
Inertia	0.022105	0.016243	0.018792	0.014298	0.123770	0.025065	0.158367
Dim. 1	-2.497008	-0.278881	-0.287220	0.070442	-0.557999	0.477569	1.105443
Dim. 2	-0.470956	0.368014	-2.490153	-0.756000	-2.731257	-2.164238	0.307060
	H8	H9	H10	H11	H12		
Mass	0.167311	0.046422	0.013540	0.105416	0.090909		
ChiDist	0.725830	1.002104	1.299393	1.100226	0.737186		
Inertia	0.088145	0.046617	0.022861	0.127606	0.049404		
Dim. 1	-0.194856	-1.414524	-0.137185	-1.678291	-0.828359		
Dim. 2	0.173083	0.762286	-1.627017	1.122426	-0.060156		

APPENDIX C: STATISTICAL TABLES

> summary(JRA1)

H1	H2	H3	H4
Min. :0.0000	Min. : 0.000	Min. :0.0000	Min. :0.000
1st Qu.:0.0000	1st Qu.: 1.000	1st Qu.:0.0000	1st Qu.:0.000
Median :0.0000	Median : 5.000	Median :0.0000	Median :1.000
Mean :0.5455	Mean : 5.909	Mean :0.3636	Mean :1.636
3rd Qu.:0.0000	3rd Qu.: 8.500	3rd Qu.:1.0000	3rd Qu.:1.000
Max. :4.0000	Max. :21.000	Max. :1.0000	Max. :9.000

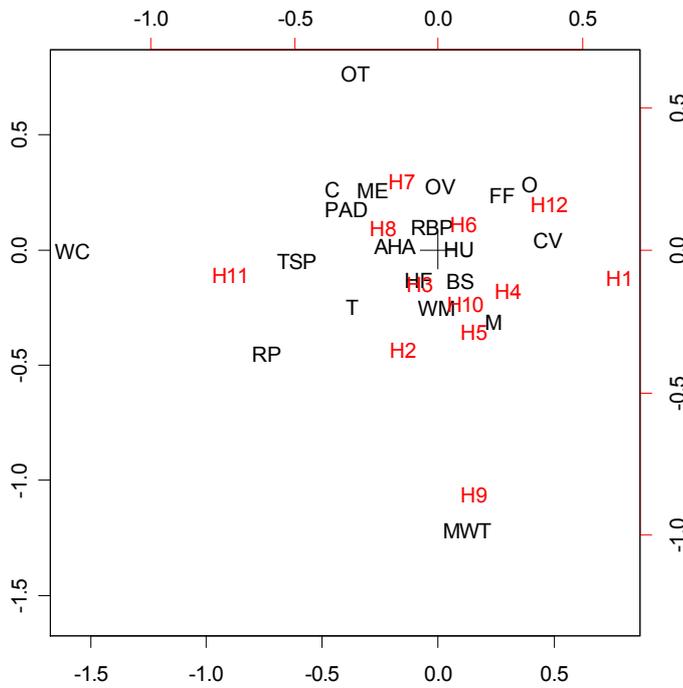
H5	H6	H7	H8
Min. : 0.000	Min. :0.000	Min. : 0.00	Min. : 0.00
1st Qu.: 2.500	1st Qu.:0.000	1st Qu.: 9.50	1st Qu.: 2.50
Median : 4.000	Median :0.000	Median : 20.00	Median : 6.00
Mean : 8.091	Mean :1.545	Mean : 36.09	Mean :15.73
3rd Qu.:10.000	3rd Qu.:2.000	3rd Qu.: 40.50	3rd Qu.:20.00
Max. :31.000	Max. :8.000	Max. :133.00	Max. :70.00

H9	H10	H11	H12
Min. : 0.000	Min. :0.000	Min. : 0.00	Min. : 0.000
1st Qu.: 0.000	1st Qu.:0.000	1st Qu.: 2.00	1st Qu.: 2.500
Median : 2.000	Median :1.000	Median : 6.00	Median : 3.000
Mean : 4.364	Mean :1.273	Mean : 9.91	Mean : 8.545
3rd Qu.: 4.000	3rd Qu.:2.000	3rd Qu.:10.00	3rd Qu.:10.500
Max. :21.000	Max. :5.000	Max. :53.00	Max. :36.000

>

For Chapter 6:

Figure AppD.1: Correspondence Analysis biplot for all Functional Categories

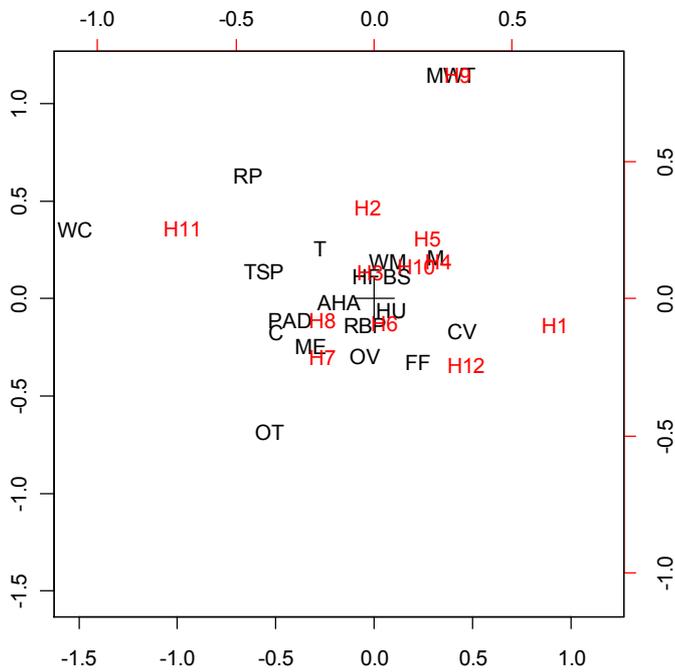


PAD - personal adornment or dress; TSP - toilet, surgical, or pharmaceutical; MWT - manufacture or working of textiles; HU - household utensils & apparatus; HF - household furniture; RP - recreational purposes; WM - weighing and measuring; WC - written communications; OT - transport; BS - buildings and services; T - tools; FF - fasteners and fittings; AHA - agriculture, horticulture, and animal husbandry; ME - military equipment; RBP - religious beliefs and practices; M - miscellaneous; O - organics; CV - ceramic vessels; OV - other vessels; C - coins.

H1-H12 = Houses 1-12

APPENDIX D: ADDITIONAL STATISTICAL DATA

Figure AppD.2: Correspondence Analysis biplot for Functional Categories, with O (organics) omitted

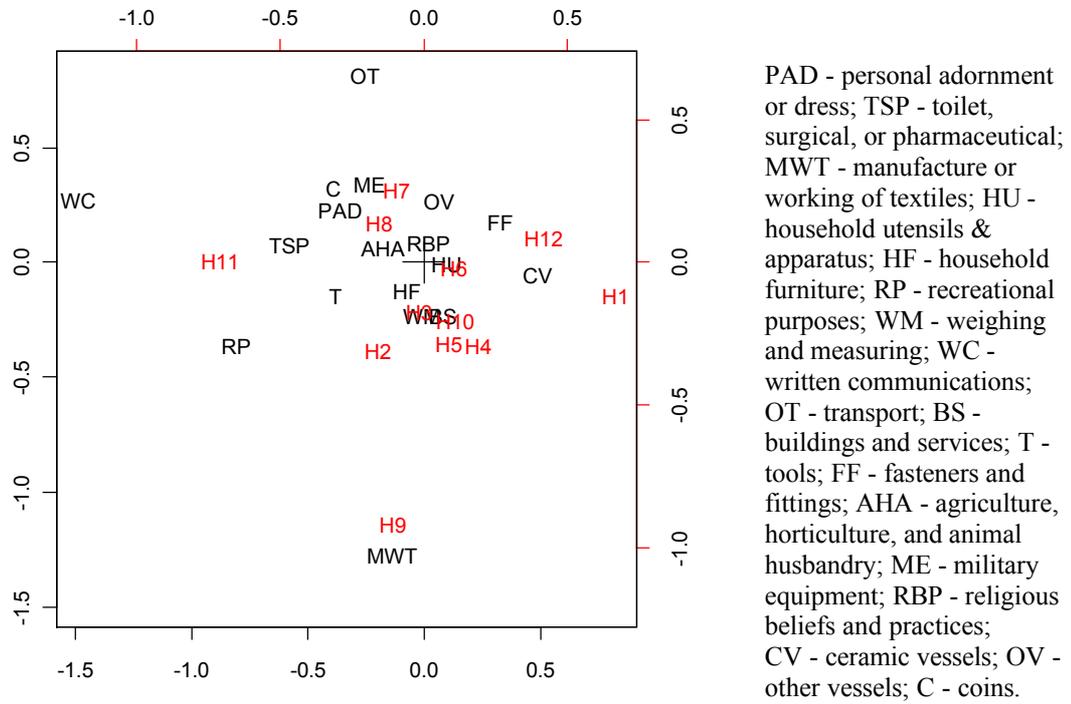


PAD - personal adornment or dress; TSP - toilet, surgical, or pharmaceutical; MWT - manufacture or working of textiles; HU - household utensils & apparatus; HF - household furniture; RP - recreational purposes; WM - weighing and measuring; WC - written communications; OT - transport; BS - buildings and services; T - tools; FF - fasteners and fittings; AHA - agriculture, horticulture, and animal husbandry; ME - military equipment; RBP - religious beliefs and practices; M - miscellaneous; CV - ceramic vessels; OV - other vessels; C - coins.

H1-H12 = Houses 1-12

APPENDIX D: ADDITIONAL STATISTICAL DATA

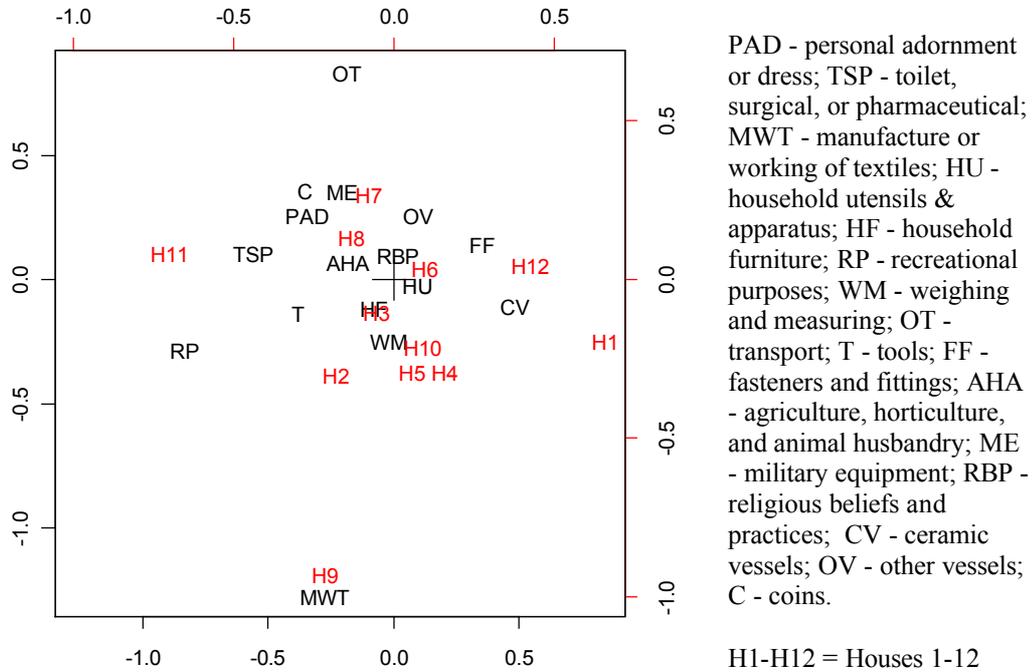
Figure AppD.3: Correspondence Analysis biplot for Functional Categories, with O (organics) and M (miscellaneous objects) omitted



H1-H12 = Houses 1-12

APPENDIX D: ADDITIONAL STATISTICAL DATA

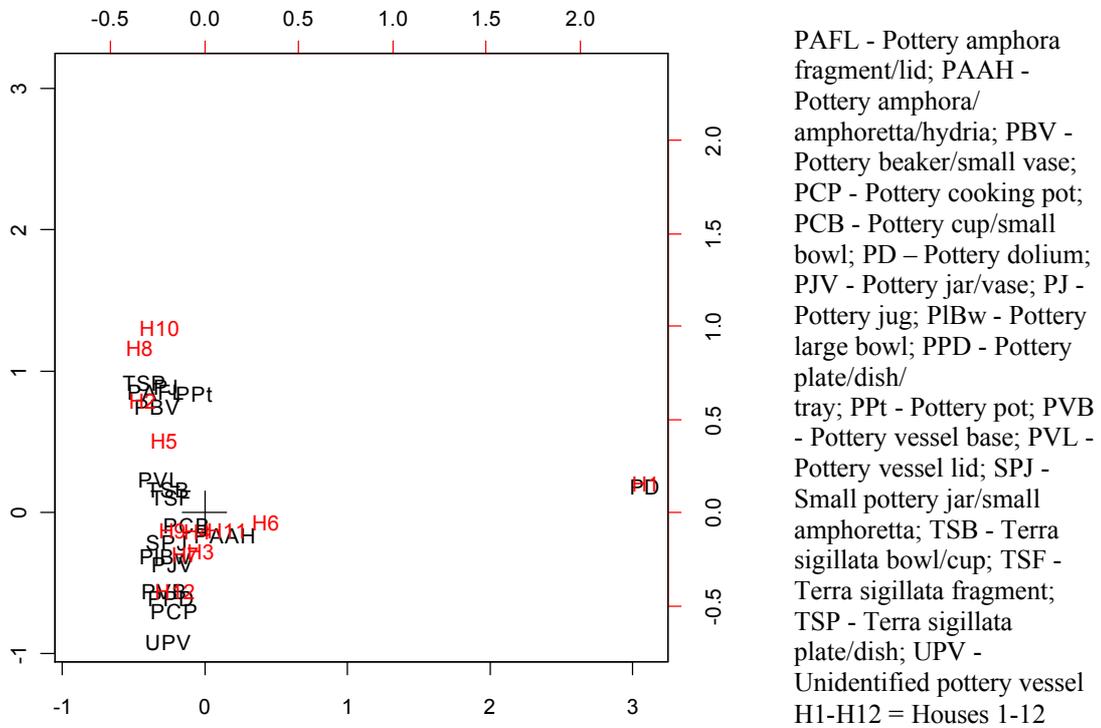
Figure AppD.4: Correspondence Analysis biplot for Functional Categories, with WC (written communications) omitted, in addition to O (organics), M (miscellaneous objects), and BS (buildings and services)



APPENDIX D: ADDITIONAL STATISTICAL DATA

For Chapter 7:

Figure AppD.5: Correspondence Analysis biplot for CV (ceramic vessel) artefact type component categories, before exclusion of PD (pottery dolium).



APPENDIX D: ADDITIONAL STATISTICAL DATA

Table AppD.1: Weighting of ceramic vessel artefact types

Ceramic Vessel Artefact Type	Total Freq. by Type	No. Houses Present in	Weighted Rank Value
Pottery amphora fragment/lid	5	4	1.67
Pottery amphora/amphoreta/hydria	328	12	328
Pottery beaker/small vase	82	9	61.5
Pottery bottle	1	1	0.08
Pottery cooking pot	4	2	0.67
Pottery cup/small bowl	32	7	18.67
Pottery dolium	35	4	11.67
Pottery jar/vase	161	10	134.17
Pottery jug	46	9	34.5
Pottery kernos	0	0	0
Pottery large bowl	25	6	12.5
Pottery pan	1	1	0.08
Pottery plastic vase	1	1	0.08
Pottery plate/dish/tray	82	7	47.83
Pottery pot	36	10	30
Pottery vessel base	26	3	6.5
Pottery vessel lid	68	7	39.67
Small pottery jar/small amphoreta	11	6	5.5
<i>terra sigillata</i> bowl/cup	19	8	12.67
<i>terra sigillata</i> fragment	5	3	1.25
<i>terra sigillata</i> plate/dish	12	4	4
Unidentified pottery vessel	2	1	0.17

APPENDIX D: ADDITIONAL STATISTICAL DATA

Table AppD.2: Weighted ranking of all ceramic vessel artefact types (from full population of twelve houses)

Weighted Rank	Ceramic Vessel Artefact Type	Weighted Value
1	Pottery amphora/amphoretta/hydria	328
2	Pottery jar/vase	134.17
3	Pottery beaker/small vase	61.5
4	Pottery plate/dish/tray	47.83
5	Pottery vessel lid	39.67
6	Pottery jug	34.5
7	Pottery pot	30
8	Pottery cup/small bowl	18.67
9	<i>terra sigillata</i> bowl/cup	12.67
10	Pottery large bowl	12.5
11	Pottery dolium	11.67
12	Pottery vessel base	6.5
13	Small pottery jar/small amphoretta	5.5
14	<i>terra sigillata</i> plate/dish	4
15	Pottery amphora fragment/lid	1.67
16	<i>terra sigillata</i> fragment	1.25
17	Pottery cooking pot	0.67
18	Unidentified pottery vessel	0.17
=19	Pottery bottle	0.08
=19	Pottery pan	0.08
=19	Pottery plastic vase	0.08

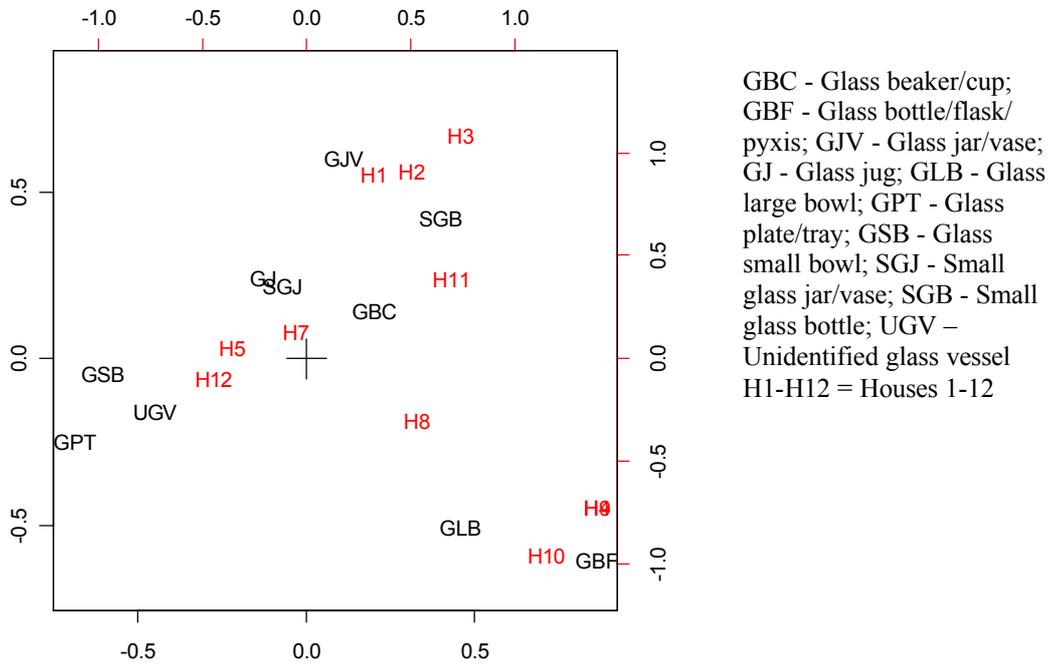
APPENDIX D: ADDITIONAL STATISTICAL DATA

Table AppD.3: Weighted ranking of ceramic vessel artefact types from upper two classes of occupation status (from population of eight houses)

Weighted Rank	Ceramic Vessel Artefact Type	Weighted Value
1	Pottery amphora/amphoretta/hydria	255
2	Pottery jar/vase	129.5
3	Pottery beaker/small vase	59.5
4	Pottery plate/dish/tray	48.13
5	Pottery jug	31.5
6	Pottery vessel lid	28.75
7	Pottery pot	17.5
8	Pottery cup/small bowl	16.25
9	<i>terra sigillata</i> bowl/cup	15.75
10	Pottery large bowl	13.75
11	Pottery vessel base	9.75
12	<i>terra sigillata</i> plate/dish	6
13	Small pottery jar/small amphoretta	2.63
14	Pottery amphora fragment/lid	2.5
15	Pottery dolium	2.25
16	<i>terra sigillata</i> fragment	1.88
17	Pottery cooking pot	1
18	Unidentified pottery vessel	0.25
=19	Pottery pan	0.13
=19	Pottery plastic vase	0.13

APPENDIX D: ADDITIONAL STATISTICAL DATA

Figure AppD.6: Correspondence Analysis for glass vessels by artefact type (House 6 omitted, n=1)



APPENDIX D: ADDITIONAL STATISTICAL DATA

Table AppD.4: Weighting of glass vessel artefact types

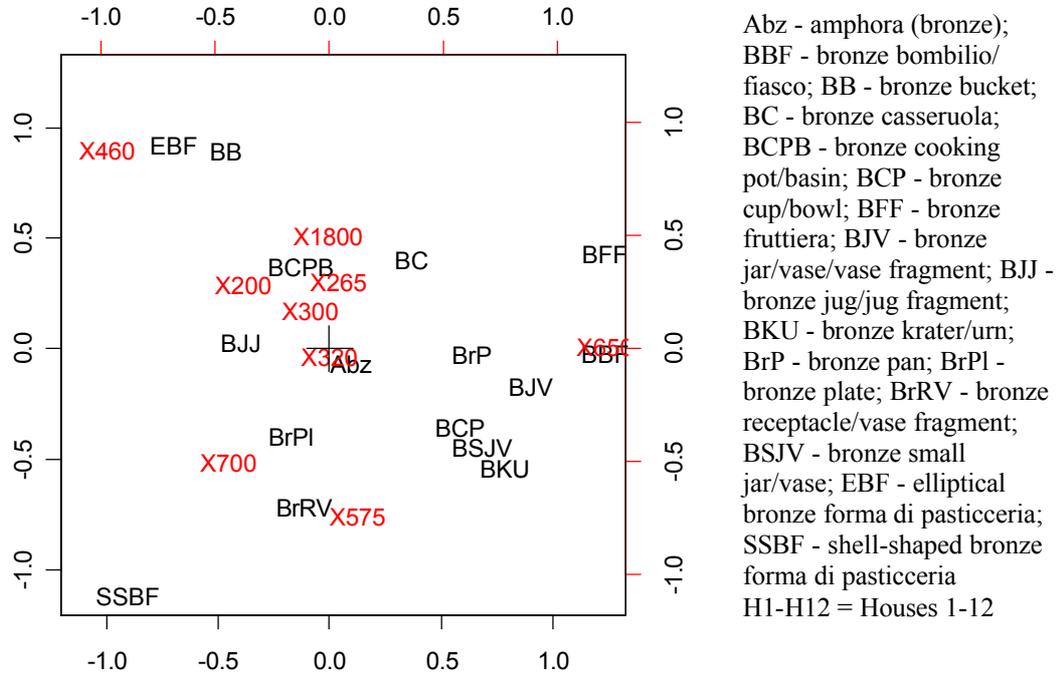
Glass Vessel Artefact Type	Total Freq by Type	No. Houses Present in	Weighted Rank Value
Unidentified glass vessel/lid/fragment	136	4	45.33
Small glass bottle	90	12	90
Glass bottle/flask/pyxis	57	8	38
Small glass jar/vase	33	7	19.25
Glass jar/vase	22	6	11
Glass small bowl	22	5	9.17
Glass plate/tray	21	3	5.25
Glass beaker/cup	20	6	10
Glass jug	4	3	1
Glass large bowl	3	2	0.5

Table AppD.5: Weighting of bronze vessel artefact types

Bronze Vessel Artefact Type	Total Freq by Type	No. Houses Present in	Weighted Rank Value
Bronze jug/jug fragment	57	7	33.25
Bronze casseruola	24	6	12
Bronze receptacle/vase fragment	24	6	12
Bronze cooking pot/basin/pot/fragment	14	7	8.17
Amphora (bronze)	12	5	5
Bronze plate	12	7	7
Bronze bucket	8	4	2.67
Bronze cup/bowl	8	4	2.67
Bronze fruttiera/fruttiera	8	3	2
Bronze krater/urn	4	2	0.67
Bronze pan	4	4	1.33
Bronze small jar/vase	4	3	1
Elliptical bronze forma di pasticceria	4	4	1.33
Bronze jar/vase/vase fragment	3	3	0.75
Bronze bombilio/fiasco	2	2	0.33
Shell-shaped bronze forma di pasticceria	2	1	0.17
Bronze lid	1	1	0.08

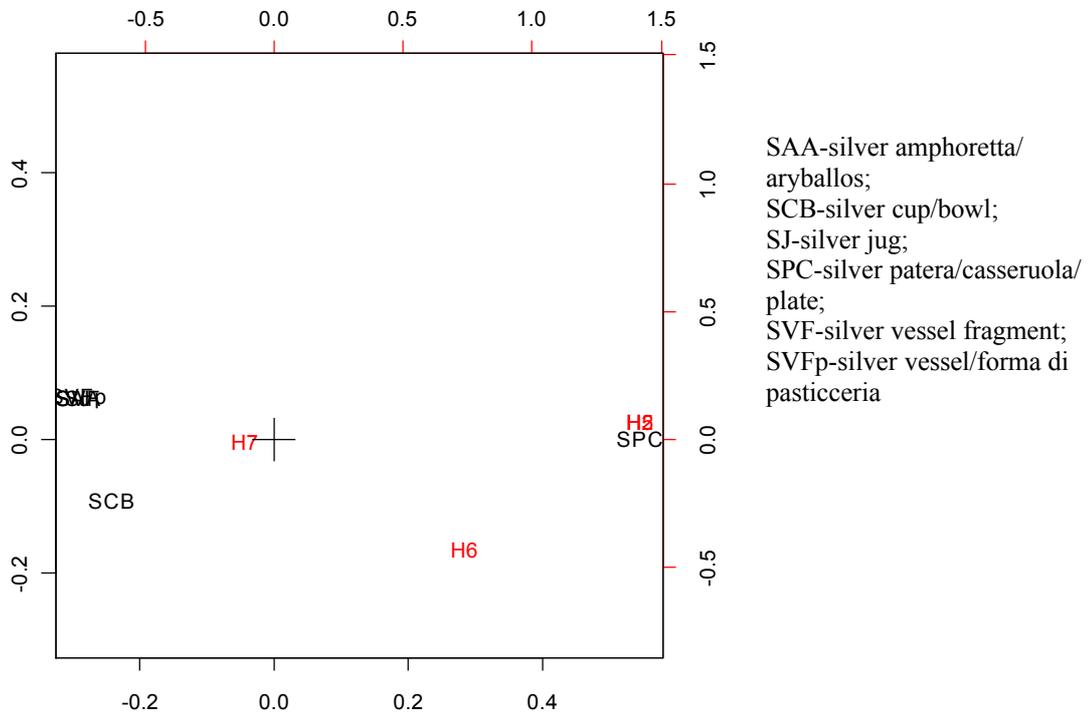
APPENDIX D: ADDITIONAL STATISTICAL DATA

Figure AppD.7: Correspondence Analysis by house area for bronze vessel artefact types, with BL (bronze lid) omitted. Houses 1, 3 and 6 all yielded no bronze vessels.



APPENDIX D: ADDITIONAL STATISTICAL DATA

Figure AppD.8: Correspondence Analysis for silver vessels by artefact type. Houses 1, 3, 4, 8, 9, 10, 11 and 12 all yielded no silver vessels.



APPENDIX D: ADDITIONAL STATISTICAL DATA

Figure AppD.9: Vessel assemblage profiles (height of chart indicates size of assemblage)

