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Behavioural Ecology and Advertising Practice

An Evolutionary Approach to Consumer Engagement within Complex Networks

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Abstract

This study takes an evolutionary perspective on consumer behaviour in an online context. Specifically, it aims to show how such an analysis can not only enhance our understanding of the contemporary online era but also suggest new avenues for advertising practice.

The theoretical approach will draw on insights from a range of disciplines including memetics, semiology and anthropology, as well as cross-disciplinary fields of study such as behavioural ecology. This is necessary given the underlying premise that human behaviour is a response to a complex mix of environmental pressures, both biological and sociocultural. (Advertising's power to engage consumers rests on its ability to harness these pressures; but for the purpose of this study it can also be seen as simply another such pressure.)

The focus on the online world is a recognition of the internet's increasing importance – in general sociocultural terms, and as reflected in advertising practice. It has also rapidly developed the hallmarks of an environment, evolving along with the entities that inhabit this virtual space, through various selection and survival mechanisms. The study will identify these mechanisms and investigate the ways in which they operate. Finally it will propose an evolutionary strategy to maximise the chance of survival for brands within this environment, based on the model of symbiotic, co-adaptive behaviour.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

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Literature Review | *Memetics, Semiotics and Neural Darwinism*

Introduction

Richard Dawkins developed the theory of memetics in his books *The Selfish Gene* and *The Extended Phenotype* (C. R. Dawkins, 1976, 1982). Dawkins proposed that memes were ideas that replicated via a process similar to genetic replication. I aim to present a refined description of memetic terminology and apply memetic theory to the study of advertising methods and online search propagation. Advertising aims to provide information and create desire for a product, motivating the consumer to purchase the product. A direct link between product (the *external stimulus*) and consumer behaviour (the *neuronal stimulus*) is made. The *external stimulus* is replicated by the psyche and stored in memory within the neuronal structure of the brain. The *external stimulus* develops the *neuronal stimulus* through comprehension and value judgement. The *neuronal stimulus* manifests as synaptic firing patterns, developing structural commonalities of thought and memory.

Dawkins highlighted two key properties of a meme. Firstly a meme replicates or proliferates from person to person via imitation. Secondly a meme resides in memory; the substrate for replication and storage is the human brain. These two areas of memetics are crucial and give rise to two, associated questions: How important is imitation as a process of conscious phenomena replication? And where is the replica stored? Attempts to grapple with these questions have resulted in the development of Dawkins' work in two distinct directions: The first direction is in regards to the interaction and transference of *external stimuli*. Various terms have been proposed for this category, including *M-Culture* (Cloak, 1975), *Merkwelt* (Von Uexküll, 1928 [1973]), *nature/culture* (Zlatev, 2009), ST *simulation theory* (Gallese & Goldman, 1998; Vogeley & Newen, 2002). I propose to call memetic phenomena external to the brain *phenomenological memetics*. This direction looks at memetic processes associated with cultural artefacts and trends outside of the brain. The second distinction I shall propose concerns the retention of memetic processes within the mind. Again, various terms have been proposed for this category, including *neurological memetics* (Aunger, 2002; Blackmore, 1999; C. R. Dawkins, 1976; Dennett, 1991, 1995), and *sociocultural memetics* (Blackmore, 1999; Botz-Bornstein, 2008b; Boyd, 2001; Brodie, 1996; C. R. Dawkins, 1982; Dennett, 1991, 1995; Distin, 2005). The category of *neuronal stimuli* has been given various names: for example, *Electric meme* (Aunger, 2002), *I-Culture* (Cloak, 1975), *Wirkwelt* (Von Uexküll, 1928 [1973]), *mind/*

matter (Zlatev, 2009), *mental phenotype* (Siefkes, 2004), TT *theory theory* (Gallese & Goldman, 1998; Vogeley & Newen, 2002). I propose to call these memetic processes within the brain *neuronal memetics*. This direction looks specifically at neuronal mechanisms of memetic transfer and storage. The categories I have proposed will help clarify a variety of terms used to distinguish internal brain development from external cultural development. This will allow us to argue for the incorporation of memetic concepts into neurological and semiological theory within the framework of *behavioural ecology* (Danchin, Giraldeau, & Cézilly, 2008).

Memetics | *Consciousness developed via blind cultural imitation*

Memetics is defined as a process of replication working within a framework of natural selection. The meme represents the equivalent of a gene. A meme is an information unit of indeterminate length. The meme fitness is determined by its proliferation within a culture. The three properties of selection fitness are '*Fecundity* (ability to reproduce), *Fidelity* (ability to remain the same) *and Longevity* (ability to survive)' (Blackmore, 1999). Speaking at the symposium of memetics and documented in a report by David Hales (1998), Hans-Cees Speel announced, 'We aim to build memetics into a scientific community and as such the emphasis on methodology is correct at this stage'. However Mario Vaneechoutte warned, 'Science is currently in a state of reduction and specialisation. Here an attempt is being made to bring the parts back together again to explain and understand social phenomena … However, often we are unaware of the terminology used by other disciplines … The danger is reaching a point where we see everything as a meme'. The main arguments against memetics are that it is too broad in its focus, and it is a repetition of work done in anthropology, semiology and neurology (Aunger, 1999, 2002; Bloch, 2000; Edmonds, 2002, 2005; Gil-White, 2008; Lissack, 2004; Lynch, 1998b; Sonesson, 2009). Ultimately memetics aims to develop an understanding of emergent societal conscious phenomena via mindless environmental stimuli replication. To study the value of memetic theory, we must first find areas in which memetic trend proliferation can be of use.

Dawkins' decision to employ the term *memetic* – a descriptive Latin appropriation – rather than the more traditional *mimetic* reflects his aim of relating and combining both imitation and memory. This choice, along with the association with a process of faithful replication, may have drawn criticism; however, this does not make the fundamental idea of memetics redundant. Refinement in terminology may well be appropriate but our focus is to discern how we develop culture (*semiotics*) or how culture develops us (*memetics*). This process is likely to involve both conscious selection of traits and unconscious predetermined trait elements. The link between memetic and genetic replication may be questionable if we look for strict relationships. However if an entity develops higher order consciousness because of environmental selection pressure, the processes of environmental manipulation could only have evolved on top of genetic evolution. To state otherwise is to suggest a conscious mind without an unconscious base, or worse a mind without a physical manifestation in which to develop. The mind has developed to defend against the environment, and cooperation is a genetically useful trait of defence, so culture is likely to represent the commonality of interests alongside a healthy capacity for norm violation when appropriate. We react to cultural situations within these behavioural outliers, and this largely resembles genetic diversity at a cultural level. Genetics is not the code of culture; however links between survival instincts and culture are evident.

Neural Darwinism | *Consciousness via selection and retention of external phenomena*

Neuronal group selection or *neural Darwinism* was developed by Gerald Edelman in his book *Neural Darwinism* (G M Edelman, 1989). Building upon selectionist theory (Ernst, 1982; Gottlieb, 1979), Edelman describes three essential processes in the development of higher order consciousness – defined by Edelman & Tononi as 'the ability to be conscious of being conscious' (Gerald M Edelman & Tononi, 2001: 208). These processes are identified as *Developmental Selection*, *Experiential Selection* and *Reentry*. *Developmental selection* occurs in pre- and postnatal development and continues throughout life as we discover new phenomena. *Experiential Selection* builds on developmental learning to solidify the knowledge through experience. *Reentry* is the repetition and consolidation of a learnt mental process, which then develops to form both mental and cultural norms. The main difference between neural Darwinism and memetics is that neural Darwinism proposes the development of consciousness through a process of value-

based selection while Memetics proposes conscious development through a process of blind selection. Robert Aunger suggests in his book *The Electric Meme* (2002) that memes are most likely to be found as a motivation on neuronal firing patterns, the emergence of which forms brain development and habitual thought. This process evolved via genetic selection leading to the development of connectivity between stimuli phenotypes, such as the *sensory organs*, and neuronal information processing phenotypes such as the *cerebral cortex* or the *neocortex* (Bolte Taylor, 2009; Carlson, 2009; Fernyhough, 2008; Sporns, 2011; Squire & Kandel, 2009). Edelman views brain development as requiring *developmental*, *experiential* and *reentry* selection rather than a theory of blind information replication. As Blute describes: 'selection processes are selection processes and the same general principles should apply whether realized biologically (gene-based evolution by natural selection), socioculturally (meme or social learning-based sociocultural evolution by sociocultural selection), or psychologically (neural-based learning by reinforcement and punishment)' (2005: 2). How does neuronal group development occur via phenomenological selection? It is likely that both views have their own merit. Beer points out, 'Free will or determinism may simply exist as different interpretations of the same phenomena in different theoretical contexts' (Beer, 1999). Similarly I propose that these theories should be considered complementary rather than mutually exclusive. They operate together in combination – memetics working as an unconscious cultural artefact and neural Darwinism as the conscious selection of unconscious artefacts.

Semiotics | *Consciousness via cyclical interaction with external phenomena*

While neurology looks at the inner workings of brain function, semiology develops the phenomenology of sign formation. Charles Sanders Peirce advanced the fields of phenomenology and semiology over his life in a collection of essays (Peirce, 1867-1893, 1893-1913), paralleling Ferdinand de Saussure's development of the linguistic field of semiotics (de Saussure, 1857-1913). I have chosen Peirce to inform this study, as Peirce approached phenomenology from an environmental context, developing a triadic model that sought to describe the evolution of sign meaning. This aggregation of sign information was extended by Roland Barthes (1957). Barthes' study of the construction of myth by means of *multiple sign stimuli* develops our knowledge of a given environment alongside previously embedded cultural mythology. In this way, our conscious understanding of the present can be manipulated by prior and

externally originating interpretations and representation of the present. Again we come up against the internal–external adaption of primary phenomena. In semiotic terms, these binary opposite forms of consciousness are the neuronal *Biosemiotic* (Barbieri, 2008; Bax & Van Heusden, 2004; Bruni, 2008; Champagne & Barbieri, 2009; Nöth, 2008, 1994; Rothschild, 1986; Van Heusden, 2004; Wheeler, 2006; Wildgen, 2004; Witzany, 2008) and the cultural *Anthroposemiotic* (Brier, 2009; Sonesson, 2009). They derive from phenomenological perception, *Firstness (Object)*, interaction with phenomena, *Secondness (Representamen)* and phenomenological reasoning, *Thirdness (Interpretant)*. From a semiotic standpoint, memetics is the development of consciousness via a cyclical interaction with external phenomena. However, semiology identifies both processes of sign evolution as semiosis.

Neuronal Memetics | *Memetic effects within the mind*

In evolutionary theory, the organism does not evolve separate from its environment. A more apt description is to say that *an organism is evolved*. Dawkins notes that the environmental pressure selects out individuals leaving the survivors to replicate. In this respect the environment resembles a sculptor's chisel, augmenting an organism's form and function (1976). If culture developed on top of an evolutionary arms race then the *culture of an organism is evolved* by the cultural environment. The environmental sculptor's chisel would ultimately apply both to cultural artefacts and organisms (1982). Dawkins argues that the genes may seem to evolve *selfishly* if you focus on the present structure of the gene; however, if you focus on the developmental process, you discover all genes do is replicate without a focused intent; they *are evolved* and so are not *selfish* in any way. It is the environment that governs who survives to replicate in future generations. This suffices when discussing the mindless replication of DNA, but the human mind can predict outcomes and, most importantly, choose. Edelman suggests that human choice is contradictory to the theory of memetics and believes that the consciousness of an individual as well as a culture is a process of continuous reappropriation and appraisal (1989, 1990). Edelman believes there are links between evolutionary development and our conscious mind but suggests that most of our thoughts have been developed from early childhood through developmental learning and imitation and judgement. Our language, religion and opinions are inherited through developmental commonalities and become habitual through repetition. Arguments such as these are of importance when trying to clarify the exact

process or terminology but they do not alter the main focus of the debate. The conversation still suggests that meme/sign structures, like gene structures, proliferate if useful to the process of proliferation. Genes *are evolved* and form organisms, memes *are evolved* and form cultural norms and signs *are evolved* and form cultural myth. Ultimately the environment is the arbiter of evolutionary and so cultural descent, whichever terminology we choose to use.

Neuronal memetics has been the focus of Robert Aunger's enquiry (2002). Aunger acknowledges that work in neuroscience is needed to test if a direct connection between input stimuli and regulated or recurrent neuronal firing patterns exists. Regardless, his proposal has been contentious. As Lynch explains, 'Science has achieved no direct observation of the neural encoding of ideas … even if we knew in principle how to express the ideas of a single person in terms of neurons, synapses, etc., the description would likely be prohibitively complex' (1998b: 6). There are similar complexities when trying to qualify the success of stimulus such as an advertising campaign. Edward Bernays deployed psychoanalytic methodology to motivate consumer engagement, using emotional cues to form the basis for brand loyalty (Bernays, 2004; 1956). Bernays was successful at augmenting consumer behaviour but he could not truly measure the intricate processes involved in behavioural change. As Dirlam describes, 'Psychology has no true unit of analysis for spontaneous and complex human behavior' (2005). However, areas of psychology such as Maslow's hierarchy of needs (Maslow, 1943, 1954), supernormal stimuli (Barrett, 2010) or conflicts related to manifestations of self-identity (Claxton, 1994; Dennett, 1991, 1995; Egege, 2008; Fernyhough, 2008; Freud, 1923; Greenfield, 2002, 2009; Jung, 1957, 1964; Sanchez & Vieira, 2007; Wagner, 2003) are relevant in highlighting feedback interactions between consumer and brand.

A consumer's choice often relates to their social group. These groups are now enriched through the use of social media, and the choices and opinions made online can be ranked by search racking functions. At a sociocultural level this could be considered as a process of group selection. Carr explains that the grouping of search trends is quantitative rather than user specific thus the search value is guiding by the relevance to a trend rather than individual choice (2011). Memetic analysis may have a direct application to search term ranking, as explicit search terms evolve and coalesce because of a mutually beneficial boost within the search environment. What is more ambiguous at this stage is a direct recordable connection and feedback between the artificial search provider and the conscious decision to search in a chosen/given direction (Carr, 2011). As Conte describes, 'Memetic phenomena can be observed in artificial societies

with learning and evolutionary agents, as well as with intelligent agents. One auspicious development is that learning and intelligent agents will merge to a greater extent than has been the case so far' (2000: 90). The problem with artificial search functionality as it stands is the difficulty of discerning the length and flow of conscious units of thought or *memes*, as Reader & Laland observe: 'To argue that largely reconstructed memes are not memes would require an arbitrary and unenforceable rule to be employed regarding just how much reconstruction is allowed before acquired information qualifies as a meme … to eliminate them on arbitrary grounds at this early stage in the science of memetics risks eliminating a large number, maybe even the majority, of interesting cases of social transmission that may benefit from memetic analysis' (1998). This is not to say artificial search engines need to discern thought at this stage but the ability to qualify groups of thought/search clusters, or 'memeplexes' (Speel, 1995) would lay the connective foundations between consumer and search provider.

In contrast to Edelan's three foci of neuronal cluster development noted above, Bandura posits four essential areas of observational learning or imitation: *attention, retention, reproduction* and *motivation* (1977). Castro & Toro present a third variation: 'To discover and to learn the behaviour, to evaluate behaviour as good or bad, to reject or to incorporate it into the behavioural repertory' (Castro & Toro, 2002). Though all of these researchers use differing terminology, a clear distinction between processes is evident. Ultimately, as Conte points out, 'no satisfactory model of imitation has been worked out so far, although developmental psychologists and ethologists have long been trying to define and operationalize it' (2000: 95-96).The aim is to establish a procedure for the transfer and referencing of input stimuli. Links between the mirror neuronal acts of *doing* in relation to *thinking about doing* (Gallese, Fadiga, Fogassi, & Rizzolatti, 1996; Stamenov & Gallese, 2002; Wallace, 2007) are at the centre of the process of thought contagion (Lynch, 1998a). Mirror neuronal activity goes beyond experiencing a phenomenon to empathy regarding a phenomenon. For example: drinking a glass of water, and thinking about drinking a glass of water when thirsty. The empathic motivation to partake in an experienced behaviour forms social bonds (Senkfor, 2002; Wohlschläger & Bekkering, 2002). Mirror neuronal activity builds upon imitative learning though memory. When a human mimics an action, the human *first person* has to put themselves in the mind of the mimicked human *second person*. The *first person* cannot truly mind-read the *second person*; the imitation is a construct of the *first person's* prediction of the *second person's* point of view, so developing an illusory *third person*. This *third person* prediction informs Machiavellian tactic creation, each human predicting the intention of the other (Gallese & Goldman, 1998; Vogeley &

Newen, 2002). These interactions can be selfish or altruistic dependent on the payoff to the individuals involved (Axelrod, 1984; Dugatkin, 2006; G. R. Price, 1970). The behaviours become habitual via *developmental selection* payoffs and can be augmented by advertising through the psychological hierarchy of needs (Maslow, 1954). As Price & Shaw describe, 'objectified individual acts are replicable and can become typified and habitual, thereby becoming practices, themselves reproducible, and through typified reciprocal interaction, institutions can emerge with roles that serve their own propagation' (1998).

Dawkins defined the gene as the *first replicator* and the meme as the *second replicator*, to highlight the similarities between genetic and memetic replication (1976). The meme is the second replicator as it builds upon genetic replication. A meme can be viewed as a co-adaptive or maladaptive parasite, dependent on the mind of a genetic entity. However it is the selective motivation behind an idea, or a meme's replicative fitness, that enables it to proliferate. For our purposes, the motivation is advertising practice. A *meme* or *idea* is likely to have originated from the processes used by a creative team. However the creative process is more likely to be a process of idea recombination and would be better identified as a hub for the proliferation of pre-existing memes in combination with the rare inclusion of truly original creativity. Brands try to identify and create trends in order to attach trend values to a product. As Holt points out, *mind-share branding, emotional branding* and now *viral branding* are popular approaches to brand advertising strategy but the strategy itself is also a practice that is replicated due to popularity and trend proliferation (2004: 13). Marsden identifies six broad areas of behavioural contagion, however we will focus on three of the most relevant to advertising practice: 'rule violation contagions, consumer behaviour contagions, and financial contagions' (1998). We express thought outwardly using behaviour and in doing so allow others to interact with that outward projection of our persona. Shennan notes, 'all cultures will have co-ordination problems akin to deciding which side of the road to drive: think, for example, of customs about when and where to meet after separating to forage. All agents have some interest in co-ordination' (2002). This behavioural group thinking proliferates not only throughout the cultural environment but can be documented and iconized over generational periods of time. As Sterelny highlights, 'Humans often succeed in making good decisions in informationally challenging environments. Often this capacity is culturally mediated: adaptive action depends on a multi-generational accumulation of knowledge and skill' (2006: 149).

If memetics is to help shape the development of planning and advertising strategy it has to provide a useful application to the field. To leave memetics as the replication of imitated units of thought precludes a useful development of the theory's potential. Replication via imitation does not cover all processes of developmental selection. And even though Dawkins named the second replicator a *meme* to incorporate both imitation and memory, the process of memory retention is not well defined. A noted, Edelman's view of conscious development looks from the standpoint of the selective conscious entity, while Dawkins' view is of blind selection developing an entity's consciousness. By looking at the problem from the point of view of both the observer and the observed, we may gain a fuller picture of the whole. As Marsden writes, 'memetics involves the application of the selectionist paradigm to the sociocultural world. However, unlike Lynch and Gatherer, I maintain that the appropriate unit of analysis in this application should be neither the "thought" nor the "behaviour", but rather the strategy. A meme conceptualised as a culturally transmitted behavioural strategy has a number of advantages' (1999). This transmission strategy may well be the most useful area of application for memetic study, particularly in the study of cultural evolution. Tarde notes, 'self-propagation and not self-organisation is the prime demand of the social as well as of the vital thing. Organisation is but the means of which propagation, of which generative or imitative imitation, is the end' (1903-1962: 74). If we want to understand the society to whom we are advertising, it is advantageous to understand its driving component. 'What is society? I have answered: Society is imitation' (Tarde, 1903-1962: 74).

Phenomenological Memetics | *Memetic effects within culture*

Culture reflects human need. If an element of culture is no longer relevant it is unlikely to survive. The survival property of a cultural element may be aesthetic or in its practical application. As the human mind is built upon a genetic framework, cultural elements scaffold the architecture of mental appropriation. We may have problems when trying to define the aesthetic fitness of a cultural element in relation to an individual's opinion; however aesthetic commonality can be identified within the aggregate of individual opinion. Zheng suggests that cultural commonalities affect an individual's opinion as well as strengthening a cultural norm, and this reflective process perpetuates cultural commonality over individual creativity; but while this at first seems like an oppression of creativity, it provides a cultural

plateau that creative innovation can exploit, thus redefining the cultural norm (2008). This process is often referred to as group selection. With the development of technology we are now able to track social trends in real time. Tracking allows us to better understand how trends emerge and refine useful methods of sociocultural tracking. With the advent of online search engines and social media we have seen an expansion in trend proliferation purely because of modern network and communication technologies. How much of this trend proliferation is conscious or unconscious selection may help develop a memetic assessment of advertising practice within social and search media.

When focusing on the external application of memetics in relation to advertising, we need to make note of semiotic practice. Our internal consciousness is inextricably linked to external stimuli. As Peirce describes, 'it is the instincts, the sentiments that make the substance of the soul. Cognition is only its surface, its locus of contact with what is external to it' (1893-1913: 31). This connection between internal and external is often developed by humans linguistically. Rothschild notes that 'facts and processes in the world are communicated in sentences, expressing judgments' (1986: 83). These judgments connect indexes of relation – as Peirce describes 'there is a triple connection of sign … relation of reason between the sign and the thing signified; sign as icon. Direct physical connection; sign as index. And a relation which consists in the fact that the mind associates the sign with its object: sign as name' (1991: 183). The interrelated nature of internal gene and external stimuli asks us to question which part of this duality, or 'Dual Inheritance Theory' (Shennan, 2002: 19), is the driving force behind conscious reality. Wheeler proposes, 'culture is the new symbiosis of self-conscious organism and environment which describes human being: the consciousness is part of the reality, and the reality is part of the consciousness' (2006: 124). This level of conscious referencing is not static and develops levels of interconnected meaning (Van den Hoven, 2008). Barthes writes, 'it can be seen that in myth there are two semiological systems, one of which is staggered in relation to the other: a linguistic system, the language (or the modes of representation which are assimilated to it) … and myth itself … is a second language, in which one speaks about the first' (1957: 138). This developmental construction of the world requires a great deal of mental processing. If the process of thought is to have evolutionary fitness it would need to be a useful survival tool. Both Darwin and Peirce recognized the useful properties of conscious development – Peirce states 'that animal would have an immense advantage in the struggle for life whose mechanical conceptions did not break down in a novel situation (such as development must bring about), there would be a constant selection in favor of more and more correct ideas of these matters' (1867-1893: 181).

Our modern or *neomammalian* brain has been constructed on top of the *paleomammalian* and *reptilian* brain structures. These states of the brain are referred to by Kull as '*Vegetative*, which is capable of recognition - iconic relations; *Animal*, capable for association - indexical relations; *Cultural*, capable for combination - symbolic relations' (2009: 15). This makes the idea of conscious semiotic selection hard to tackle as large areas of conscious thought emerge from unconscious beginnings. This is where we may find memetic development of conscious thought more relevant. As Mayer suggests, 'the structure of the human brain and its functional differentiation brings about the coexistence of older and more recent sign systems' (1994: 104). We develop a culture-based sign system upon a biological sign system. From this we might view sign system development from an evolutionary, bottom-up *memetic* perspective, or a culturally developed, top-down *semiotic* perspective. According to Dawkins, 'examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches' (1976: 192). However according to Koch *Semiogenesis* covers 'animal communication, computer systems, oral language, written language, theater, film, gestural systems, philosophy or religion as languages, the language of the drums and flags, pheromones or logic as sign systems, DNA as genetic "code", painting etc' (1982). Effectively we are describing the same process of conscious development from two differing disciplines. So let us now gain knowledge of memetics through the lens of semiology. According to Figge there are two main semiotic principles: firstly '*The subsequent processing of energy or matter by an organism results in a particular inner state*'; and secondly the '*organs are used to manifest inner states that are otherwise imperceptible*' (1994: 26). This informs us of the physical manifestation of semiotic process; however, the characteristics of semiosis as described by Kull may include 'memory, self-replication, recognition, agency, inside-outside distinction, codes, semiotic controls, etc' (Kull, 2009: 9). All of these topics are also covered in memetic theory; however, semiology focuses on sign representation within culture (Botz-Bornstein, 2008a; Deely, 2009; Hoffmeyer, 2010; Moeller, 2007; Petrilli, 2008c; Terenzi, 2008). As Ipsen suggests, 'in terms of sign systems, all exclusively focus on the sign carrier … around which everything else is arranged: the social impacts of the media, ideological issues, and so forth' (2004: 37-38).

The final outcome of relevant meaning is the storage and replication of memory. Memory provides a basis for judgment and helps interpret and consolidate meaning. This consolidation can be found within personal memory as well as cultural memory in the form of cultural tradition. Delius writes 'cultural traits, as behavioural items acquired through social learning, are therefore also represented as particular contents in the memory of the individual bearers of culture' (1992: 81). As noted earlier, our perceptual

singularity of the present is pervaded with mental relationships of past experience. We form associations with past experience and make predictions of possible future outcomes. These two abilities allow us to build an illusory remembered present myth that is often practical but can also be delusional. As Strawson explains, 'it involves other past (and hence non-actual) perceptions, of the *same* object being somehow alive in the present perception' (1970). This re-presentation of the present is stored in both memory and in cultural artefact (Merrell, 1997; Petrilli, 2008a, 2008b; Simpkins, 1994; Sorensen, 2009). But is cultural memory really governed by the individual or does cultural memory develop separately from the individual? In semiotic terms, it is the *Interpretant* of the *Representamen* that is in control of cultural meaning; however if the *Representamen* develops independently of the *Interpretant* the process could be identified as memetic. The whole view of interpretation and so memory may be better described as a fluid process. Allan suggests, 'metarepresentation, "thinking about thinking" is taken to be something that has to develop or be constructed by complication of a Piagetian (*a dynamic system of continuous cognitive change, developed by Jean Piaget*) kind of cognition that makes representations' (1987: Piagetian discription italicised). If our interpretation of our environment is in a constant state of emergence then as Allott states 'perhaps we should seek to construct a theory of signification (the extraction of meaning) rather than a theory of signs' (1994: 267). Our more immediate connection to our environment is translated into sign meaning. This sign meaning is a static representation we can then recommit to the environment at a later time. Schnelle writes, 'these neurobiological pathways provide the framework for the semantics of visual and manipulatory situation-determined language. Semantics proper consists of the relation of pathways for language understanding and speech with the visual pathways' (1994: 347). This is a process of sign representation rather than the immediate reflective nature of the phenomenological firstness (Tanaka-Ishii, 2010).

The connection and abstraction of our environment is a personal one that we communicate to others. According to Aunger (2000) and Conte (2000) the process of transmission from sender to receiver can be considered memetic. The sender and receiver of messages are able to manipulate each other's meaning. This imperfection in memetic replication is called by Aunger *information leakage* (2000), while Delius uses the term *meme mutation* (Delius, 1992) and Hofstadter labels it *conceptual slippage* (1995). Terminology notwithstanding, this phenomenon is plausible considering both sender and receiver have differing life experiences and opinions, as Lynch describes: 'An observer just selectively lumps these proliferated ideas along with their original(s) into a set, using an abstract inclusion criterion' (1998b: 6).

Humans judge the relevant information in relation to past information and their personal values. In this way we can form social groups that share similar opinions, or solidify prior social bonds in a community, as Meyer describes: 'The theory of evolution seems to be particularly suited to such an enterprise because it emphasizes the contribution of any given morphological or behavioral trait to the survival of the living system' (1994: 103). This morphology of behaviours does not stop at the biological level. Our tendency to consolidate ideas into related structures of meaning allows efficient transfer between individuals. Another expression of structural replication efficiency is of an industrial nature, as noted by Sterelny: 'artefacts (and skills) were often inputs to template copying procedures and in which successful artefacts would be copied more often in virtue of that success' (2006: 156).

The usefulness of a cultural artefact or brand can enhance its replicative properties, but this is not always the case. If a brand forms a loyal consumer base then the consumers can add to the brand's value through their history and attachment to it, as Siefkes writes: 'Species and environment develop in interaction. Thus one speaks of co-evolution rather than evolution, the paradigm being *cooperation* rather than aggression or adaptation' (2004: 72). Brand loyalty is often developed though such reciprocity of interaction with the consumer, with reward schemes and brand appreciation ensuring continued interaction between brand and individual. Similar mechanisms of reciprocal, complementary negotiation are observable even between children, as Trevarthen highlights: 'Reciprocal imitation permits negotiation of play themes and leadership in the creation of games' (1994: 237). Ultimately we imitate behavioural trades as an efficient way to consolidate social bonds and set up cultural and linguistic formulas for the effective transfer of ideas. In Allott's words, 'one human and another … share similar behavioral organization, perceptual organization, language organization, ultimately neural organization. The meaning of "sign" then has to be deepened to recognize it as the product of a complex shared structure' (1994: 267). Delius describes this structure as 'a particular pattern of activated/inactivated synapses from the associative networks of one brain to another' (1992: 82).

Meyer views thinking in evolutionary terms and suggests behavior would enhance evolutionary success (1994: 106). This opinion is echoed by Van Heuseden, who writes 'adaptations such as the growth of the human neo-cortex to accommodate complex linguistic and logical patterns, for instance, probably did not change the basic make-up, but elaborated upon it' (2009: 124). The neo-cortex finds meaning by referencing patterns with one another to form 'behavioral patterns' (Anati, 1994: 389). This is a

natural edifice on which 'culture is erected' (Van Heusden, 2004: 4). This link between *neuronal* brain development and *phenomenological* cultural meaning coalesces as a 'code-duality'(Brier, 2009: 41) or, as Siefkes explains, the '"habits" and "habitus" of a person, thus identifying genotype and phenotype' (2004: 73). In this way memory is not explained as a solidified filing system, but rather the reconstitution of habitual synaptic firing patterns. This reconstitution accounts for memory augmentation and slippage (LeDoux, 1998; Sporns, 2011; Squire & Kandel, 2009). Van Heusden describes this process as the 'four stages in the evolution of semiosis, which we termed episodic, iconic, symbolic and indexical' (2004: 25). For Taborsky, semiosis in relation to memory augmentation and slippage 'evolved its capacities for both the stability of functional integration and the flexibility of diversification' (2004: 66). For Delius, meme replication is the synaptic motivator of 'neurostructural modifications' (1992: 84). Significantly, the brain reconfigures its understanding of a norm by being both aware of the 'recognized pattern and something recognized in terms of the pattern, yet different from it' (Van Heusden, 2004: 9). This memory pattern augmentation reinforces the original memory while changing it slightly. In this way the memory *is evolved* by the input stimuli, strengthening its fitness as a useful pattern to be acknowledged by the conscious mind.

Donald suggests semiosis started as a presemiotic primordial soup serving as a rich source of potential iconic signs (1993) and 'mimesis is the basis of situation-independent learning … without actually running any risks' (Donald, 1991: 173). Both statements indicate the need for a certain level of prior semiotic involvement with the environment or a preexisting semiotic propensity of mind. In Darwinian term this cannot be the case as the semiotic mind has first to *be evolved* rather than preordained. This is not to say biosemiology is incorrect; rather, as Allott acknowledges, 'the confusion about what constitutes a sign makes one wonder whether there is something fundamentally wrong. Is the whole idea of the atomic sign a mistake? Are not "signs" only meaningful in the context of the total organization of the individual's "knowledge-structure" and of the total relevant environment as perceived by the individual' (1994: 265). This ambiguity lies at the heart of the debate concerning memetics and semiotics. Semiology may profit from a more biological approach, or as Aunger describes, does memetics 'merely coat this standard endeavor in more explicitly evolutionary garb'? (2000: 6). In the end memetics looks at the evolution of culture via the mindless replication of ideas while semiology looks at the evolution of culture via the significance of ideas. As Kull writes, 'the problem is whether it is copying or translating what takes place in the biological realm? And is there a real difference between copying and translating? Could not these

be simply small differences in using of the terms in biology and humanities?' (2000: 102). Whether in relation to brain function, cultural phenomena or advertising trends, all of them gain relevance through meaning. As Bateson proposes, meaning is the pattern that connects (1980).

Memetics is a process of knowledge acquisition and transfer that develops without direct conscious selection and semiosis is a process of knowledge acquisition and transfer that develops due to directed conscious selection in accordance with sign and language acquisition. A brand's logo allows a consumer to identify and connect with a brand through a process of semiotic knowledge acquisition. The brand is identified by a process of semiosis as the brand logo is a physical sign and the brand often associates itself with semiotic lifestyle and cultural indicators. If a consumer identifies and engages with a brand the consumer may wish to further publicise the brand amongst friends, so the brand begins to become a trending topic. The topic proliferation is a memetic process because the information proliferates without conscious intent. The individuals transferring the information are conscious but the information is not. The more the information is transmitted, the more likely it is to mutate away from the control of the originator. The information becomes part of the cultural information environment and is now subject to environmental selection pressure rather than direct conscious selection. The argument may arise from the semiotic perspective that even cultural morphology is developed via semiosis. I do not dispute the validity of this opinion; however I believe memetics offers a complementary view of knowledge acquisition and transfer to semiotics, and is particularly appropriate to this debate because of its relation to Darwinian evolution.

Memetics in Advertising in the Online Era | *Memetic advertising theory and analysis*

The preceding sections of this chapter indicate the broad theoretical and conceptual dimensions that frame and inform my study. Throughout what follows I will refer back to these ideas and debates as the touchstones for my analysis. But, as should be evident, their potential scope and application is vast. Indeed, memetic theory has already been used to complement historical studies of culture (Shennan, 2002) and for contemporary analysis of corporations (I. Price & Shaw, 1998). As noted at the outset, my field of interest and the aim of this work is to identify how memetic theory may help us understand the

growth of social media interaction. Three areas of social media will be used to highlight promising areas of investigation. Chapter One will look at online search environments and analysis feedback. Chapter Two examines the trends in social media for communication and sociocultural information cascades and plateaus. And Chapter Three considers sociocultural clustering and immunisation. Advertising will be identified in terms of social awareness and subsequent transfer. More traditional methods of advertising and branding are likely to adapt or enhance social transfer; however we will focus on social media outcomes.

In 1989 Tim Berners-Lee invented the process of storing, accessing and searching documents we now call the World Wide Web (Gillies & Cailliau, 2000). Interestingly, the process of linking collections of data had previously been discussed by Vannevar Bush, who posited a machine he called the Memex (Bush, 1945). This machine 'mirrors the cognitive processes of humans by leaving "trails of association" throughout document collections' (Langville & Meyer, 2006: 3). The word Memex is itself noteworthy, being Bush's portmanteau of *memory* and *index* in the same way Dawkins would later combine *memory* and *imitation*. The use of the word *index* also provides the identification of the *indexical* value of the *memory* that links back to the memory's semiotic properties. Furthermore, Bush made a clear link between cognitive and mechanical processes of indexical mirroring and storage. These cognitive and mechanical processes may differ, however there are strong similarities. Earlier innovations such as Johann Gutenberg's printing press, developed in 1450, helped proliferate stored knowledge. Libraries serve as accessible repositories of knowledge. The rise of physical data storage on the internet extends this transference of cognitive *mind* to *analogue/digital* format, because of its useful application in reinforcing knowledge traditions and social norms. Culture can then develop at both an accelerated pace and a reduced cost.

A variety of search models are used by most internet search engines: for example, the *Boolean* search, for the presence of key words in a document; the *Vector Space* model, which searches for related key words such as 'car' and 'automobile'; and the *Probabilistic* model, which ranks the probable relevance between documents. The *Meta-search* model is a combination of search models that collates passed search data alongside Meta content such as key words and link infrastructure. Langville & Meyer identify these models to allow us to understand the processes of content selection and indexing (2006). These models qualify query words as present, related and relevant. This diagnostic approach has both indexical and relevance diversification qualities. As with slang modification in language, the indexical identity of a

word can be augmented by relative association with others. In a continuation of this process, sentence structure and meaning can further augment a search query. Pariser reminds us that search engines look for search query relevance without conscious deduction, and companies can manipulate search query relevance to drive queries to their site (2011). The system of page ranking is vital to a company's success, so purchasing AdWords becomes an element of a company's investment strategy as well as search engine optimisation literature (Fox, 2010; Marshall & Todd, 2010). Search engine companies try to optimise their platform's performance by SEO violations as well as developing their search efficiency by data mining search statistic. This has drawn criticism because the very practices they use to enhance their own service is designed to inhibit competition as well as violation (Auletta, 2009; Cleland & Brodsky, 2011; Levy, 2011; Vaidhyanathan, 2011). We must therefore recognise commerce as a contributing factor developing search engine feedback.

Search word associations can adapt in relation to selective value. If a search word becomes popular, words that are associated with it also become popular by association. This association can be adapted by advertising or search popularity. Memetics concerns itself with qualifying social contagion by infectious repetition. A person's opinion can be swayed by group opinion or by the network density of social communication platform. Group selection evolved because it is a useful survival tactic. De Landa suggests that we work more efficiently in teams, and build hierarchy and social bonds because they are useful to our survival. Group selection is a focusing of opinions within a group that strengthen social bonds between individuals and the group as a whole – what De Landa describes as a process within '*mechworks*' (1998, 2005). These socio-political changes within groups proliferate or aggregate social norms. Johnson suggests, 'some environments squelch new ideas; some environments seem to breed them effortlessly' (2010: 16). Memetic selection is a form of unconsciously constructed cultural choice. Cultural elements can develop innovative solutions dependent on environmental circumstance. Gleick notes that, 'most of the elements of culture change and blur too easily to qualify as stable replicators' (2011: 321). Communities use patterns of checks and balances to govern a cultural set of predefined norms by which they map out their own social environment (Shirky, 2008, 2010). This feeds into socio-cultural media channels (Brown, 2011; Halligan & Shah, 2010), which in turn develops and feeds back upon society.

Our online search environment can develop an interesting and unforeseen issue that Pariser calls *search filter bubbles*. These filter bubbles occur when a user profile is being over-profiled (Pariser, 2011; Solove, 2011). Bubbles predetermine the content of a user's search, so predetermining the user's next choice. As we connect with technology our use of search engines has revolutionised information retrieval. However Carr believes that these changes in our information retrieval behaviour have replaced more traditional critical thinking exercises, habituating lateral search enquiry (2011). Filtering search inquiries has a practical application when trying to evaluate vast amounts of available information but profiling user search can over-filter content by applying user search history to content ranking. Pariser does not advocate against the use of user profiling but highlights the issue of filter bubbles because user interest allows the search engine to rank past interests higher than sporadic, norm-violating searches (2011).

Online social media allow users to create an online persona, but this persona is often a surface reflection of a human's full identity. Pariser relates that the discrepancy between our online persona and our true nature can augment how we perceive one other. The professional, social and family lives are just some of many social personas we use to navigate our social world. We are also emotional animals, so our moods can determine how we view our world and indeed how other people perceive us. Anger, happiness, introversion or extroversion contribute to how we are seen by others (Pariser, 2011). Nevertheless, traits like introversion are more stable whereas outbursts of anger or elation pass as quickly as they develop. Conte suggests 'social agents are increasingly viewed as complex systems in which several types of interrelated mental states … are formed and account for many social activities' (2000: 89-90). Our online persona is a set of still frames in time that show little about our long-term aspirations, as Siefkes observes: 'dealing with computers we have to develop ourselves while we develop machines and formalisms' (2004: 83). We are more likely to suffer socially if our online presence does not suit social norms, so we are more likely to present our best attributes and hide less acceptable ones. The key elements of social media interactivity are personal status updates, opinion posting and group contribution. A Facebook or Twitter account gives a user site space in which to build their online persona. From this platform you can share ideas and opinions. If other users *like* your opinions and wish to share them with others your influence within the group improves. Group collaboration, whether structured or emergent, exponentially accelerates opinion proliferation. Opinions are no longer part of an individual persona. The opinion becomes a cultural entity and therefore develops memetic properties.

The phenomenon of cultural entity is at the heart of social media. A user joins a social network to connect with friends and uses the service as an online address book. When contacting another user there is often a trade of information – for example, a time and place to meet or an update of what is going on in your life. This trade of information develops further when groups are constructed to organise a reunion of friends or a more open socio-political forum. However, social media companies need to run as a business, so their interests are focused on revenue as well as success. Kirkpatrick provides an insight into the motivations behind the business models of social media such as Facebook (Kirkpatrick, 2011). Facebook had to find a revenue stream to survive as a company. Not wanting to advertise in an intrusive way by selling banner space, they decided to tap into the naturally occurring collectivism within Facebook communities. This style of advertising is now a well-developed advertising model for social media companies. If we take Twitter as another model of social media, the same process of advertising as a social conversation applies. Twitter condenses content trading into small packages and, as Ipsen suggests, 'the usage of a sign system close to the innovation node may only be a harbinger of what is possible in the future' (2004: 45). The idea preferences speed and interconnectivity over content size. The idea behind Twitter is instant real-time information feeds that direct followers to content they may like. As Comm relates, this content is directed by user interest as well as by marketing and public relations agencies (2010).

Information has become a commodity that can now directly link popularity with profit. Information can be critical analysed by a collaborative process of rigorous peer review. Truth can be sorted by cultural selection however misinformation can also proliferate across societies if the society wishes to believe and share it. As Edmonds describes, 'The "fitness" of this information lies not in any intrinsic propensity for being communicated but rather due to its utility in utilising the bus system for personal transport, i.e. its *truth*' (2002: 3). One pertinent example of this misappropriation of meaning is the word 'meme' itself. A *meme* as described here is a cultural unit of indeterminate size that is replicated from person to person. However, if you search 'meme' on the internet (Beal, 2015) you will find the definition of internet meme refers to a unit of information that is proliferated over the internet often with intentional misspellings or content-related information spinoffs. The original description of a *meme* has large implications for how we might view the evolution of culture. The misinterpretation of *internet meme* is an incorrect yet playful expression of internet meaning derivation. Cultural selection can be both conscious and unconscious in its development. If we can discover how much of this cultural selection is in our direct control, we will be better able to determine an appropriate direction for culture to develop. Ongoing investigations into

dynamical processes in complex networks may shed light on shifting patterns within culture. Deb Roy and his team at MIT have studied how online conversations react to news media (Talbot, 2011). Their work shows how information from online news content proliferates among users. This online traffic can then be monitored and fed back to News Corporation for media analysis. Ideas can now be evolved naturally by memetic adaption as well as via financially motivated content industries. Ideas are formed by a process of feedback loops, or '*autocatalytic loops*' (Maturana & Varela, 1987) between our cultural environment and our phenomenal understanding of our environment.

I have examined a broad range of texts covering the various areas relating biology, psychology and advertising. These fields of study are often associated with one another because they affect the human experience, yet it is hard to find all areas discussed in one text. One noticeable development is the application of evolutionary process within the fields of technology, such as games theory; and the humanities, such as behavioural ecology. Advertising has largely focused on engaging with our emotions through processes of cognitive priming (Boush, 1993; Mark R. Forehand & Deshpandé, 2001; Yi, 1990), an approach fundamentally unchanged since the early twentieth century work of Bernays and Maslow. However this area of study is now also beginning to consider evolutionary processes (Garcia & Saad, 2008; Saad, 2006). Where previously advertising had to tackle the issues of consumer awareness and engagement, now the focus must shift to tackle message saturation and brand reputation. The internet has not changed the process of consumer engagement, just radically enhanced the communication networks between consumers and brands. I believe that due to the new online market environment brands will have to redirect and diversify their effort if they are to survive and thrive. At this time there are many conversations about trend forecasting and data mining but few have considered evolutionary processes as a potential area of insight. The disconnect between evolutionary selection, human behaviour, social networks and advertising practice needs to be addressed to build a cohesive and holistic understanding of the challenges facing both brands and consumers going forward. It is this conversation I hope to invigorate.

Introduction

Essentially, advertising is a tactic employed by companies to expand and consolidate their market share by informing and persuading consumers about the benefits of a product or service. In its original and simplest form, advertising presented information about a product or service in order to create awareness. This approach has been largely superseded by contemporary methods that focus on triggering emotional desire within a target audience (Bernays, 2004; Bernays & Cutler, 1956). Modern techniques of consumer engagement have often succeeded in creating desire for a brand; however, it was hard to quickly and accurately quantify the success of a campaign until the advent of the internet. With the rise of the internet, brands have been able to gather vast amounts of data relating to a campaign's roll-out. This has been a boon for advertising, enabling increasingly detailed, real-time study of consumer responses. However, the internet has also brought with it an unforeseen cost, fundamentally changing the relationship between brands and their consumers.

In order to understand the nature, consequences and potential opportunities of this changed relationship, I propose to examine advertising practice through the lens of evolutionary theory – as the response to, and outcome of, evolutionary pressures. This theoretical approach is two-pronged. Firstly, by recognising how brands interact within, and with, their market environment, we can define the properties relevant to brand survival and avoid the threat of brand obsolescence. Secondly, we can begin to see how the internet represents a significantly new environment, to which brands must adapt. As Shirky asserts, 'Our electronic networks are enabling novel forms of collective action, enabling the creation of collaborative groups that are larger and more distributed than at any other time in history' (2008: 48). We shall investigate how modern advertising practice affects consumer behaviour within these digital networks, and how the lessons of evolution suggest the need to move towards a radically new form of advertising practice: developing brand loyalty via a relationship of mutual reciprocity, predicated on interactions that benefit both consumer and company.

In Chapter One I will focus on the internet *as an environment*. The structure of the internet is a network that connects information by relevance and popularity. These connections are ranked by search engines within a process of search relevance lineage. In this respect the internet is a sociocultural evolutionary mechanism that applies selection pressure to the content found within; an environment in which

information survives or dies due to content relevance. But the selection pressures of popularity and relevance are imposed because the internet connects information not only to other information but also to *users*. If a connection is made with a unit of information, the user will engage with it. If a connection is not made then the user will not engage with it, so not be influenced by it. The online environment extends out to users of the internet as they too are part of this sociocultural evolutionary mechanism: humans are both the beneficiaries (and victims) of the internet and the mechanism behind its ranking function. For this reason I will incorporate a memetic model of information transfer.

Memetics looks at the process of knowledge acquisition and transfer within humans from an evolutionary perspective. As such it provides a useful tool for the analysis of advertising trends. I will use memetic processes to highlight how information combines and influences other ideas within the minds of users as well as how information trends on the internet. Memetics looks at mimicry, the action of imitation or close resemblance to another quality. The word implies an imperfect copy, unlike *duplicate, reproduction*, *copy* or *replica*, which connote fidelity to the original. However, even these terms suggest degradation or simulacrum in the process of replication. My goal will be to unpack search engine network dynamics to provide an understanding of both sociocultural memetic transference of information and profit-driven advertising effects on the network environment. In so doing I hope to present a holistic understanding of the internet as an information environment.

In Chapter Two I will shift the focus from our understanding of the network environment to the organisms that populate the environment. I use the term organism to continue the analogy between biological and digital evolutionary processes. One of the challenges facing a discussion that traverses biological, sociocultural and digital networks is accounting for the effects one network has upon another. The second challenge is making sure that unconscious evolutionary processes and conscious cultural processes are clearly delineated. To this end we will distinguish between biological, sociocultural and digital network terminology, and likewise between conscious and unconscious selection pressure. An organism is often defined by the barrier that separates it from the surrounding environment. In terms of digital organisms we shall identify three stages of complexity from a single-cell organism node to more complex cluster and hub organisms. Once the relevant terminology has been established we will look at the interactions between digital organisms and the evolutionary selection pressures placed upon them. After establishing both the structure and the dynamical processes of digital organisms we can

then consider how information proliferates between the minds of users and the networks in which they interact. These interactions between users cause cascades of information. As we will see, cascades can be formed by user interests, search ranking properties or paid-for advertising campaigns. One current issue presented by network dynamics is the propensity to guide cultural traits. Modern advertising practice has shifted towards data mining as both a source of revenue and a way to better align campaign goals with measurable outcomes. We, however, will focus on the emergence and atrophy of network cascades and the effects they have on the evolution of network groups.

An advertising campaign is essentially information provided to consumers by a brand. I suggest that this information, when placed online, becomes an organism inside an information ecosystem. The advert is designed to engage with consumers as part of an information transfer system between a brand and its target audience. The information is designed to influence the mind of the consumer and affect the consumer's decision-making process toward engaging with the brand. If an advert is successful the consumer will interact and that interaction can be monitored and valued by both the brand and the search engine. The search engine charges the brand a fee and the brand hopes to recoup that expense and make a profit from the consumer. As we shall see, this process of interaction and feedback develops the value of the advert while enhancing the search engine's ranking function. If the advert is successful this process also develops the brand's overall value while aligning the target audience toward continued engagement. Advertising is one process of information transfer that fits inside an ecosystem of information transfers such as social media, interest groups and other natural or nurtured user groups. Each user or individual piece of information is a cellular node. These nodes interact with each other and in time form groups. Thus nodes, clusters and hubs behave as cellular organisms within a network environment. Each organism finds itself in an ecosystem and its survival is assessed by its popularity. One survival technique is to combine with other organisms for mutual benefit. Such a process is evident in biological multicellular lifeforms, memetic combinations of thought known as memeplexes, digital information clusters and hubs. This again provides a conceptual link between biological, cultural and digital commonalities.

In Chapter Three our focus will settle upon the motivation and manifestation of behavioural traits caused by the power dynamics active in groups. We continue to regard nodes of information and users as organisms but we now focus on the behavioural categories found within user groups and how memetic properties help to develop and categorise user opinion. When looking at the memetic value of a brand,

I will identify the cost of co-adaptive or maladaptive behaviour within consumer engagement. A co-adaptive meme complex is a *meme* or *idea* that helps the survival of its host as well as the meme. A maladaptive meme complex helps the survival of the idea to the detriment of the host. Identification of the co-adaptive or maladaptive aspects of the memetic process is central to an application of memetic theory to the analysis of advertising trends. If we wish to derive maximum benefit from the study of memetics, to enrich advertising practice and future brand strategies, we must consider philosophical discourse as well as data analysis. We will focus on user hierarchies within groups and identify how habitual behaviour consolidates cultural practices within groups. Once these group dynamics have been established we will look at how advertising can infiltrate consolidated user groups or be rejected by user opinion; how advertising works within social networks; and how traditional methods of advertising may suffer due to the saturation of a message within dense social networks. Behavioural dynamics within social media such as friendship and ideological relationship groups are an integral part to its success so we shall look at how groups and advertising interact. The main consideration of this chapter is the behavioural ecology of social networks and how they place feedback pressure upon cultural evolution. It is crucial to understand what pressures the internet places upon individuals and culture. We have never been so connected to both knowledge and each other, and this may well be profoundly affecting our lives and even our biological survival fitness.

Having examined a range of issues relating to the advancements in network technologies, we can then work toward solutions that could benefit both individual consumers and advertising practitioners. Our focus on cultural dynamics from an evolutionary perspective enables us to view group dynamics as a process of evolutionary emergence, survival and atrophy, and to use behavioural ecology to find the most stable strategy for survival purposes. Selfishness may seem like a useful solution and survival of the fittest is often understood in this way. However, as we shall see, cooperation may well be a more suitable candidate for sociocultural engagement fitness. Groups form for mutual benefit and persist because that benefit is sustained. Mutual benefits could involve the sharing of labour or goods, defence, or a mixture of all three. Grouping for mutual benefit is seen in all forms of life but it is a precarious strategy finely held in balance by past behaviour and perceived future behaviour based on past outcomes. Reputations are built at cost to all partners and thus reputation becomes a precious commodity in its own right. Models of cooperative reciprocity work precisely in the same way whether applied to biological, cultural or electronic network groups. Furthermore, the evolutionary process of cooperative reciprocity is clearly

observable in its feedback effects on groups, providing a clear understanding of the consequences of uses and abuses found within behavioural dynamics and advertising practices such as persuasion profiling where advertisers target an individual's ideologies or concerns to motivate engagement.

Underpinning this entire discussion is an argument for the relevance of evolutionary theory to the field of advertising. The effectiveness of a campaign can be ascertained through research and data collection, but the effects of advertising may extend deeper into our physiology than we might expect. With technology driving many forms of media and advertising, the forces governing consumer behaviour can be played out in real time all over the planet. Financially driven internet practices can ultimately change cultural opinion, and we may wish to consider how co-adaptive and maladaptive behaviours are affecting the evolution of human culture. As Morrison highlights, 'it is only within the last two decades that researchers investigating culture have begun to perceive the necessity of regarding cultural transmission not only via anthropological approaches, but psychologically and evolutionary as well' (Morrison, 2002: 333; Plotkin, 1998; Sperber, 1996). A memetic analysis might help us to understand the processes of cultural change and to develop a more nuanced understanding of the social nature and implications of global advertising practice.

Ultimately I aim to make a case for the use of cooperative reciprocity – in the short term to augment traditional advertising practice, and perhaps in the long term to replace it entirely. With the advancement in social networks I believe brands should aim to incorporate an evolutionary focus within their strategy planning. We should seek to understand network collectivism in order to develop reciprocal relationships with consumers for mutual benefit while warding off the danger of consumer reprisal. Due to the density of online networks, consumers can gather knowledge from collective opinion. Brands that are seen to violate consumer values may be left in a vulnerable position because of negative opinion cascades. Cooperation with the threat of reprisal is both a positive and a stabilising strategy, proven by the trials of an evolutionary process. Our biological success has led to the development of language and culture, which in turn have enabled us to develop technologies that further our success. All of these steps have been subject to evolutionary pressure but we must remember that our technologies, our culture and our biological nature are intrinsically linked and to neglect such connections would likely lead to a negative effect on our survival fitness. This rule applies to consumers, brands and even the networks that connect them, so we would be wise to understand the true interactive extent of our network ecology.

Chapter One | *The Internet as an Environment*

Introduction | *Online Search as a Sociocultural Evolutionary Mechanism*

This chapter aims to identify the internet as a search environment in order to provide an understanding, grounded in evolutionary theory, of the internet's ability to place environmental selection pressure on data. Once we understand how data search trends adapt we can then apply contemporary advertising practice in order to ascertain the effect on internet users. The search environment is the structure that links users to content. The structure directs the user's search intent by providing search options whilst simultaneously using the search information to build a search lineage for that search term. The use of the term 'environment' relates to the internet's search environment, which provides a place for interactivity between the user entity and information entity. The individual user is a goal-directed entity while the information entity lacks goal-directed intent; however, the information entity gains a form of goal-directed intent derived from multiple user search lineage (Barrat, Barthélemy, & Vespignani, 2008: 60-61). The search environment's development of lineage allows for the commodification of information. This commodification not only presents a new market in information traffic but can also highlight models of communication between brand and user to develop a co-adaptive model of modern advertising practice.

Once we have discerned the parameters that frame our understanding of the search environment, we can focus on elements pertaining to the evolution of information entities. In the second chapter, I will focus on social media cascades (Comm, 2010; Halligan & Shah, 2010; Kirkpatrick, 2011) and will examine the *node*, *cluster*, *hub* model that develops due to social media cascades. These cascades are connective feelers that bridge gaps between nodes of information. The cascades can be directed by advertising or emerge through user interactivity (Easley & Kleinburg, 2010: 444). Over time, a cascade can affect the relationships between nodes to form node clusters. Node clusters can be identified as online social groups, interconnected websites or collections of related data sets (2010: 489). Node clusters can inform us about the popularity of a group and its evolutionary development over time (Barrat, et al., 2008: 238).

In the third chapter I will focus on the evolutionary destructive and stabilising pressures that affect social groups. Although groups develop through a process of user node clustering, this process can be comprehended by an individual or a sub-group. If a group is developing in a maladaptive way, the individual or sub-group can defect from the group. A group's commodity is based on the information's value and infrastructure functionality. The group may agree on certain ideologies and disagree on others, so may divide or experience a kind of cognitive dissonance. The commodity of a large social group has a greater opportunity to attract more users, so enhancing its collective commodity in relation to smaller groups (2010: 486). It may therefore be wise to suffer a degree of cognitive dissonance in order to benefit from being part of a group. These information groups can elevate a user's experience, but can also become prohibitive to the individuality of the user experience. The social grouping process is a trade-off between a user's search individuality and search efficiency (Pariser, 2011: 125). The individual user in a group can decide what technologies suit them, however the cost of defection from a group comes at a cost that directly affects their sociocultural connectivity and social status (Vaidhyanathan, 2011: 181).

In essence, the link between connective infrastructure and social influence can be viewed as co-adaptive. Each chapter of the following study builds upon the preceding chapter. Chapter One identifies and defines the information environment. Chapter Two identifies the process of information proliferation. The third chapter identifies the process of information consolidation. Synthesising these topics, I will argue that the interconnectivity and influences of online technologies upon sociocultural development can be viewed from an evolutionary perspective. This perspective will allow us to better understand how online trends develop and affect user interest, how trends can be useful to brand equity, and how online search may affect societal norms. This field of study is important to modern methods of advertising, and its findings are likely to become best practice when developing a brand's popularity and ethical integrity.

Digital Networks | *The Structure of the Internet*

It is prudent at this point to consider the relationship between the digital world and the organic world. If we are to develop a grounded theory that recognises the interactivity of the two environments we must understand the infrastructure and constituent elements of both. Their similarities and differences will

help validate the correct interconnectivity of the user input and the algorithmic feedback. We can view the human brain in relation to a computer if we wish. However there are vast differences between the two. We need to identify the differences in order to solidify our understanding of possible similarities.

The internet information structure is connected by hypertext mark-up language: HTML. The HTML code performs two main functions, involving page content and page links. The underlying idea was to allow information to be shared over long distances so that people all over the world could collaborate on projects (Dries & Hans, 1999). The page is held on a server and can be connected to using its hypertext transfer protocol (HTTP) address (T. Berners-Lee & Fischetti, 2008). The idea of copying and transporting information has been around for a long time and technologies such as the printing press were designed to speed up the process of the replication and transfer of text.

In 1945 Vannevar Bush proposed the idea of a machine he called 'Memex' that would revolutionise human experience. In Bush's account, 'a memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory' (Bush, 1945: 6). This is noteworthy for its prescient grasp of not only the mechanisation of information replication and storage, but also the consequences of such a process.

If we step forward in time to when the World Wide Web is now used by people all over the globe we see how this process has already generated an interesting set of evolutionary phenomena. In the early years of the internet many new companies sprang up. Some of these companies would become cultural phenomena like Google and EBay, while others were bankrupted, swallowed up or made redundant by more popular companies (Perkins & Perkins, 1999). This phenomenon of volatility is common in newly emerging environmental niches. After a while the environment stabilises as its denizens stabilise and consolidate their position within the environment (Axelrod, 1984).

One such environmental niche is that of search. The search engine provides a way to connect a user with relevant information. At its heart search engines use information on a web page and present a list to the user in order of relevance just as Bush had predicted: 'Selection by association, rather than by indexing, may yet be mechanized' (1945: 6). There are a variety of ways a search engine can assess the data; the most

traditional methods being 'Boolean', 'Vector Space', 'Probabilistic' and 'Meta-search' (Langville & Meyer, 2006: 5-8). These search models help assign a page's relevance and provide the hypertext meta-links to the user. Ultimately the job of a search engine is to increase the speed, accuracy and functionality of user search. Search engines like Google use crawler bots to search pages for HTML content. These programs check new pages and calculate the relevance of words on the page (2006: 12). The combination of words helps rank the page and places it in an appropriate search term listing.

Learning by Imitation | *Placing Memetic Process in Relation to Human Environments*

The term 'memetic' describes the mimicry and replication of information. In relation to this chapter, the memetic properties manifest in the online environment. However, internet users are also relevant as they can effect, and can be affected by online memetic processes. In this chapter I will focus on Easley & Kleinberg's work on network systems to provide a solid structure of online networks and internet interactivity. Easley & Kleinberg's work is of particular relevance as they relate online interactivity to user influence. The use of environment will not cover the physical storage of the internet on servers. The physicality of server storage can have an effect on transfer speeds and storage security, but this distracts our attention unnecessarily away from the topic of online interactivity. Let us first consider what is meant by 'environment'.

The environment is a physical realm in which, and with which, an entity can interact. The environment provides the materials for life to exist (Darwin, 1859). From a biological perspective, chemical reactions underlie the very beginnings of ribonucleic acid (RNA) and its interactions with deoxyribonucleic acid (DNA). How RNA first combined and how RNA and DNA interact are on-going projects (Wongsurawat, Jenjaroenpun, Kwoh, & Kuznetsov, 2012). However from the perspective of memetics, units of information can interact and combine to form more complex related information packages that survive due to replication fitness. This process of replication is a form of '*heritability of acquired characteristics*' (De Lamarck, 2011) described by Jean-Baptiste Lamarck. Lamarck incorrectly suggested that you could improve your children's genetic fitness by your own efforts during your life. For example, if you exercised, when you had children they would benefit. Genetics does not work this way; however memetics can,

as memes can replicate without being impeded by genetic barriers as ideas are not fixed. Apart from '*heritability of acquired characteristics*' the search term, and the search term commonality develop within an evolutionary framework similarly to that of genetic evolution. The subject that concerns our enquiry is this relation between biological and information environments.

Throughout evolution, entities have communicated information using chemical reactions, posture, touch and call signals. Phenotypic sender and receiver organs such as eyes, ears and a nervous system have evolved to allow us to sense environmental information such as light, sound and mass (C. R. Dawkins, 1982: 27; Wheeler, 2006: 120). As we have developed, humans have created language, which has led to a semiotic interchange of signals. The basis of word assignment allows us to communicate ideas outside of the present moment (Barthes, 1957; de Saussure, 1857-1913; Peirce, 1867-1893, 1893-1913). Language can present meaning as a learning tool that can aid survival at minimal cost. The strength of meaning can mutate through use, as can a word's relationship to an object or meaning.

The combination of linguistic entities presents a similarity between genetic and linguistic assimilation. Separate words have individual meanings, but when combined can evoke a very different meaning. This environment might be understood as an interconnected *rhizome* of objective entity clustering (Deleuze & Guattari, 1987: 22). Deleuze and Guattari's concept of the rhizome describes how the interconnectivity of concepts does not initially form direct connections between data and our interpretation of the data; only through time and repeated use will they become progressively strengthened by association. A link could connect any two sets of data, however it is the relevance between the two data sets that would make the link more useful. The rhizome model allows us to consider the morphogenesis of data association and the emergence of network formation. Although the notion of the rhizome is a helpful concept in this application, I deploy the term *clustering*, after Easley & Kleinberg, in order to describe how information group together by guided and unguided association.

The popularity and use of a word or sentence provides the selection pressure. The more a word is used, the more likely it is to be observed and used by others. This word consolidation allows information networks to assess and value each word. Google AdWords is the clearest example of a word value market. Each word gains a value in relation to its use and meaning. Words such as *the* have a low value attached to them as they do not name a specific field of interest. Nouns such as *ship* have a high value attached to

them as they instantly classify a field of interest, so narrowing a search. Words that are of use to guide a user to a website are of high value and can be bought and traded using AdWords to direct search traffic alongside advertised links at the top of a Google search list. At an early stage of the internet Google was aware that words could be maliciously used to raise a website's ranking. In reaction to this misuse Google put in place a relevance check on websites so if a website had no relation to a search word the site would be penalised. Google's platform of *paid for* AdWords and *relevance based* search terms allow us to identify the commodification and lineage of the search term environment.

There are two variants of search: the first variant looks into search interconnectivity in relation to the 'replication' value of information within the search infrastructure; the second variant looks at search 'memory', storage and the effects of data mining search lineage to enhance information ranking. The two variant properties, *replication* and *memory*, relate specifically to the properties originally described by Dawkins. Both these properties are implicit in Dawkins' choice of the word 'meme' to describe 'a cultural unit of imitation … *Mimeme* comes from a suitable Greek root … or alternatively being related to "memory", the French word *même*' (C. R. Dawkins, 1976: 192). The focus upon internet search infrastructure and practices will help define both a measurable memetic unit and traceable replication parameters of memetic proliferation lineage. The unit of replication may have memetic properties because of search history or popularity among individuals. Advertising may play a role in guiding a user's or group of users' online search behaviour. With an understanding of online search enquiry replication and search lineage memory, we will be able to consider search enquiry as a memetic process working within a sociocultural selection environment.

The online search infrastructure can be viewed as an environment of information. The information's fitness within this environment is governed by relevance. Advertising has a long tradition of focussing messages presented to an audience, and relies on gathering data to ascertain the success of a campaign. Prior to search engines, the collection of accurate data had been detached from the direct patterns of consumer behaviour in relation to the campaign. Campaign planning prior to search engine technology evaluated audience numbers and focus groups to estimate an advert's influence (Yunjae, Federico, & Kihan, 2010). With the internet, we can now directly track the placement of online advertising and its effects on the user's search term choice, as Levy describes: 'analyzing the clicks of Google users was like sitting beside a window with a panorama on the world' (Levy, 2011: 120).

We can use various terms to describe lineage in relation to search terms. I would like to propose two concept terms as we are studying the interconnectivity between the user and the information environments. I propose these terms in order to clarify the notion of lineage in relation to both [*x* & *y*] environments. A 'search lineage' is first produced by the user as they input a term. As more and more search terms are input, these search terms are ranked by a search engine. The search engine takes the inputs and processes them using varying equations to produce a 'rank lineage' that reconfigures the search term's value. The reconfigured value is presented back to the user, and is targeted specifically at their search history on top of the search history of others. This set of feedback informs the user of the most popular or relevant options. These options can then be discussed and exchanged in an offline environment. The *search lineage* is user input specific. The *rank lineage* is subject to programmed algorithms. The *search lineage* identifies all aspects of the user search interactivity while *rank lineage* is specific to the search engine's ranking technologies.

With the introduction of rank lineage, the search topic of a user is placed on top of previous user searches. The accumulation of rank lineage redirects a user's search into a search environment. This process is augmented firstly by 'group opinion': as Price & Shaw observe, 'while the push of the bully or the seduction of the temptation may invoke plenty of activity, the source of action fundamentally remains external to the actor' (1998: 251). And, secondly, by 'commercial interests': as Levy describes, 'Google … was able to predict not only how many clicks an ad would probably draw but how many sales those clicks would deliver to the advertiser' (2011: 119). The information itself takes on a selective life of its own without direct influence of any one individual. Pagel points out, 'our environments routinely give us clues to be thinking about certain things, but the clues and our thoughts about them might sit mostly beneath our awareness' (Pagel, 2012: 326).

The application of digital technology streamlines the process of information transfer, further enhancing the user experience. As Gleick describes, 'ideas cause ideas and help evolve new ideas. They interact with each other and with other mental forces in the same brain, in neighbouring brains, and thanks to global communication, in far distant, foreign brains … to produce in to a burstwise advance in evolution that is far beyond anything to hit the evolutionary scene' (2011: 311). Search engines help data collection by guiding the user to search relevant information. The more often an article of information is selected for use, the higher its ranking value. The ranking value provides an indication of the information's value in

relation to popular opinion. Popular opinion may not be the best indication of true quality in relation to the specific intentions of the individual search. In effect, the individual search may be diluted or misdirected by the popularity value peaks that result from rank lineage. Advertising best practice would help guide interested users to the product and stabilise rank values relating to their brand. A brand will be valued by its ability to sustain a strong rank lineage. Campaigns will help build brand awareness but a stable and effective rank value will be a more useful tool to implement stable strategies of development and brand integrity.

Lineage is a key concept that links the online search and the biologically defined use of environment. Heusden describes this concept from a semiotic perspective, and suggests 'the biological approach is restricted to the natural basis of the use of symbols. On top of this natural basis, the edifice of culture is erected' (Bax, Van Heusden, & Wildgen, 2004). Without a search lineage, the search rank would remain at a base value, as search history could not be added to its base properties. In this way, we may consider search history as a form of information memory. Each individual search would be held in the present without the foresight to appropriate past outcomes. When a variety of information entities can produce a lineage, subject to environmental selection fitness, we may consider the process of transfer and replication as having evolutionary properties. The lineage provides a memory that allows for an assessment of the past, so allowing for an accumulation of collective knowledge – what Edelman describes as the 'remembered present' (G M Edelman, 1990). The lineage of past search behaviour presents a timeline of search popularity and interplay that can affect future search values.

Alongside an advertising campaign's intentions to heighten the popularity of a search term, there is a natural emergence of search trends that is not governed by focused intent. As Axelrod describes, 'the shadow of the future' (1984: 128) is a system of values that prevents retaliation due to the possibility of future retribution. The nature of learning is also a process of interacting with others. You learn from others and pass on what you have learnt. Knowledge is a tradable commodity that gives an advantage to the owner. Billard & Arbib state 'learning by imitation is fundamental to social cognition. It is at the basis of the animal's ability to interpret the behavior of others … attribute intentions, to deceive and to manipulate others' states of mind'. (2002: 343). The aforementioned shadow is a prediction of threat that serves as a reconfiguration of a selfish choice, to a process of group consolidation. When describing an environment that has both latent units of information and conscious interpreters, we are looking at an

environment that enforces an evolutionary stable state upon both. A volatile unit of information, like a volatile opinion, will thrive or suffer because of the environment within which it finds itself. As Price & Shaw highlight, 'whether privately or publicly run, the dispersal of decisions and accountability to local units has proved an essential stimulus to faster adaptation and change' (1998: 303). Just as in biology, the arms race of information helps propel relevant topics to the top of the search inquiry pricing index and punishes less relevant topics. Within this pricing index, Botz-Bornstein notes, 'the fate of any idea, new or old, brilliant or hackneyed, is determined by its relative fitness in the world stock of memes' (2008b: 198).

Without search lineage, information fitness is defined by the user in accordance with search relevance alone. When a search history is stored, a search engine such as Google can build upon their platform by data mining web pages and ranking the pages using various criteria. Shirky suggests that 'our technological tools for making information globally available and discoverable, by amateurs, at zero marginal cost, thus represent an enormous and positive shock to the combinability of knowledge' (2010: 142). Searches are ranked and sold as commodities in accordance with past search history. Over time, the search information manifests as a search portfolio that is commercially valued in a pricing index that can be auctioned to relevant and interested parties. Easley & Kleinburg observe, 'search engines determine prices using an auction procedure, in which they solicit bids from the advertisers' (2010: 387). If a brand wishes to develop its value then the most useful approach would be to develop a cohesive rank lineage developed in relation to relevant user search lineage.

The search topic 'unit' can take on memetic lineage properties as the combination of search enquiries is not determined by an individual user. The unit emerges over time due to its natural proliferation value in combination with other search topics. These topics can either retaliate, parasitize or form symbiotic relationships that leave search lineages to feedback into the topic's future search value. This process emulates evolutionary search pressures when an individual user no longer directly controls all aspects of the search enquiry feedback. The split between a process of intellectually derived information selection, 'higher order consciousness' (G M Edelman, 1989), and the emergence of relevance-derived data clustering, 'memetic development' (C. R. Dawkins, 1976), is the split between the conscious and unconscious information clustering that feedback upon social opinion. This distinction will help to provide a framework of unconsciously constructed sociocultural evolution. It is hard to predict online

and offline interactions as we can only obtain knowledge from studying the outcomes of the interactions. To better understand the search environment we need to examine more closely how interactions affect and are affected by it.

Unpacking Search | *Search Engine Network Dynamics*

The page ranking system uses a variety of search models that have evolved over time, often in direct response to search criteria violations. As user search brings up a list of web pages, the list naturally introduces a platform of competition. The goal of search engine optimisation (SEO) is to make your website reach the top of the search list. SEOs have to work within acceptable parameters laid down by Google as the opportunity for page rank violation can disrupt the user experience and so the reputation of Google as a useful tool for search. SEOs have been known to fill a page with every word in the dictionary and hide the hypertext in the background of the page. This sort of malicious behaviour led to Google reassessing its page crawling procedure to detect violations and penalise or ban offending sites (2006: 43-44).

When an HTML page is placed on the internet it goes through a process of ranking. Firstly a 'crawler module', often referred to as a spider, searches the web for new content. The crawler module collects the page data and stores a compressed copy in a page repository. This page is then assessed and an index module collects the most relevant link data. This assessment looks for page links, headings and a host of other markers to assess the content validity and interconnectivity of the site (2006: 11-12). When the site has been ranked it is placed in Google's search listings. From this point on there is interplay between search lineage and rank lineage. A user types in search terms and this is processed by a 'query module'. The query module will assess the search terms and calculate the appropriate pages to list using the 'rank module'. This is the link between the user *search lineage* and the computational feedback *rank lineage*. The search lineage is stored in human memory and makes impressions on the rank lineage; however, the user can stop searching or search for something totally new without influence. The rank lineage is held in a system of predictive feedback without inspiration. Rank module technology is a very powerful tool but is limited to its programming parameters (2006: 12-13).

Advertising software known as AdWare is used to draw the attention of a user to a company's product. Malicious software known as MalWare often forces page content onto a user or misdirects a user's search. These approaches of content manipulation are often unwanted by the user but provide evidence of programmer derived abuse of user search intent. This abuse ranges from unwanted banner advertisements up to the collection of personal computer data. These program-based parasites/viruses are specifically designed by programmers; however, we are focused on search regulated environments. AdWare and MalWare detract from the more global focus upon online sociocultural network development. The area of interest is in relation to the communication trade-offs between user and search engine. A classic example of interface miscommunication involves search term intent, as described by Easley & Kleinburg: 'Keywords are short and inexpressive, they suffer from the problems of synonymy … your search for information about the animal called a jaguar instead produces results primarily about automobiles' (2010: 351). We might suspect this problem occurs because of a company's AdWare but it is more likely because of a search term's relevance and popularity in relation to the automobile site that focuses the search terms *rank lineage*.

The popularity of a site is one property that affects *rank lineage*. Google is a company that, like all companies, requires revenue. Google's main source of income is based on pay-per-click search term auctioning. Each search term has a market value based on user interest and must be relevant to a company's website information. The more relevant the search term is to your site the higher your page rank. The less relevant the search term the more your page rank is penalised. Words such as 'and', 'the' and 'of' have been set with minimal search status as they saturate the internet. Nouns are often highly ranked as they name a specific company or topic. In language the noun is designed to focus attention and attach a linguistic tag to the object in discussion. Keywords are crucial to bridging the connection between the user and the information. If the semiotic meaning is clear and relevant then the search outcome is likely to be appropriate. *Rank lineage* does not take into account inappropriate search term input by the user, nor can it truly predict a user's search intent. Companies like Google aim to narrow this margin as much as they can for the benefit of user experience. Technologies such as data mining go a long way to refining search topics, but the more personalised search metrics become, the more they are likely to narrow the fields of creative or random search. We must consider the trade-off of focused feedback with that of broader, less popularity-based feedback.

Profit Based Search Ranking | *Profit Augmented Appropriation*

The page ranking system is named after Larry Page and is the quintessential example of *rank lineage*. Page ranking was developed as a key part of Google's approach in connecting the user to relevant page content. Page ranking is essentially the commodification of information; it is natural that the sale of this commodity would be essential to Google's business model. Easley & Kleinburg suggest 'rather than simply showing results computed by a ranking function, the search engine offered additional slots on the main results page through a market in which sites could pay for placement. Thus, when you look at a search results page today, you see the results computed by the ranking function alongside the paid results' (2010: 365). Much like advertising space, pay-per-click models are a focused way of relating the success of an advert to the user's interaction with the link. Essentially we are looking at a market economy laid over the user's conscious search decision culture, as Easley & Kleinburg describe: 'Clicking on an ad represents an even stronger indication of intent than simply issuing a query; it corresponds to a user who issued the query, read your ad, and is now visiting your site. As a result, the amount that advertisers are willing to pay per click is often surprisingly high' (2010: 386). This integration between conscious and market-led decision-making is at the heart of this study.

With traditional advertising, there are barriers to message proliferation such as cost, media and accurate campaign tracking. With the internet these barriers become less problematic as the cost is decreased, the media is standardised and the tracking is accurate and accessible. Online markets can change how markets interact, as Easley & Kleinburg describe 'nearly all of Google's revenue … creates markets out of the information-seeking behavior of hundreds of millions of people traversing the Web, and has surprisingly deep connections to auctions and matching markets' (2010: 385). New markets of information tracking and assessment are now calculated and traded in real time. These new markets of information have another benefit such as the previously mentioned *rank lineage*. Search engines can extrapolate data as a chart of figures or can be used to track trends over time. This can make it hard to quantify a fixed price. Easley & Kleinburg note, 'search engines tend to get agreements from advertisers that they'll extrapolate from their bids on certain queries to implied bids on more complex queries' (2010: 407). The new market of search will continue to gather more and more data so as to streamline relevant and targeted information.

Search engine optimisation has many applications and has adapted over the years in accordance with search protocols. As Easley & Kleinburg write, SEO 'came into being, consisting of search experts who advise companies on how to create pages and sites that rank highly' (2010: 365). SEO is a fundamental principle of the internet. The traditional SEO expert looks for ways of driving more business toward your site. Modern SEO practice involves working mutually with other sites so the traffic flowing through your site can be tracked over time and developed. SEO has another focus, more related to the internal management of registered user data. The measure of success relates to the size of network you support, and the size of the networks of which you are affiliated. Amazon.com is a strong example of network support and infrastructure. Amazon connects users to products and provides them with a method of collection. From the user standpoint the purchase costs little in both time and money; however, Amazon does not stop there. Over time Amazon uses your 'registered user' information to offer you similar products based on your search history in relation to the search history of all other 'registered users'. The process of targeted recommendation seeks to maximise search efficiency, though it also redirects personal choice in favour of a calculated cultural norm.

The most prominent difference between *search lineage* and *rank lineage* is the way in which the feedback data is used. A user has intent and wishes to gain knowledge about a subject. The more a user becomes informed about a topic the more focused their search will become. In this way the user projects knowledge upon the presented data that can be assessed by a search engine's ranking system. This assessment is at first a diagnostic process. The user judges the quality of the presented data, and selects or rejects its relevance. This process is described by Easley & Kleinburg as a cascade. As we shall discuss in the next chapter, 'cascades arise naturally when people can see what others do but not what they know. If the payoffs (or statistics based on the payoffs) from earlier consumers are visible, this can help prevent a cascade of bad choices' (2010: 444). Examples of cascade ranking are Facebook *likes*, Twitter *follows*, and *star ratings*. These are user implemented ways of recommending content to other users. The two weaknesses of these recommendation tags are that your opinion of useful content may differ from a user that has recommended the content. Secondly recommendations are subject to violation as recommendations are a product that can be purchased. Issues of recommendation purchasing or rigging are likely to be penalised by search engines but, as Easley & Kleinburg describe, 'marketers attempt to get a buying cascade started for a new product. If they can induce an initial set of people to adopt the new product, then those who make purchasing decisions later on may also adopt the product' (2010: 444).

An effective buying cascade system is Amazon's recommendations engine. When logged into Amazon each search is recorded and added to previous searches. When you have selected an item you are offered a set of relevant products that have been purchased by others. These products can be purchased as a group at a discount, so enhancing the motivation to purchase without excessively imposing related products. The goal of recommendation links is to draw attention to related content. Two other forms of links are identified as 'In-links' and 'Out-links'. An In-link guides a user toward the recommender's website while an Out-link directs a user away from the recommender's website to an affiliated website. This form of reciprocal linking helps increase the site traffic of both sites. This form of reciprocal linking is only effective if the links are relevant. If the links are not relevant then users are less likely to use the link again or may stop using the site altogether, and the site will be penalised by search engine ranking criteria.

Peer Review Based Search Ranking | *Sociocultural Augmented Appropriation*

Search engine user interface design focuses on clear and fast presentation of content link options. Users do not wish to be presented with a different or confusing interface. Humans minimise mental effort where possible through routine and habit so allowing mental effort to be directed to other tasks (Duhigg, 2012: 19-21). A user builds a relationship with user interfaces, based on the fulfilment of need. If an interface is clear and directs the user efficiently to the content they are looking for, that need is satisfied and the user is likely to use the interface again. The priorities of searches have two values. The first relates to the amount of material that is available and the second is focused on the quality and relevance of the material.

Search engines optimise the search experience by streamlining the time it takes to connect user with content. It is wise for the search engine to be able to pre-empt what is likely to be wanted. With this in mind search engines track and add values to content. This allows the search engine to predict what content is more likely to be useful to a user based on previous users. As Easley & Kleinburg describe, 'if we believe that pages scoring well as lists actually have a better sense for where the good results are, then we should weight their votes giving each page's vote a weight equal to its value as a list' (2010: 355). There are two definitions of user search. The first is the 'random walkthrough' where the user is browsing

without a particular aim in mind. They may have stumbled upon a piece of content that has triggered an interest. The second search method is the process of 'repeated improvement' where the user is looking for specific information that others have also searched for. The user follows the links that are useful to get to the information thus further validating the searched information. As Easley & Kleinburg suggest, 'repeated improvement and random walks, respectively – are equivalent, we do not strictly speaking gain anything at a formal level by having this new definition. But the analysis in terms of random walks provides some additional intuition for PageRank as a measure of importance' (2010: 363).

It is impossible to say anything concrete about current ranking systems as they are continually evolving and the search engine companies themselves are extremely secretive about their ranking functions. This is not surprising as ranking technology is the main component of the company's intellectual property. Search engine companies also protect their ranking functions to prevent abuse by individuals wishing to gather search traffic by misleading users with false information. Google, for example, would lose its usefulness if its ranking list could be manipulated to direct users to false or malicious websites.

The evolution of the internet is built upon connections developed by user traffic feedback loops. As each page is created it is placed within the search environment. The information has links that have been programmed by the site developer. The search engine then uses its ranking function to promote the link if it is of value to the user. Easley & Kleinburg observe how we use page rank 'to assess the authority of a page on a topic, through the implicit endorsements that other pages on the topic confer through their links to it' (2010: 353). The link may be off-topic, misspelt or may convey criticism rather than endorsement or it may be a paid-for advertisement. However 'we hope that, in aggregate, if a page receives many links from other relevant pages, then it is receiving a kind of collective endorsement' (2010: 353).

A search engine's overall success is graded by speed, accuracy and functionality. The ranking of links are therefore a marker of a search engine's overall quality. As Easley & Kleinburg describe 'search engines have control over the ads they display … selecting an equilibrium for the overall market in which users expect high-quality ads, and advertisers with high-quality content are correspondingly willing to advertise via search engines' (2010: 634-635). The relationship between ad quality and product quality evolves over time until it reaches a self-fulfilling expectation equilibria – what Maynard Smith called an 'evolutionary stable state' (1982). However as Easley & Kleinburg highlight, 'a user can't tell how well the ad text

reflects the true quality of the landing page' (2010: 634). Nor can the user ascertain the true quality of the product by either the ad link or the landing page. It is likely that over time the page rank will truly reflect the product's quality, but only if not influenced by advertising pressure. The reality is that page rank is likely to be influenced by advertising either directly by pay-per-click advertising or indirectly by external media advertising. Therefore advertising augments page rank from the true quality of a product in a market.

As previously described, the user history develops the rank value of a link over time. The more it is used the higher the value becomes. This applies to an advertising campaign's effect on user awareness. The more successful a campaign the more times the link is selected and the rank lineage improved. This effect is described by Anderson as 'the long tail' (2008). The long tail describes the accumulation and fluctuation of value over time, and can be used to govern the success of an advertising campaign over both geography and time. The long tail is of great use to advertisers as it provides evidence of a campaign's success and assists in the development of strategies for further campaigns. For our purpose the long tail provides a way of mapping how advertising accumulates a brand's value and allows page rank monopolies to form over time. Paradoxically we can also find that the long tail provides an opportunity to look at how similar brands or information can collectively accumulate for the benefit of less individually popular brands (2010: 487). In essence we can view brands as guided 'rank clusters' developing alongside unguided 'search clusters' governed by content association competing in an environment evolving through search rank selection pressure.

The mechanisms behind rich-get-richer dynamics provide an understanding of how popularity arises from competing information. As I have described the use of the term 'rank' relates to search engine ranking technologies. Brand-guided rich-get-richer dynamics relate to *rank* as advertising is set up to directly influence rank value. It therefore follows that unguided user content association falls under the rich-get-richer category of 'search' as it relates to user search interactivity. Regarding rank rich-get-richer dynamics Easley & Kleinburg suggest 'a few very popular items have the potential to crowd out all others… this kind of feedback can accentuate rich-get-richer dynamics, producing even more inequality in popularity' (2010: 489). This accumulation, if unchecked can lead to online monopolies. Examples can be observed in both websites and search engine technologies that dominate a market. Unregulated online monopolies have the potential to affect creative innovation, data ownership, intellectual property, patent clarity and copyright policy.

In regards to search rich-get-richer dynamics, users can counteract ranking rich-get-richer dynamics by typing a wide combination of search queries. As Easley & Kleinburg highlight that more focused search query groups 'can in fact provide ways around universally popular pages, enabling people to find unpopular items more easily and potentially counteracting the rich-get-richer dynamics' (2010: 489). We must recognize search engine technologies can be of great benefit but are subject to manipulation and over-filtering of information. When researching information we are in danger of supplementing linear for lateral research methods. Ultimately using both methods of research will provide the best outcome. As it stands, search engine technology is primarily laterally focused leaving it up to the user to research linearly. Lateral research is the gathering of related material without any focus on quality or continuity. Linear research is the process of filtering gathered material into relationships that build toward a focused and cross-referenced body of knowledge. Easley & Kleinburg acknowledge 'the design of search tools is an example of a kind of higher-order feedback effect: we can reduce rich-get-richer effects, or amplify them' (2010: 489). With continued use of search engine technologies as they stand, users are guided by the search engine interface to habituate lateral research methods. The neglect of linear research may affect society more profoundly then we would wish. As Easley & Kleinburg write, 'these are among the subtle consequences that take place when we inject sophisticated information systems into what is an already complex social system' (2010: 489).

Viewing sociocultural technologies from a biological perspective helps identify similarities between sociocultural and technological information lineages. Easley & Kleinburg note, 'it is never clear a priori how much one can extrapolate from digital interactions to interactions that are not computer mediated, or even from one computer-mediated setting to another' (2010: 88). Evidence of the interactive connections between these environments will inform the debate concerning memetic information proliferation and clustering in order to define online search lineage as having significant memetic traits. Easley & Kleinburg propose that 'the kinds of measurements enabled by these large data sets represent interesting first steps toward a deeper quantitative understanding of how mechanisms of link formation operate in real life' (2010: 89). If advertising measured sociocultural lineages from a biological perspective, campaigns would produce data that would help a campaign adapt to new customer groups and emerging markets.

The internet is a synthetically derived tool for information storage and transfer, although information creation and sharing are not specifically goal-directed in favour of any individual user or company. The abundance of available data can directly inform a user's search while indirectly influencing the search fitness of data sets. Easley & Kleinburg suggest 'at the heart of many of these issues, is the fact that the Web has shifted much of the information retrieval question from a problem of scarcity to a problem of *abundance*' (2010: 352). Advertising will have to face the problem of abundance as advertisers wish to present a message to a consumer but the automation of internet advertising may well lead to the over-saturation of an advert's message if it is not targeted toward interested consumers in moderation.

Amazon's 'product suggestion' is a good example of a cooperative approach to advertising as it follows user purchase trends and suggests complementary products to the user at an appropriate point of purchase. YouTube provides a bad example by forcing users to watch a snippet or full advert before being allowed to access the content the user wished to see. Companies that force advertising can alienate consumers while companies that cooperate and co-adapt will add value to their brand's integrity. The popularity and use of a word or sentence provides the selection pressure. If a brand harnesses relevant search terms, taking into account the speed, accuracy and functionality of site infrastructure, they will be able to monitor and improve their brand's survival strategy in the search environment.

Chapter Two | *Social Media as an Organism*

Introduction | *Advertising Proliferation through Social Media Infrastructure*

In the first chapter we identified the internet as an environment of information that can be searched under a number of criteria. Search engines are designed to minimise search time and maximise search relevance. Search engines store and rank webpages, providing us with a set of properties that we can use to promote and demote information value. This first level of the information environment could be described as a primordial soup of information with single cells of information floating around in cyberspace. This chapter looks at how information can be combined to produce cellular differentiation within the search environment. Node clustering is the first stage of informational morphogenesis. From an advertising perspective a brand is an information cluster that combines *information nodes* to form a cluster of relevant information. The cluster of information relates to the brand's image and lifestyle indicators to form the *advertising campaign*. Node clusters can also emerge organically through user interest. This form of clustering has been described as 'trending' (Becker, Naaman, & Gravano, 2011). Although trending is often unforeseen, brands can use trending as an advertising tool to model and streamline online campaigns. The ultimate goal of a brand in an online environment is to become a hub that groups and engages with as many clusters as it can.

A *hub* is fundamentally a group of groups or *clusters* that form an online environment of its own. EBay is a classic example of a hub as it combines buyer and seller user groups within the eBay environment. Hubs can also be collaboratively developed, as in the case of Wikipedia, an environment that combines readers, authors and authentication groups. As we will see, advertising has reached a milestone and must evolve to suit these new conditions. For a brand to become successful in an online environment it will have to develop an environmentally co-adaptive brand strategy. As user groups develop online, group hierarchy dynamics emerge. If a brand wishes to engage with user groups it will have to traverse the complexities of such group dynamics. If a brand has developed a branded online environment for its target users, the brand could then consolidate its products and build upon its brand capital within the group in a variety of ways. But let us first clarify the variety of *cascade cluster* dynamics to gain a holistic understanding of *node-cluster-hub* morphogenesis.

Nodes, Clusters and Hubs | *Network Infrastructural Dynamics*

A *node* is a singular piece of information. This can be defined as a word or a string of words that identify an idea. We can describe a node, from a memetic point of view, as being a single meme. In evolutionary terms, a meme is equivalent to a gene – the term used for a singular piece of biological information. Like a gene, a node/meme is of indeterminate length and is impossible to truly define without taking into account its surrounding nodes. This ambiguity is a great problem when trying to describe genes, memes and nodes as they are hard to truly quantify. It is also worth noting that the properties of genes and memes are not identical: genes can be studied and pulled apart as they have a physical presence; memes, on the other hand, will never truly be dissected as thought can only be dissected philosophically as a dialogue between thought and meaning. However for our purpose a node/meme is a singular piece of information, for example the word *ship*. The word ship could be placed in combination with other words or nodes such as *naval* or *container*. The linguistic combination of *naval ship* produces thoughts of sea battles and historical wars. *Container ship* develops a significantly different combination of thoughts such as global trade and commercial enterprise. As we can see a node is constantly placed in flux due to our past experience and consolidation of meaning. The node is the first level of a process of meaning combination and should be considered as an element of thought, even though it is highly volatile in combination.

If nodes are the elements of a thought then a *cluster* is the thought, or the combination of thought elements. That is, a *cluster* is a collection of nodes that share similar meaning or nodes that combine meanings. For example nodes can relate a topic such as *plant*, *tree* and *flower* or combine such as *captain*, *ship* and *treasure*. The cluster is formed by the combination of constituent nodes. In memetic terms a cluster is described as a 'memeplex': a combination of ideas that reinforce one another. Schools of thought, interest groups or political ideologies can be seen as memeplexes. Clusters, like nodes, are volatile in combination and effect and are affected by each other. The memeplex is a complex of memes as a cluster is a complex of nodes. The cluster can emerge, develop, parasitize, be parasitized and atrophy – a process similar to cellular evolution. The gene *nodes* build the structure of the cell *cluster*. The cell is in a constant arms race with other cells it encounters. The cell is evolved by its environmental conditions and develops over an evolutionarily biological timeframe. The cluster or memeplex can adapt at the speed of thought and can influence generations, as in the case of religion. Thought is reliant on the human

mind to house it, but that does not stop thought from being deadly to its host in relation to protecting an ideology. In short, the cluster is the formation or collection of nodes that can be viewed as working in combination with one another for mutual benefit, or simply for identity classification purposes.

A *hub* is an overarching structure that uses clusters to develop an environment in which clusters can interact without directly harming the hub. One might suggest that a hub is essentially a cluster that has developed to such an extent that it envelops smaller clusters. Hubs are no more than super clusters that group the constituent clusters for mutual benefit. EBay is an example of a hub that holds a vast range of products that are bought and sold by users and small businesses. EBay's main business is the auction interface environment and customer integrity ranking system. Each individual and company is a cluster in its own right. EBay provides a hub that allows these clusters to interact safely in an environment based on rules of trust. In memetic terms the hub is a large memeplex like a religion. The religion is based on a set of values and traditions, with stories to consolidate the mythology of that religion. The mythology can be interpreted in different ways and can often be contradictory; however the mythology is consolidated into a religious doctrine. In biological terms a hub could be identified as a complex organism like an animal. The animal is built and kept working by a vast range of cells, organisms and environmental cultures. The organisms do not work consciously for the survival of the animal but their contribution benefits the whole. Essentially the hub is a complex cluster that consolidates smaller clusters for mutual benefit. Like clusters, a hub can emerge, develop, parasitize, be parasitized and atrophy but are more stable as its size often defends against systemic atrophy. This structure of collaborative reciprocity heightens the survival of both the hub and enveloped clusters.

We should always remember that, when referring to similarities between biological, memetic and network structures, we are merely identifying similarities. There is no direct connection between genetic, memetic and network cluster development. I only suggest that there are causal similarities that link our understanding of the three to the process of evolutionary selection. Biological evolution is the classical example, and has led to the evolution of human consciousness. Human consciousness has allowed us to share and select useful or popular skills and ideas, thereby bringing about the process of memetic evolution. Finally, with the advent of information networks we are now faced with another environment for evolutionary selection to take place: the evolution of digital information in the online, virtual space. We are now able to manipulate large data and study society in real time by tapping into the data available

to us online. This may have serious implications for society and our engagement with information. Technology evolves at a speed that vastly outpaces any form of evolution that came before, and we should consider the possible social consequences and the effect on our environment as a whole. Let us now examine how the *node-cluster-hub* model allows us to understand the dynamics that evolve digital networks and how they can be affected by advertising practice and naturally occurring factors.

Node-Cluster-Hub Traffic | *Cascade Dynamics*

Advertisers can promote information nodes by adhering to search engine standards and leveraging rank lineage, but if we are to develop a cohesive brand campaign we need to combine information nodes to the benefit of the whole. As noted in the previous chapter, Amazon has a highly effective system of providing links to associated products without interfering with the purchasing process. This benefits Amazon in two ways. Firstly Amazon could potentially make an additional sale if the user likes the recommendation. However if the user does not wish to add the recommended addition then the sale is not impeded. Amazon's brand is therefore seen as helpful yet non-intrusive. Facebook and YouTube have advertising attached to content. Facebook places adverts in a user's news feed while YouTube places adverts in front of selected videos. Both forms of content could be perceived as intrusive and work against the brand's reputation as a content provider, and may lead to advertising avoidance (Baek & Morimoto, 2012; Cho & Cheon, 2004; Edwards, Li, & Lee, 2002).

Essentially a cluster is an entity formed by *cascades*. Whether the cluster is created intentionally by an advertising campaign or formed emergently by user interest, the cluster provides the evidence of cascade activity. Data mining has the potential to identify new markets in which to trade and streamline many areas of human life. Data mining will become one of the largest forces effecting cultural change (Meisel & Mattfeld, 2010; Smith et al., 2006). With this in mind, there are many ethical challenges that will need to be addressed. We have seen many examples of ethical challenges relating to the data protection of governments, companies and individuals. The power of data mining should not be underestimated. Data mining could, if used incorrectly, severely compromise human rights. However if ethically legislated, data mining could help empower individuals to collaborate and develop a transparent, efficient and

enlightened society as I will discuss in Chapter Three. The main concern for society today is that of inequity (Wilkinson & Pickett, 2010). Data mining can help identify cultural trends over time and assist in correlating socioeconomic activity. Furthermore, cascades of human interest can unlock collective intelligence (Surowiecki, 2005). As we become more connected, we become influenced by our connections. It is this ecosystem of cluster connectivity that we need to understand. We need to understand the selection pressure that enables a cluster to survive – and ultimately to understand what properties define the health of that ecosystem. We may focus on the flourishing of an ecosystem or its demise. But it is the interplay of such forces that will best shed light on the whole, with the view to making improvements to a cluster, as well as to the ecosystem in which it survives. Just as there is no culture without nature, there is no online clustering without user cascades.

Our aim is to build upon our understanding of the search environment by identifying how social media cascades emerge (Comm, 2010; Halligan & Shah, 2010; Kirkpatrick, 2011). This emergence of connective traffic between nodes of information may occur in two ways. User cascades develop through online communication via *user ratings, like tags, Twitter feeds* and other user-based endorsement, when an endorsement rating or a link guides other users to make the same choice as the endorser (Chang, Wen, & Tan, 2012: 635-637). This choice is memetic as the user is mimicking the endorser's choice. Information nodes, on the other hand, are primarily connected by the similarity of key terms in the information that is determined by search engine ranking bots. The nodes of information are initially ranked by the search engine. Over time user interest in certain nodes can further develop the node relationships by raising the search rank of valuable information and recommending in-links to the information's uniform resource locator (URL). Over time information develops a *rank-lineage* that is further strengthened by user *search-lineage*.

Cascades can emerge naturally or can be encouraged by advertising practice (Easley & Kleinburg, 2010: 444). Cascades direct the search traffic to a given webpage or node of information over time. Cascades can be created consciously by a user group organising an event. Or a cascade can emerge over time as a cultural trend such as *planking*: a potentially dangerous trend in which people take photos of themselves lying flat in precarious places and publish the images online (BBC, 2011). The emergence of a sociocultural cascade has memetic properties as described in Chapter One. The social meme can proliferate even at the cost of human safety, such as planking on the edge of a tall building. Over time

cascades form node clusters that can be valued by a hit rate – the number of visits in a given period of time – or by in-links and out-links or by the number of HTML links that direct users to and from a node of information. Examples of node clusters are online social media groups, Twitter feeds, interconnected websites or collections of related data sets (Easley & Kleinburg, 2010: 489). Let us now focus on the user side of node-to-node connectivity.

The Transfer of Ideas | *Information Cascades within Groups*

Prior to the internet, telecommunications provided the ability to pass on interesting information to friends and family. With the advent of social media, such information could proliferate across a range of online social media platforms and be transferred without the hindrance of time or distance. A *user-to-user* cascade is simply the transaction between two online users. Users engage with the internet motivated by a goal or idea in mind. As previously mentioned, ideas can be fluid – in Gleick's words, 'Ideas have retained some of the properties of organisms … they too can fuse, recombine, segregate their content; indeed they too can evolve' (2011: 311). The user is a node through which ideas can flow. The internet stores past ideas that, as Price & Shaw describe, 'interconnect at all levels – the individual mind, the interpersonal exchange, the intra-organisational and the inter-organisational' (1998: 361-362). The big difference is that the brain forgets and the internet does not. For this reason the internet becomes a universal repository of ideas. This repository is of great benefit to the user as it can provide answers to many questions. But this repository may have a feedback effect upon humans, as Carr observes: 'the arrival of the limitless and easily searchable data banks of the Internet brought a further shift, not just in the way we view memorization but in the way we view memory itself' (2011: 180).

Traditionally humans have had a vertical transmission of ideas handed down through family inheritance, and an oblique transmission through social grouping (Shennan, 2002: 44). As with many social animal groups, hierarchies are often formed. Each human has a set of ideas, but the human with the most useful idea becomes more useful as a human. To hypothesise the thoughts of others is a further tool for gaining tactical influence over others. As Pagel writes, 'it became necessary to have a "theory of mind" a sense of knowing what you think another animal knows, and being aware that it is having similar thoughts

about you' (2012: 311). The theory of mind is the tactical force behind social connection and idea development. As previously stated, the 'meme itself, represents a useful shorthand way of referring to the idea that culture is an evolutionary system involving inheritance' (Shennan, 2002: 48). The meme, like the mind, develops according to input stimuli. A single user has his or her beliefs and knowledge specialties, but every external influence introduces the possibility of change and development. On a small social group scale a culture can become very complex, but with the introduction of the internet and social media, the complexity has suddenly increased, as Shirky writes: 'The ability of people to share, cooperate, and act together is being improved dramatically by our social tools' (2008: 321). The improvement to our lifestyles due to internet connectivity may also have unforeseen side effects on societal traditions and cultural traits.

Guiding Cultural Traits | *Guided Variation within Culture*

As biology is governed by natural selection, culture is governed by 'guided variation' (Shennan, 2002: 51). We collectively guide variation within our social groups. Wikipedia pages are a perfect example of guided variation. The pages can be written by anyone in the world, with or without any authority on the subject. People research and contribute to the subject, thus improving the subject content. However as Shirky reminds us 'Wikipedia pages on subjects ranging from evolution to Islam to Microsoft to Galileo are under fairly steady threat from people who want the contents significantly altered or removed' (2010: 179-180). Wikipedia has a group of people that review conflict pages but a large proportion of page development is not of high political significance so is often developed with appropriate improvements. We could suggest that belief drove the dispute found within the aforementioned Wikipedia pages. Belief is one of the guiding variants, the second is financial guidance and the third is group or *brand* guidance. As Shirky describes, 'this tension between the individual and the group reflects the strains involved in taking advantage of cognitive surplus for public and civic uses' (2010: 179-180). Wikipedia is a self-accrediting platform but that does not make it immune to fraudulence. Interested groups will inevitably leave their mark on the global store of knowledge for the betterment of the group's opinion, not the subject itself.

An advertiser's role is to assess the market and develop bonds between target audience and product. Advertisers try to identify what Holt calls 'myth markets' (2004: 39) as a way of connecting a brand to a cultural myth. Myth markets are, however, volatile and can shift relevance with use. This is the evolutionary property of a cultural myth, as Holt highlights: 'Iconic brands not only target the most appropriate myth market; they are also sensitive to cultural disruptions, shifting their target when opportunity strikes' (2004: 39). Myths survive due to their popularity while unused myths die off. Alternatively a myth can also adapt and change to better suit a new audience. A myth is a network of ideas integrated together to create a new idea. However even large myths can break down; as Johnson describes, networks should be 'plastic, capable of adopting new configurations. A dense network incapable of forming new patterns is, by definition, incapable of change' (2010: 46). To identify a myth market, advertisers can look at the success of rival markets and adapt their brand to fill a niche or dominate a contested market. Brands must be recognizable and, as Johnson writes, 'able to recognize and respond to changing patterns' (2004: 103). In effect patterns of information reflect our cultural lexicon as they are recognised as cultural artefacts. If a pattern of information bears no relation to a cultural artefact then it has no markers of definition.

To have a market platform and a brand are vital to a business; however, design and infrastructure are the physical entities a user needs to interact with the brand. Google decided early on to study how their users interacted with their product. As Carr writes, 'Google relies on "cognitive psychology research" *by monitoring eye movements* to further its goal of "making people use their computers more efficiently"' (2011: 151). Humans tend to minimise effort once a task has been learnt. A search engine or website becomes more useful to a user if it follows a previously learnt set of functions. Page layout and navigational regularity streamline user experience and efficiency. This regularity conditions habit and becomes a user's behavioural norm. As Shennan writes, 'culture is not the same as behaviour; it influences behaviour's range of possibilities' (2002: 37). A user makes a search decision; a myth or experience that may have influenced the decision can then be ranked, data mined and finally fed back to the users. This discourse between the user's past experience and the ranked feedback involves a combination of past cultural input and the user's past experience. The more users interact with information the more the information is refined and relevant to the user. 'The patterns are simple, but followed together, they make for a whole that is wiser than the sum of its parts' (Johnson, 2010: 246). Networks develop in combination, looping back to make the network more efficient.

These node clusters essentially stem from neuronal firing, through consciousness, into digital documentation. Information clusters help guide our choices and come in many different sizes and densities, as Price & Shaw explain: 'In any complex system, self-organisation; spontaneous and emergent order, depends on the density of agents in a network' (1998: 304). A dense cluster would indicate its health, growth or decline over time. Smaller clusters could indicate a close interest group or a less popular information cluster. Data could be mined to effectively model cluster dynamics. It is likely that there will be diversity within clusters but there is likely to be an average density, or evolutionarily stable environment. As Gleick describes, 'the standard model for plotting variation was and is the bell-shaped curve. In the middle, where the hump of the bell rises, most data cluster around the average. On the sides, the low and high extremes fall off rapidly' (1988: 84). There is a variety of cluster densities each with its own ecosystem, intricately linking both culture and the general store of human knowledge. Shennan writes, 'entities that interact with the environment in such a way that their differential success at what they do has consequences for the differential perpetuation of the procedures and ideas behind them' (2002: 266).

Data Mining | *Trend Forecasting and Data Commodification*

In the past humanity has had to evolve due to forces of scarcity within an environment (Claxton, 1994: 111). A similar dynamic has governed the way humans have tried to store gathered data in libraries and places of learning. Privileged access and education limited the spread of information among society. Now we have a network that provides us with a totally new environmental force, that of abundance. The social distribution of knowledge defines a user's predicament. We cannot know everything so we specialise in a field of study and rely on others to specialise in other fields. As Berger & Luckmann explain this process 'culminates in exceedingly complex and esoteric systems of expertise' (2011: 46). Our expertise defines us and becomes a way of defining us within the world. As Claxton describes, 'our fundamental tactic of self-protection, self-control and self-definition is … telling stories' (1994: 116). Our whole identity is wrapped up in the story of the self. We are a good father, mother, daughter or son. We hold down a job and we have friends. All of our lives are built upon a vast range of signposts that highlight who we are. These signposts can be identified online through our social groups and the products we purchase. Planning companies purchase statistical information relating to online trends to better target

social groups and offer related products to the target groups. Search metrics are often data mined for commercial use without a user's knowledge, or the users are required to waive their rights of disclosure in order to be able to use technologies such as Facebook, Twitter and most online email services.

Google's original PageRank function has been developed over time to data mine societal consensus results but now also tracks personalised results. This, as Pariser notes, 'represents a shift in how Google understands relevance and meaning' (2011: 177). A Google account can be seen as a very user friendly way of accessing personalised data but is also a great way of modelling that human's behaviour. A common defence of such intrusive monitoring is the caveat: "*You're only worried about being monitored if you have something to hide*". This of course relies on the institution monitoring you being open and transparent, which is unlikely to be the case as the act of monitoring is often a secret and intrusive technique. However most energy has been spent building upon improving traditional search models as Barrat, Barthélemy & Vespignani describe: 'Empirical observations of heterogeneities have also revamped several areas and landmark problems such as Boolean network models and the issue of stability and complexity in ecosystems' (2008: 267). The internet, much like company intranets, can suffer from spikes in traffic and data delivery that need to be evaluated and resolved. As Barrat et al. highlight, 'infrastructure networks may also be affected by rapid evolutions during cascading failures, or may have to be reshaped because of the traffic they carry' (2008: 240-241). Networks have to be restructured to minimise failure and maximise efficiency. For the moment this process is overseen by web architects and programmers, in reaction to naturally emerging real-time traffic. It is likely however that the monitoring and correction procedure will become totally automated.

John Wanamaker is quoted as saying 'Half the money I spend on advertising is wasted, I just don't know which half'. Of course this no longer applies to advertising. You can instantly measure the success of advertising campaigns in real time. Advertising budgets can be cut as wasted effort is quickly identified and amended. There is a flip side to such ease of data collection and distribution that has deeply affected certain traditional industries, as Pariser describes: 'Bloggers and freelance journalists started to package and produce news content for free, which pressured the papers to do the same online' (2011: 48). The traditional news media has shifted dramatically, leaving news agencies in serious danger. News agencies leapt into online distribution without consolidating a payment system. They also neglected to address the problem of competing with free online news blogs and search-engine-developed news services. With

so much money at stake companies must be aware of new environments of growth and revenue to build upon their business as well as identify emerging threat markets. Search engines have developed a very successful business model, with its revenue based on advertising auctions. It does not matter what you search for, as Easley & Kleinburg point out, 'When you look at a search results page today, you see the results computed by the ranking function alongside the paid results' (2010: 365).

Search engine ranking functions will always be hidden from the public as the technology behind the ranking function is the intellectual property of the company. No company would allow this information to be made public as competing companies would benefit from the data. Furthermore, unregulated search engine optimisation would soon boost the search rank of large companies to the detriment of data relevance (Easley & Kleinburg, 2010: 365). If data metrics are misinterpreted for the benefit of an interested party, the sociocultural norms can produce unwanted effects and in extreme cases sociocultural norm violation. An example of norm violation would be the monopolising of a market by a company, triggering retaliation from affected companies in that market. Data analysis makes assumptions about the future based on past trends; however this bias augments the future trajectory in favour of past trends. As Pariser describes, 'algorithmic induction can lead to a kind of information determinism' (2011: 135). However digital networks are fundamentally developed by humans and humans can decide what digital networks best support human culture and survival. Pariser is more critical when he says 'technology mostly can't distinguish compulsion from general interest' (2011: 127). Technological problems will always be amended with time but we must be forward thinking about the trajectory of human culture. Google, Microsoft and Comcast executives have described what they call a convergence of digital networks (2011: 65). With the rapid innovation of digital networks, this convergence becomes increasingly likely.

Identifying Patterns | *Network Pattern Emergence and Atrophy*

We need to be cautious when identifying similarities between ecological and digital networks. Cybernetic systems do not tend toward stability or an *evolutionary stable state*. Norbert Wiener believed that you could study and map ecosystems to reveal the hidden systems underlying ecological stability (Odum & Barrett, 2005; Wiener, 1961). However the more research gathered, the more the evidence suggested

ecosystems can change dramatically (Meadows, 1972). An *evolutionary stable strategy* is a survival strategy that helps an organism to endure a very diverse and unstable ecosystem. The environment is in constant flux, and the survivors adapted through that environmental change. Genetic fitness is a line traced through family heritage. It only shows you the survivors that reproduced along that path. Evolution can seem deterministic when looking back over genealogical history, but our future evolution is open and subject to radical change. As Price & Shaw write, 'patterns, like genes, are not right or wrong – they simply *are*' (1998: 321). Consciousness helps the genetic entity survive; it could be considered as an evolutionary stable strategy. The hierarchical nature of culture and society suggests that hierarchy could also be considered as an evolutionary stable strategy.

Humans have been able to develop a cultural hierarchy on top of biological hierarchy. But we should consider the digital world as being in its infancy – a primordial soup governed by probability, and incentivised by connectivity. Digital networks develop and dissolve like waves of connectivity. A developing network is a network that is in a state of *emergence* and an eroding network is in a state of *atrophy*. We may also describe a network as being stable; however this is never really the case as the network will always be fluctuating between emergent and entropic states. Only when a network is sustained do we recognise it as an identifiable brand or group. Anderson writes: 'Our culture and economy are increasingly shifting away from a focus on a relatively small number of hits (mainstream products and markets) at the head of the demand curve, and moving toward a huge number of niches in the tail' (2008: 52). The effect of this vast range of connectivity is essentially freedom. A user has total access to open areas of the internet with next to no effort. Brands must incentivise choice in their favour. As Anderson suggests, 'the true shape of demand is revealed only when consumers are offered infinite choice' (2008: 52). This new user freedom comes at a cost to a network's stability. The network has to continually adapt at a culturally rapid rate to remain competitive, and be able to identify future opportunities and threats.

Network patterns are *emerging*, *fluctuating* and being *enveloped* all the time. If a brand wants to survive, it should try to respond and hopefully cultivate a market, or 'network pattern'. As Price & Shaw mention, 'the pattern cultivator always has to work with emergence' (1998: 255). A brand should not only find patterns in a market but react to the market. Reviewing a brand's network structure continually makes it responsive. The more data you can mine, the more statistics you can implement into a market network model. Data mining and network pattern management may need to be more closely governed in regard

to the data protection of an individual's private data. Yet at a trend recognition level the data could be useful. As Shennan points out, 'the amount of wasteful advertising in any competitive system should depend on the variation in the competitive ability of the entities involved, including the ability of the worst competitor, and the pay-offs for advertising' (2002: 252). However we should not forget about pay-offs to the user, remembering that the user is a major contributing entity in the network system. Shennan splits the tactical elements of a network into 'Actors, Strategy, Currency and Payoff' (2002: 24-25). Or in Johnson's words: 'Pay attention to your neighbours', 'Look for patterns in the signs', 'Ignorance is useful', 'More is different' (2004: 78-79). The more we mine data the clearer network patterns become. These patterns are likely to provide us with a deeper sense of how unstable network ecosystems are over time in relation to environmental pressures.

Advertising and Data Collection | *Trading Organisms within Information Ecosystems*

Advertising is an environmental pressure that can manipulate a network's ecosystem. Human culture has often been shaped by mass media, and advertising is designed to bias a message for the benefit of a brand or product. Advertising at best informs a consumer of the benefits of a product. But all too often the benefit of the product is a fabrication invented to prime a consumer's need (Maslow, 1943). The ethics of such a practice in advertising varies on a campaign-by-campaign basis. But as Brin and Page describe, 'Advertising-funded search engines will he inherently biased towards the advertisers and away from the needs of the consumers' (1998). Advertising is inherently motivated to bias the consumer's opinion for profit. This is contradictory to the network's motivation of pure information transfer. And Carr reminds us, 'information is a kind of commodity … Anything that stands in the way of the speedy collection, dissection, and transmission of data is a threat … to the new Utopia of cognitive efficiency' (Carr, 2011: 152). Advertisers should be wary of disrupting network efficiency as it could do substantial damage to a brand's reputation. In the case of Google and other search engines, advertising takes the form of a matching service much like 'computer dating' (Levy, 2011: 117). The more a brand sticks to a search word term formula, the stronger the connections become between the user's search term and the brand's website search tags. In this way both brand and user are matched. In effect we have a win-win for brand and user, but actually it is a win-win-win system as Google makes money from all the user click-throughs

to the brand's website. As Levy describes, 'Google … had cracked the code to making money on the Internet. Google had invented one of the most successful products in corporate history' (2011: 69).

Google is not just a new generation of advertising; it is a new platform of advertising. Google is an ecosystem, in which brands can evolve. Google is the gatekeeper of a portal between brands and users, the new middle man, the road toll of the online world. Sir Tim Berners-Lee, the inventor of the World Wide Web, gave his invention free to the world. Google's search engine is also a free world service, but it auctions its data to the highest bidder. As Levy describes, 'the company name became a verb, and the media seized on Google as a marker of a new form of behavior' (2011: 77). Google is motivated to allow companies to access its ranked data while heavily guarding its ranking technology. As Johnson says, 'the promise of an immense payday encourages people to come up with useful innovations, but at the same time it forces people to protect those innovations' (Johnson, 2010: 232). A company protecting its innovations is not a new thing. Patents have protected innovators for generations. However in the technology age we, as a global society, may have to shift our position away from the protection of a minority to the protection of the majority. Johnson argues, 'we are often better served by connecting ideas than we are by protecting them' (2010: 22). Google's mantra of "Don't be evil" could include loosening its grip on its search portal monopoly, but Google is unlikely to want to do this as it is a profit-based company. Even though its platform offers a free market system, Google has no incentive to allow other search engines to compete with it. Without the competition found in a free-market system, Google's innovation may stagnate.

It is unlikely that Google will slow its pace of innovation but Google's success may itself lead to user discontent. As Carr writes, 'the number of incoming links the page attracted and the authority of the sites that were the sources of those links' (2011: 154) define the website's authority. In this way Google, Facebook and Twitter are the most powerful authorities of user interaction in the western world. Recently America's National Security Agency has been accused of hacking Google and Facebook's systems for reasons of national security. This has sparked debate about the NSA's misuse of civil rights on the premise of national security. However the same could be said about Google, as Google has *carte blanche* to use its search metrics in any way it wants, with limited scrutiny. And Google's mantra, "Don't be evil" is a clear indication that even Google itself realises the potential it has to, in fact, do evil. Sir Tim Berners-Lee himself on the 25th anniversary of the internet has suggested, in his campaign 'Web We Want' (Tim Berners-Lee, 2014), that a new *Magna Carta* be drawn up for the internet to preserve the civil rights of

online user data. At this moment in time the internet is becoming the gigantic repository of all human knowledge. We should be cautious about how the internet is monitored and by whom.

From an advertising perspective, the tools used to collect data on a target audience are now collated in an online repository that is purchased and implemented into a brand's strategy. Another strategy might be to open up the brand to suggestions from its target audience. Social connection between a brand and its audience is likely to be the best survival strategy for a brand. The brand is constantly getting feedback and can change to the needs of the audience in real time and at minimal cost. As Johnson writes, 'liquid networks, slow hunches, serendipity, noise, exaptation, emergent platforms do best in open environments where ideas flow in unregulated channels' (2010: 232). Unregulated channels sound nice however in reality most channels are regulated by one organisation or another. Data on the other hand is, by its nature, there to be used, and can proliferate anywhere on the internet. The more profitable the use of the internet becomes, the more companies will use it to consolidate brand loyalty. The best platform to consolidate loyalty is to have customer user data all in one place and all on the internet – or as we call it today, a 'Cloud'. However in reality the data is stored openly for Google to use. As Levy writes, 'Google had declared that the cloud was its destiny. And ours' (2011: 212). Google is now becoming much more than just a portal to the internet. Google is trying to envelop a user's online experience. Gmail, Google earth, Google+ and many more Google products are designed to help the user and store information on the user to help the user. The question of online data control and ownership is not for us to discuss here; however, this question still needs to be resolved for the preservation of a user's civil rights.

Copyright and patents have become problematic for companies and individuals. Music and newspaper industries are losing profits, while individuals are downloading content all over the world without considering the legality of their actions. Shirky observes, 'the basic problem of copying and distributing information, previously an essential service of the music and newspaper industries among others, is now largely solved thanks to digital networks, undermining the commercial logic of many industries that relied on previous inefficiencies' (2008: 209). Media companies understood that self-published content on the internet was less likely to be of a high standard and trustworthy. But they did not comprehend that the effortlessness of publishing online would greatly affect the stability of professional media outlets. Shirky writes that 'from now on news can break into public consciousness without the traditional press weighing in' (2008: 64-65). The new editor of media is now the collected knowledge of internet users,

working as a hive mind. Each individual user can still choose what news to engage with; however, past interactions by other users affect how that news is presented to us. Each individual contributes ideas to a network or hive of other contributors. The hive mind is the sum opinion of the whole network over its individual contributors. As Pariser describes, 'each article ascends the most-forwarded lists or dies an ignominious death on its own' (2011: 65). The effortless nature of internet transfers has made possible new work methods, forcing adaptations in business practice. Industries will have to adapt to suit the new environment or die out. In this process of transition, media industries and lawmakers must re-evaluate intellectual property law to minimise the suffering and maximise the education of individuals. Industry must understand that they are suffering from a shift in technology for which they are responsible. We can prosecute individuals or open up a dialogue with users to improve legal and appropriate online distribution services. From a brand's perspective, prosecution only bites the hand that feeds. In biological terms a brand survives in synergy with its target audience. If a brand becomes hostile towards its host then the target audience is likely to retaliate, to the benefit of no one.

Online Social Connectivity | *Online Engagement and Information Transfer Systems*

I have previously noted that humans have evolved to look out for both threats and opportunities, with the aim of cost minimisation. Our survival is highly aligned with our behaviour, thus humans have developed behaviours and strategies to enhance their survival. Furthermore, humans by nature are social animals, and 'when people are connected by a network, it becomes possible for them to influence each other's behavior and decisions' (Easley & Kleinburg, 2010: 425). As people start to align themselves to others around them, some strategies based upon selfishness develop into altruistic strategies. We form interest groups, cooperatives or corporations. The city *hive* is a living example of human connectivity. We are now further connected, at very little cost. The online world breaks down physical barriers of connection, making our networks global. As Barrat writes, 'the structure of social systems can be generally represented by complex networks whose topologies exhibit … strong heterogeneity of the connectivity pattern' (2008: 216). Thus we form our online networks based on both selfish and altruistic strategies, transferred at minimum cost.

There are various techniques that a brand can use to build a platform of communication. The most popular method used after the launch of 'Web 2.0' is the RSS feed. Web 2.0 aimed to speed up online communication and the RSS feed is a modern technology that is designed to accommodate quick fire communication. As Carr writes, 'RSS readers, which became popular around 2005, allowed sites to "push" headlines and other bits of information to Web users, putting an even greater premium on the frequency of information delivery' (2011: 157-158). Suddenly from basic websites came content that could be interacted with. *Leave a comment*, or *like this content* became the new face of the web. Content can now be judged by a group, so a brand needs to have an understanding of how best to communicate with its audience. Pariser writes, 'the stories that get the most attention on Facebook are the stories that get the most Likes, and the stories that get the most Likes are, well, more likable' (2011: 149-150). We must not think that the likability of content is all important. Groups can tend to close in on a conversation or topic, so we should diversify if we are to develop a broader intellectual outlook.

This group dynamic arises because individuals will align ideas in a process of group consolidation. As Pariser observes, 'conversations between my friends (who will tend to be like me) are overrepresented, while conversations that could introduce me to new ideas are obscured' (2011: 150). A brand should try to identify its online audience and find ways of enhancing their lives, but this can lead to content irrelevance. Groups form because of social benefits such as information and resource sharing. They are a way of communicating and sharing opinion, but ease of communication can lead to an overload of competition, as Carr writes: 'To be up to date requires the continual monitoring of message alerts. The competition among the social networks to deliver ever-fresher and more plentiful messages is fierce' (2011: 158). Social networks can suffer from their own success. It is hard to believe that a company might suffer from online exposure, but a group of users can turn on a company if it bends a social contract too far. A brand is built on its success in gaining custom from users. It must not forget that in an online world both good and bad news has now a limitless, leaderless readership.

If a brand is to develop a strong online presence, it needs to develop a high quality consumer relations platform to communicate and listen to its customers. Humans look for indications of threat or prospect. The best strategy for a brand is to become a prospect if it wishes to build a strong reputation among consumer platforms. As Pagel describes, 'our cooperation depends upon acquiring high-quality and up-to-date information about others' reputations' (2012: 231). Brands have become very powerful – so powerful

as to have become a concern to government security. The Chinese government disallowed Google's *carte blanche* approach to media access in their country in an attempt to control information deemed critical of the government. The USA has also requested Google's cooperation on intelligence gathering. Neither of these agreements has been open to the general populace for debate. Users are being monitored from a distance by ranking functions. To use such technologies on individuals by a government under the guise of national security neglects civil liberty. We see this as socially wrong but it does not affect most of us, so we have little incentive to react. This is a form of habituated disaffection paralysis: the lament 'We cannot fight the system so why try?' However an even more profound problem is potentially arising. As Shirky describes, it is 'when a technology becomes normal, then ubiquitous, and finally so pervasive as to be invisible, that the really profound changes happen, and for young people today, our new social tools have passed normal and are heading to ubiquitous, and invisible is coming' (2008: 105).

The internet by nature is an information transfer system. It is also a medium that envelops our sociocultural connectivity and is now one of the main ways of communicating. This sounds like an efficient and innovative tool for a modern culture, but it has an unforeseen problem. When people can communicate at no cost, any message can travel unhindered. Both truth and lies can permeate the internet with the help of users. Our natural tendency toward pattern recognition and habit formation comes from a set of deep human instincts. The instinct of threat detection, aligned with the cost involved in wasting time discerning threats, leads humans to live cooperatively yet under the shadow of the future. In Pagel's words, 'all of these problems arise because we seldom have access to the truth, and we normally arrive at some guess as to what it is by copying others' (2012: 340). Mimicking others is a very good survival technique but it can lead to the copying of both good and bad cultural habits. An example of group mimicking that is open to abuse is the online method of star rating restaurants. The user reads the average rating then reads a few comments about the restaurant. The user's judgment is based on nothing but other people's opinion. The opinion may be valid but who is to say that the comments or ratings are not biased by a slighted customer or even a rival establishment. Pagel notes 'this is particularly problematic in the hotel and restaurant industry, where a proprietor will hire people to write unflattering accounts of a rival's establishment, and the reports can be read by anyone in the world' (2012: 219). This is not to say that individuals will not learn more sophisticated methods of reviewing data but identifying such data value manipulation is useful to gain a broader understanding of the dynamic interplay involved in rating systems.

Social Organisation | *Online Sequential Decision Making and Opinion Alignment*

Reputation is a vital survival strategy for a brand. It is the audience consumption of a brand that keeps the brand strong. Like any corporation or government, the society as a whole ultimately decides the fate of a social organisation. As Holt describes, 'followers form the nucleus of the icon's customer base' (2004: 140). Humans are not mindless drones; we consider our choices to a large extent. Of course there is always social and political pressure on an individual's choice; however, Jay Appleton's idea of 'prospect and refuge' (1984) highlights how humans traditionally make decisions. As Dutton writes, 'human beings like a prospect from which they can survey a landscape, and at the same time they enjoy a sense of refuge' (2009: 21). The cost of looking for a prospect is reduced when humans work together. Refuge travels with the group because more eyes are looking out for danger and potential places of refuge. Working in groups lowers the cost of finding and collecting food at the minimal cost of sharing gathered food. Although sharing is contradictory to an individual's survival, sharing benefits the group and the group's progeny. As Shirky writes, 'group-forming matters because the desire to be part of a group that shares, cooperates, or acts in concert is a basic human instinct' (2008: 54). In an online context, group formation has many similar benefits. The cost of searching for a good restaurant is reduced by other people's opinions. There is little to no reason for a restaurant reviewer to give good or bad advice. If a human finds food and does not share it, the group may chastise or even banish the individual. Online however the group is anonymous, unaccountable and often acts out of self-gratification. The reviewer is less likely to be truly altruistic and more likely to be reacting emotionally to an ordinary dining experience, perceiving the experience to have been wonderful or terrible. The other motivation of course is that the comments may be posted as a slander campaign by a rival.

Our emotions are intricately connected to our neurobiological evolution and cannot change at the rate of internet groups. Group size is also problematic for us, as we all recognise in daily life. If we had to keep in contact with our entire social contact list as much as our close family, we would not have time in the day to adequately attend to everyone. As Shirky writes, 'as groups grow, it becomes impossible for everyone to interact directly with everyone else. If maintaining a connection between two people takes any effort at all, at some size that effort becomes unsustainable' (2008: 28). This is where the point at which a user's conscious decision making shifts into collective group consciousness. As Barrat writes, 'collective behavior is given by the emergence of consensus in a population of individuals who can *a priori*

have contradictory opinions and interact pairwise' (2008: 225). A consensus is formed and a bell curve of opinion is created. The outliers may not agree with the general opinion, and they may be correct in doing so. However the general opinion is likely to be attained through discussion and our natural instinct to cooperate for mutual benefit. It is likely that the general opinion will develop and improve over time. The popularity of an idea may dwindle as other ideas develop. This fluctuation and consolidation is all developed because of users involved in the group. An idea cascade only solidifies when a user group has consolidated their opinion. If an idea cascade comes into contact with a cluster that holds an opposing idea – if it does not influence or align with the cluster's consolidated opinion – the cascade may be stopped. Easley & Kleinburg note that 'a cascade comes to a stop when it runs into a dense cluster, and, furthermore, that this is the only thing that causes cascades to stop' (2010: 507). Co-operators within a group are likely to continue cooperating. A co-operator may wish to stop interacting with a defector but the defector will want to keep connecting. Barrat summarises, 'these reactions are balanced, and for simplicity only links between defectors are assumed to be rewired' (2008: 240).

An interesting aspect of this *cooperator-defector* group dynamic is its similarity with Dmitri K Belyaev's work on the domestication of silver foxes (Belyaev, 1980). Belyaev developed a breeding program to see if silver foxes could be domesticated by selecting foxes that showed domesticated traits. If a fox showed fear or aggression when interacting with a human, the fox was not chosen for breeding; if a fox showed traits of confidence and play with a human, it was selected for breeding. As the breeding program progressed, the foxes became tamer. Stress hormones reduced and phenotypic expressions such as drooping ears presented themselves. Belyaev's selection process was artificial but provides evidence that behavioural traits can be consolidated though a process of evolutionary as well as guided cultural selection. In relation to the *cooperator-defector* group dynamic, the defectors are selected out by the co-operators. As a group matures it starts to self-regulate toward cooperative stability. If this is not achieved, the group members who defect collapse the group until only the co-operators are left. Cooperative stability is by no means stable, as the environment in which the group finds itself is in constant flux. Yet cooperative stability is the defining selection pressure of an online group. Interestingly this cooperative stability selection pressure is vital to the development of human social domestication. As Easley & Kleinburg write, 'the links in the social network encode strong ties, where the two endpoints of each link trust each other. Thus, we assume that each person in the network knows the thresholds of all her neighbors in the network' (2010: 515). The 'strong tie' is a connection that is trusted and validated by the group. A weak tie is a new or

untrusted connection that has yet to be validated by the group, or has been assessed as being less useful or untrustworthy. Weak ties can become strong ties and vice versa, all governed by group consensus over time. As Barrat writes, 'the agents update their internal state through an interaction with their neighbors and the emergent macroscopic behavior of the system is the result of a large number of these interactions' (2008: 216).

As I have described, cascades occur because of sequential decisions being made by users, with later users forming opinions based on previous user decisions (Easley & Kleinburg, 2010: 425-426). Copying behaviour aligns user opinions until the cascade becomes a grouped cluster. When a cluster of users start to consolidate the group toward cooperative stability the cluster takes on the properties of a hub. The hub is a network built from user cooperation and goal-directed belief. This social contract underpins our entire cultural infrastructure. Regional dialects, trade and social etiquette are all forms of social contract. Furthermore, as Pagel describes, 'money, like reputation, is an abstract system of trust' (2012: 219-220). If a brand wishes to develop a hub platform for users to interact with, it must consider the motivations of both the users and the group-aligned user opinion. The group-aligned ideas represent a new form of *brand-to-user* discourse. Neither the brand nor the user has full control over the development of the goal-directed alignment. If we can identify the trend, we can then use that information to supply the users with innovations that are better tailored to the group's needs. In this way a brand can evolve seamlessly with innovative ideas. As Johnson describes, 'good ideas may not want to be free, but they do want to connect, fuse, recombine. They want to reinvent themselves by crossing conceptual borders. They want to complete each other as much as they want to compete' (2010: 22). Looking at data over time is an effective way of studying the success of a brand over time. Now we can gather data from a network of users, the linear study of data can take on a more networked approach. The more a brand watches out for user clusters, the more it can fulfil and integrate with that cluster. As Holland describes, 'significant innovation depends on the "long line": the ability to go beyond cut-and-try recombinations of well-known building blocks to the more distant combinatorial horizon' (1999: 244).

Network Emergence | *Aligning Nature, Nurture and Culture*

Ultimately culture is a process of definition and selection of ideas. Whether as ideas in themselves or manifest as cultural objects, it is the categorisation of ideas that allows us to identify and interact with our culture. Culture is always in flux and evolves in reaction to the cultural environment. As Shennan states, 'assessing the extent to which cultural drift is the sole process at work on a tradition provides us with a basis for assessing the extent of selection' (2002: 266). All of these processes could easily fall under the classification of anthropology or semiotics; however it is more closely aligned with memetic processes. Our reality is a combination of imitated traits learnt from family and friends that are further developed throughout our lives. With the internet we can affect and be affected by anyone, anywhere, at minimal cost. Gleick writes, 'as the arc of information flow bends toward ever greater connectivity, memes evolve faster and spread farther. Their presence is felt if not seen in herd behavior, bank runs, informational cascades, and financial bubbles' (2011: 322). I suggest we are only in control of a small part of the total process of *node-cluster-hub* evolution, and collectively we could make a great impact on a well-established hub. But it may be wiser to let the collective mind govern. Johnson notes, 'because the decision-making process is spread out over thousands of individuals, the margin of error is vanishingly small' (2004: 77). Johnson was writing about ant colonies but the same applies to humans. The more individuals there are, the narrower the margin of error, even with groups of individuals with agendas. Indeed, we should be wary of leaving this process as an unchecked *free market* of cultural ideas because majority governance and regulation should be part of the infrastructure to limit abuse by coordinated self-interest minorities. Like all social structures we must consider human rights as the top priority (Sharp, 2010). After all at the base of all human networks are individuals.

When looking at the physiology behind human behaviour we should consider brain development as an important road map to understanding the way a human processes and stores memories. Nature and nurture work in combination as Fernyhough suggests: 'Although much of neurodevelopment proceeds according to a plan stored in the genes, what happens up there is equally a story of responding to local conditions' (Fernyhough, 2008: 15). The *nature* of a human mind could be described as the lateral mind, the mind that gathers all of the sensory input from the world around it. The *nurture* of a human mind could be described as the linear mind, the mind that relates present experiences with past ones; the mind that makes judgements on, and separates itself from the world around it (Bolte Taylor, 2009). From the beginning of our lives the

brain goes through stages of development. The first stage of infant development is dramatic, as Fernyhough explains: 'Up to half of the cells produced in those first few weeks are destined for an early death. This process of "neural pruning" ensures that only those neurons that have formed appropriate connections go forward to form the body's most complex organ' (2008: 14). The process of neural pruning shares many traits with the cascade, cluster model. Connections emerge or suffer atrophy in relation to their use. Another similarity between neural networks and the cascade, cluster model is the process of *fatigue*. As neural cells fire they produce waste that begins to accumulate, reducing the firing rate. When the rate of firing is slowed the waste build up dissipates, allowing the cell to increase its firing rate (Holland, 1999: 93-94). This process of emergence and dissipation is similar to how our minds drift through thoughts and how online topics *trend* and fall out of fashion in digital networks.

External stimuli can activate neurons; however the brain activity also loops back and can activate other areas of the brain. These different areas process different elements of the thought. These thoughts can then be stored as long term memories or disregarded. One major difference between the brain and a digital network is that a digital network can store information indefinitely and the brain does not. Only structural damage such as the destruction of a server or programming language supersedence could lead to loss of information acquisition, though most companies update and have backups of their data on other servers in different locations. The brain stores long term memories but when you remember sometimes you activate the area where the memory is stored, thus changing it in a minute way, or as Carr describes, 'biological memory is in a perpetual state of renewal' (2011: 191). The brain is constantly mutating its neuronal pathways, allowing new thoughts to be combined with previous thoughts. 'Storing explicit memories and, equally important, forming connections between them requires strong mental concentration, amplified by repetition or by intense intellectual or emotional engagement' (Carr, 2011: 193). Humans acquire knowledge by first becoming aware of a stimulus and then comparing that stimulus to similar or associated stimuli from our past. Our reality comes to us in the present moment and is then judged and placed within a pre-existing category of thoughts. Our ability to associate thoughts with previous thoughts is present in a variety of animals, but humans can add an additional layer of thought association via language (Spelke, 2003). Language reinforces mental association by placing associated ideas into linguistic sentences. All of this brain activity accumulates and strengthens the memory and the relevance of a thought. As Wagner describes, 'not all human actions begin with conscious intentions. Much of what we do seems to surface from unconscious causes, and such causation provides a major challenge to our ideal of conscious agency' (2003: 156).

We may think that we are in control of our thoughts but this may not really be the case. If we reflect on the beginning of a thought we find ourselves in a loop. When we think about an object like a tree, we have already gone through the process in our brain that leads us to the thought of a tree. In other words, before the thought can reach our conscious mind the neurons in our brain have already started firing in different areas of the brain. This means that the thought of the tree has come after the brain's activity to produce the thought. The thought does not occur because we commanded it. The thought preceded our awareness of it, so tricking our brain into thinking it was our conscious decision. In reality our mind is heavily influenced by external stimuli. Our brains compute and categorise the thought, then present the thought to our conscious mind as an experience. Our mind does not think because we command it to do so, rather thought emerges from combinations of millions of neurons firing along previously developed pathways. Neuronal pathways in turn emerge through repeated firing. Our consciousness is built upon millions of neurons firing and looping back.

Consciousness is in effect a process of habituation, all guided by mindless replication. This emergent process based on mindless replication is not such a strange concept considering that it is an innate process in evolution. One possible objection to the comparison of internet trends with evolutionary biology is that the former arises from consciousness whereas the latter is driven by impersonal, essentially accidental forces. However, as noted above, contemporary neurobiology suggests that the distinction is superficial. The network interconnection and processes of connectivity share notable similarities regardless of substrate. Other examples of network emergence in nature such as Hölldobler and Wilson's work on ant communication (1990), and Gordon's studies of emergent intelligence in ant colonies (1999) describe how insects with limited brain capacity can form collectively intelligent communities. The hive mind does not rely on the abilities of an individual. The same applies with bee hives, as Shirky describes: 'the hive is not part of any individual bee, it is part of the colony, both shaped by and shaping the lives of its inhabitants' (2008: 17). We must understand that most of what we describe as consciousness is in fact the product of an emergent process within networks.

Though the internet is an artificial network it is connected to, and developed by, human consciousness. It could be considered as an extension of the human mind, an 'extended phenotype' (C. R. Dawkins, 1982) of human intelligence and memory. Our conscious world is an alignment of our present and our residual memory. It is this residual memory that holds a mirror up to the world and reflects our conscious present

alongside our categorised past. Similarly data networks exist because of their benefit to humanity. If a network is not beneficial it is selected out. Just because neural and data networks are not directly related or linked does not mean they work in total isolation. We are affected on an individual as well as a cultural level by data networks and in turn effect the development of data networks according to processes of evolutionary emergence.

As cities get larger, idea generation speeds up. The accumulation of ideas rise in proportion to human connectivity, what Johnson calls 'superlinear scaling' (2010: 10). Johnson relates creative innovation to Darwin's description of a coral reef. Biological innovation like creative innovation is built upon an interconnected network of nodes. Nodes compete or cooperate within an environment for the sole purpose of replication. Hierarchies within groups are an integral part of goal direction within an environment (Simon, 1969). But the more diverse the environment, the more pressure there is to innovate. The 'myriad tiny architects' (Johnson, 2010: 17) as Darwin described, are these nodes. The node is not goal directed; it is sculpted over generations by its environment. As Johnson writes, 'collective invention is not some socialist fantasy … the utility of building on other people's ideas often outweighs the exclusivity of building something entirely from scratch' (2010: 231). It is connectivity that creates and builds upon ideas. From our neural connectivity through to our social networks, ideas are the entities that are encoded, transmitted, received and decoded by the myriad tiny architects within the network. Shirky observes, 'Wikipedia had shown that people are more than willing to contribute to online reference works, and that the tools are available to do so at low cost and large scale' (2008: 289). In Wikipedia's infancy, archivists were rightly sceptical of the platform's integrity. If anyone can make a change to the description of a topic then the validity of the information comes into question. However the force of competing ideas works in a similar way as cooperation. The topic is amended by argument rather than agreement (Shirky, 2008: 139). The outcome of collaboration, whether by conflict or cooperation, is the continuous sculpting of the topic. The topic only settles down when a general consensus is reached. This consolidation or consensus of fact is a crucial part of culture. Science is based on evidence gathering, testing and debate. Culture is by no means as rigorous, but a consensus is needed for communication to be transferred. Holland writes, 'cycles have a profound effect, making it possible for model networks to retain memories of the indefinite past' (1999: 95). We define and observe our cultural practice, leaving culture as a legacy to our descendants. Our cultural encyclopaedia is continuously evolving, but now it is also documented online.

Networks as Organisms | *Organisms within Environmental Ecosystems*

The focus of this chapter seeks to identify network grouping similarities between biological organisms and online groups. The environment places evolutionary pressure on an organism so it forms a skin or barrier to protect itself. From this point onwards the organism has separated itself from its environment. The organism allows desirable entities in, while protecting itself from harm. If successful, an organism, like an online group, emerges, develops, survives and reproduces. One could suggest that human interactions are vastly different to the biosemiotic interactions of organisms. However when we look from the hive mind perspective we see that the complexity of human network interactions produce a collective opinion. Collective opinion is informed by users but has the singularly mediated voice of the hive. In this way opinion can be separated into entities that will be allowed into group selection or rejected by the cellular wall of group opinion. Ant colonies and bee hives all benefit from working together but it is the emergence of group dynamics that enables the insects to achieve a form of group consciousness far greater than the sum of its parts. That said, millions of ants die aimlessly and there is nothing to stop a whole troop being lost in a pointless group effort. The human hive mind likewise can be manipulated into performing dangerous behaviours. War, segregation, addiction are all maladaptive emotional traits that had a necessary part to play in our species' evolutionary survival. However these emotional traits are now used culturally in propaganda, public relations and advertising practice (Bernays, 2004), affecting how we are informed and guiding our choices.

Subliminal or short exposure to messages has little influence on an individual or group. It is a constant and sustained engagement with an audience that develops a bond, thereby influencing a group's decision making. As Pagel writes, 'we are being persuaded, but the persuaders are not hidden' (2012: 326). We are social animals that seek safety and survival fitness by forming into groups, but these groups are complex and often evolve social contracts that limit certain individual freedoms, as described by Price & Shaw: 'We share such stories and often seek confirmation in them. When confirmed, which is often a condition of membership of a particular group, we are locked-in to what has emerged as a shared story. The same memes infect many brains' (1998: 246). When groups develop language, knowledge can be transferred more efficiently. When that knowledge can be stored and shared in texts the transmission process has a higher chance of being transmitted faithfully among large groups. As Shirky writes, 'our electronic networks are enabling novel forms of collective action, enabling the creation of collaborative groups that are larger and more distributed than at any other time in history' (2008: 48).

The development of information technologies has applied developmental pressure on many areas of cultural infrastructure. Some career paths once considered safe have collapsed while new and more appropriate job role equivalents have taken over – for example, postal services have given way to email and now social media. Some technologies have failed because of their lack of effectiveness or just because they have been less popular than an alternative. As Shirky writes, 'the centrality of group effort to human life means that anything that changes the way groups function will have profound ramifications for everything from commerce and government to media and religion' (2008: 16). My concern is that we are enveloped in a world of supernormal stimuli that is far removed from direct survival needs. Technology has evolved at such a rate as to be able to affect human survival in a very dramatic way. Global warming, social inequity, religious dogma and geopolitical discord are just a few examples of cultural challenges we could choose to tackle. If we ignore such challenges they will become more critical rather than diminish, as Johnson writes: 'For as long as complex organisms have been alive, they have lived under the laws of self-organization, but in recent years our day-to-day life has become overrun with artificial emergence … systems designed to exploit those laws the same way our nuclear reactors exploit the laws of atomic physics' (2004: 21).

From the perspective of advertising and brand building, I would prefer to discuss the possibility of improvement within the industry. To this end we as a society need to consider a shift in motivation and accountability. The internet has enabled a vast expansion of tools for advertisers to use, and at such little cost that the industry may oversaturate a message to the detriment of the campaign. We must now look at consequence and factor in models of evolutionary change over time to produce more effective and adaptive advertising campaigns. 'The Web is not simply an ecosystem; it is a specific type of ecosystem. It started as a desert, and it has been steadily transforming into a coral reef' (Johnson, 2010: 206). What does this coral reef ecosystem mean for advertising? It means that it is no longer good enough to just shout a message to an audience louder than the competition, because every other company is doing the same. Individual corals are in constant competition with each other for a greater share of the reef they are attached to. If a brand is to survive it does not have to change its message, just the method of transferring it, to establish a better relationship with its target audience. Remaining static may be more cost effective in the short term but if this is leading to brand obsolescence adaption must occur. As Gleick writes, 'a wide range of initial conditions will lead to an equilibrium attractor and not necessarily a static equilibrium' (1988: 279).

From our new perspective, brands can be seen as organisms. Each brand is developed within an ecosystem of other brands. Each brand is in an arms race with opposing brands for market share. A traditional method of company growth is to win business from competing companies. This method directly benefits the company's fiscal fitness but may not be of benefit to market fitness or consumer choice. Price & Shaw suggest, 'of greater relevance to understanding strategy is the distinction between parasitic exchanges, which benefit one party, and symbiotic variants where both benefit' (1998: 356). John Nash developed ideas of cooperative behaviour between rivals to benefit both rivals but this could be expanded to cover issues of sustainability, market regulation and consumer engagement. If we continue to work without factoring in consequence of unsustainable practice we risk over-stretching resources. Finite resources like fossil fuels or cultural resources like human rights should now be part of regulatory practice. In the same way advertising practice needs to apply sociocultural responsibility, with the aim of adding value to the client's brand by developing symbiotic relationships with their consumer audience. Integration of sociocultural feedback will be a useful tool in gathering cultural opinion that could be measured alongside sociocultural and economic models. If not, as Price & Shaw say, 'we become limited, victims of a meme that resides not, for once, in our minds but in the cultural artifact' (I. Price & Shaw, 1998: 254). We must become more informed about how cultural group dynamics work within an evolutionary framework. And about how symbiotic relationships between brand and consumer develop for the benefit of the brand, consumer and market ecosystem.

Chapter Three | *A Symbiotic Approach to Advertising Practice*

Introduction | *The Behavioural Ecology of Social Media and Advertising Practice*

Previously we have looked at areas connecting nature, culture and technology with the aim of identifying processes of memetic descent relating to advertising practice and brand building. Now we shall look at the online user as receiver and publisher of online social media content and opinion. The user will be seen as an interactive cell within a content group organism. I will discuss how much control the internet user has on content grouping and how that feeds back and affects future behaviour. Users may work in groups rather than in isolation so we must understand the properties of users that may affects other users in groups. This is not a straightforward process and will lead us to question how much of emergent thought is truly innovation and how much is a reconfiguration of sociocultural inheritance.

A large amount of what shall be discussed falls into the field of behavioural ecology (Danchin, et al., 2008) but we shall remain focused on advertising's role in changing user group opinion. The link to areas of behavioural ecology remains within the cultural artefacts of human behaviour and the environment humans inhabit. I wish to provide an understanding of the new evolutionary forces placed upon culture due to information technologies and the use of these technologies by users and brand advertising. The creation of ideas or memes subsequently evolves and proliferates according to the selection criteria appropriate to the sociocultural environment. Shennan suggests that 'the key principle behind behavioural ecology analyses of animal behaviour is the principle of optimization, which assumes that individuals will relate to their environments in ways which maximize their reproductive success' (2002: 24). This optimisation affects the individual within a social group, and produces social as well as sexual selection pressure dynamics on group selection. These in turn can be manipulated to affect an individual's cultural inclusion motivations.

The fundamental conversation underlining my argument is that of communication transfer within an evolutionary framework, chemical biosemiosis through to higher order consciousness. Communication, Fecundity, Fidelity and Longevity are the basic properties of communicated content. As Rothschild describes, 'the whole idea of evolution; that is, the creative process that leads to the development of man is the inner adaptation of the organisms to this continuous give-and-take process of communication'

(Rothschild, 1986: 23). We should not disconnect the process of cultural development from that of the natural world, as to do so would fundamentally weaken our survival fitness. Carr writes 'our ways of thinking, perceiving, and acting, we now know, are not entirely determined by our genes. Nor are they entirely determined by our childhood experiences. We change them through the way we live and, as Nietzsche sensed, through the tools we use' (Carr, 2011: 31). Nature and nurture balance the development of all living entities. Nature could be considered as the environment with which the interactive nurture reacts. In this way we could suggest that advertising has the capacity to adapt cultural behaviour as well as consumer behaviour.

Most animal interaction is directly related to environmental stimuli, from fight or flight up to complex hierarchical positioning. Social organization in humans and some animals 'can be attributed to an evolutionary effect of the capacity of individuals to form personal friendships and grudges' (Williams, 1974: 203). Uniquely, our species' ability to produce technologies on top of genealogical goals 'means that the goalposts of our existence are constantly being shifted' (Pagel, 2012: 131). In nature groups have already produced instincts that are not directly related to individual survival such as uncle/aunt child-rearing support. This is not surprising as the support is not expensive to the individual, and helps solidify family bonds alongside food sharing and group defence. As Williams describes, 'the helper phenomenon can be attributed to selection pressures for the maintenance of a certain pattern of parental behavior' (1974: 208). We must remember that behaviour is not directly related to genetic inheritance. If a parent has a tendency to commit infanticide then fewer offspring will survive. If a parent has a tendency toward infant nurturing then more of its offspring will survive to reproduce. The gene is not aware if it produces aggression or nurturing behaviour. The gene only survives to reproduce if the outcome benefits the survival of the entity within which the gene survives. The behavioural tendency to nurture becomes a cultural norm. Nurturing is evident in most species and is a vital part of a species survival but this does not rule out the possibility of infanticide, particularly if the community is placed under survival stress. In our modern age we suffer less from survival stress and more from cultural stress. Advertising often seeks to highlight a problem that the advertised product can solve. The problem may be a physical issue like disease prevention or an aspirational issue like social status. The advertiser wishes to generate sales but also generate motivational stress among consumers. If we do not purchase the product we may fall ill or lose status. The pressure to purchase may have little direct correlation to survival but can produce anxiety that can psychologically affect group behaviour.

Behaviour is two additional steps from genotype fitness. For example if a genotype produces phenotypes such as a brain, mouth and ears then the behaviour of communication can take place: mouth as sender, ears as receiver and brain as computational translator. Behaviour is indirectly linked to genetics but can affect and be affected by the linear connection derived from evolutionary emergence. In a similar way selfish survival of an individual gives way to altruistic behaviour if the survival fitness of altruistic behaviour benefits the individual. In family groups the benefit is shared among the group, so statistically benefitting the genetic lineage as Shirky notes: 'Cooperation is the next rung on the ladder. Cooperating is harder than simply sharing, because it involves changing your behavior to synchronize with people who are changing their behavior to synchronize with you' (2008: 49-50).

Behaviour is evolved and therefore a product of genetic inheritance. What we might call behavioural instinct – or the more vulgar term *intuition* – is to a large extent shaped by, if not derived from, inheritance. Behaviours that connect individuals within groups such as social movements or political mobilisation are just combinations of social institution. Selfishly motivated individuals work altruistically in groups for mutual benefit with an opposing motivation of group rejection threat. This may seem at first to be a nasty way of viewing human motivation but it is this Machiavellian 'gloved fist' approach that creates the pre-conditions for earning trust, mutual reciprocity and loyalty models of group behaviour. Humans are nice because it is beneficial to be so. This behavioural spectrum from selfish to altruistic gives us the ability to select from a range of behaviours that help or hinder our survival – and therefore are also subject to evolutionary selection. If a brand wishes to engage with a consumer group it must employ similar tactics to an individual. The brand would be subject to group selection pressure, so would benefit from implementing a cooperative approach to group engagement. If the engagement is successful the brand may also benefit from the consumer insight of the group. In combination the group develops a set of values that benefit the group and can be passed down through inheritance, often referred to as common knowledge. Berger & Luckmann suggest that 'the same body of knowledge is transmitted to the next generation. It is learned as objective truth in the course of socialization and thus internalized as subjective reality' (2011: 67).

Our individual decision making may seem like free choice and we may wish to defend such freedoms, but in reality decisions are confined by the choices available. Our subjective reality has been developing throughout our evolutionary history. The very building blocks of our mental capacity and therefore

our conscious awareness rely on the lineage that came before. The popularity and usefulness of an idea or advancement in tool design aid or hinder the survival of the user. However, popularity and survival are so disconnected that the popularity of an idea may greatly hinder survival. Survival fitness cannot respond to a popular idea, just supply evidence of the idea's effects on survival after the fact. Vogeley & Newen write, 'consciousness in general may be defined as the integrated internal representation of the outer world and our organism based on actual experiences, perceptions and memories providing reflected responses to the needs of our environment' (2002: 138). Behaviour is intrinsically linked to survival fitness, and an individual's behaviour is contained within a cultural environment, enveloped within an ecological environment that is evolved over time.

It would be wrong to suggest that we had no control over elements of our environment. We are just restricted within the boundaries of that environment. Technology has allowed us to stretch environmental boundaries but I wish to focus on our psychological boundaries. These boundaries are often subject to communication and phenomenological experience. Rothschild writes, 'in order to say something meaningful about the world, a single act is not sufficient, because every experience process presupposes the relationship between an inner and an outer system. Facts and processes in the world are communicated in sentences, expressing judgments' (1986: 83). It is often hard to communicate what you experience, as the message received can never truly be replicated in the mind or experience of the receiver. 'Because our senses point outward, we can observe other people's actions but are less aware of our own. As mental life is an internal affair, we can observe our own thoughts but not the thoughts of others' (Barrett, 2010: 121).

We all separate ourselves from the world around us from a very early age. Once we become aware that we can affect things within our environment we begin to interact, quite correctly, as if we are separated from the environment by our bodies. However this is a kind of trick of the mind because we are intrinsically connected to our environment; without it we would not be able to develop a self. 'The self is not locked into place somewhere an inch or so behind our eyes, a fixture in the mind. Rather, the agent self is a fabrication put in place by the mechanisms of thought' (Wagner, 2003: 263). Freud famously sectioned the mind into specific functions. His work has been developed or disputed; however, the fundamental functions are still recognised today. The ego and the super-ego are, as Freud describes, 'part of the id which has been modified by the direct influence of the external world' (1923: 18-19). In our modern world the story of ourselves is not just a trick our mind plays on itself; it is a trick that extends to how

we wish to be perceived, as Claxton observes: 'The Narrator is often recruited by the Self System to spin a tale, for conscious (or public) consumption, that reinforces the image of how I am supposed to be, by denying or distorting the unconscious reality of how in fact I am' (1994: 168-169).

Habitual Behaviour | *Motivation and Manifestation of Behavioural Traits*

This spin of self-image has now been opened to the world on platforms of social media. The previously anonymous individual can now be searched for online. The previously secure aspirational self must now compete with an online ego manifestation presented as an online profile to be judged and commented on. As Pariser writes, 'personalization doesn't capture the balance between your work self and your play self, and it can also mess with the tension between your aspirational and your current self' (2011: 117). Social profiles may at first seem harmless but can often encourage social judgement, narcissistic complexes and an erosion of privacy. Freud suggested, 'conflicts between the ego and the ideal will, ultimately reflect the contrast between what is real and what is psychical, between the external world and the internal world' (1923: 32). Humans have not evolved to cope with such a high level of social contact. We are social animals but there are likely to be consequences in laying open our private lives to so many people. The internet is a physical barrier separating individuals. Internet trolls rely on the fact that retribution cannot be meted out. They can get away with little or no cost to themselves. Were such antisocial behaviour to happen in the non-virtual world, members of the family or friend group would soon react with chastisement or banishment. We would be wise to consider the cost of psychological damage caused by online behaviour. Teenage suicide due to online bullying, online stalking and trolling are all examples of maladaptive social behaviours that now have a place to thrive without strong judicial interventions. Claxton writes, 'the trivial can take precedence over the biologically fundamental. People can kill, even kill themselves, in order to avoid embarrassment, or to gain a material advantage that they do not really need' (1994: 108).

We could justifiably believe that we are in control of how we think and what we choose to do, that we are manifestly in control of our own destiny. But if this were in fact the case every human would be able to do whatever they liked. There will always be limitations in career choice, wealth creation and many

other areas of life. Wallace writes, 'our existence is invariably intersubjective, for we exist in a causal nexus in which we are constantly influenced by and exert influence upon the world around us, including other people' (2007). We are constantly influenced by stimuli and if that stimulus is repeated enough times our brain will start to develop a habit relating to that stimulus. 'When a habit emerges, the brain stops fully participating in decision making. It stops working so hard, or diverts focus to other tasks' (Duhigg, 2012: 20). Advertising and point-of-sale practices such as the Gruen transfer (Hardwick & Gruen, 2004); shopping mall architecture designed to overwhelm the senses, often leading to exaggerated and erratic purchase behaviour – these phenomena exploit the distracted mind. An advertiser aims to minimise any purchase decision barrier while maximising continual exposure to a product in the hope of developing a consumer's purchase habit. This exploitation is only possible because our mind compartmentalises common behavioural routines. This is a necessary process of survival from our genetic past. If we did not develop habit, functions like motor skills would constantly require thought. The basal ganglia is an area of the brain that effectively automates motor skills, eye movement and other seemingly unconscious behavioural traits. The hippocampus works in a similar way, learning a skill by repetition and storing that information in long term memory. Essentially we learn and develop due to repeated exposure to stimuli. If the stimulus is strong or affects us emotionally it will have an immediate influence, but continuous exposure strengthens and ensures a bias towards that area of behavioural development. As Deacon writes, 'a "habit" in this sense is a behavioral bias or predisposition that may or may not be overtly expressed, but is always a tendency' (2011: 183-184).

We have evolved this process of habit recognition to minimise costs in time and energy but this also has the benefit of developing a form of predictive foresight. The down side is that we can get tricked by this very same process. A habit must be in itself 'relatively effortless or carry a particularly large psychic reward,' (Barrett, 2010: 144; Zipf, 1949). In a hunter gatherer society, learning to play the piano has little value over techniques of hunting. However if playing the piano within a modern society gains you wealth and/or happiness, the reward may shift in favour of learning to play. Thus society affects the value of behavioural habits although the process of habit formation is still a process of pattern seeking, a largely unconscious procedure. As Fernyhough states, 'compulsive pattern-seeking is a kind of neural reflex over which we have next to no control' (2008: 19). There is a system that the brain works with that values and appropriates habits. The process works in a three-step loop that connects *cue*, *routine*, *reward*. The *cue* triggers the brain into habit recognition. The *routine* normally involves a physical, mental or emotional

activation. Finally the *reward* for the behaviour is presented, helping the brain to decide which particular loop is worth developing into a habit. Duhigg suggests that 'over time, this loop – cue, routine, reward; cue, routine, reward – becomes more and more automatic. The cue and reward become intertwined until a powerful sense of anticipation and craving emerges' (Duhigg, 2012: 19; Pavlov, 1960; Skinner, 2014).

Habits can often manifest as addiction. This is not to say that habits/addictions are inherently bad for us, it is just a linguistic way of expressing the level of control we have over our craving and its usefulness to our survival. Craving food is good unless the habit is inflated to cause obesity. The habit however remains within the mind even though its symptoms may present physically. Claxton writes, 'the activity of generating putative explanations for what I am doing might come to take on an almost addictive quality' (1994: 117). One notable aspect of habit is that we tend to associate the habit with our idea of *self*. If a brand can associate with the consumer's ideology or self, the brand is much more likely to secure brand loyalty and recommendation (Belk, 2015). The habit, for better or worse, is *our* habit. Habits occupy all of our lives and even our process of thought. Language is a classic structure that is instituted throughout our lives. Dutton writes, 'life goals, experiences, and familiar local environments will engrave innate interests in landscapes and our ability to exploit them. This is no more strange than the fact that learning English will permanently engrave an individual's linguistic capacities' (2009: 22-23). Again we see that we are trapped from the very beginning of our lives within the cultural and traditional memes handed down over generations. We are genetically disposed to contract individual habit loops, so it makes perfect sense that our culture is founded upon cultural habit loops. This is the edifice of cultural institution, as Berger & Luckmann describe: 'The origins of roles lie in the same fundamental process of habitualization and objectivation as the origins of institutions' (2011: 74).

Institutionalisation is often used as an oppressive term but if we look a little deeper, institutionalisation is a consolatory infrastructure of group dynamics or memeplexes. Language is one such example. We are required to use a structured language so that we may communicate. The language restricts vocal freedoms in order to regulate a common, utilitarian communication transfer tool. The language institution is not fixed; it too is modified over time as new words become popular while others fall into obsolescence. Pagel writes, 'words must adapt to be competitive in the struggle to gain access to our minds, languages have to adapt as a whole to remain useful to their speakers, and those that do so will be the survivors' (2012: 306). Institutionalisation is not, at this level, a bad thing because of the advantages language gives us as a

species. However institutionalisation is a double-edged blade. We could call language a naturally evolving entity. But if an institution is governed by a group of individuals for personal gain over a population, institutions soon develop into master/slave or creditor/debtor models. These models are found in all human cultures across the world to a greater or lesser extent but they all began as a need to combine and consolidate patterns, even to our own detriment. 'What we can see, yet again, is people influenced by certain patterns, patterns which serve to limit individual and collective potential, patterns in which the unwritten rules of the game emerge from a blend of tradition, paradigm and individual self-interest' (I. Price & Shaw, 1998: 251). And all encapsulated within a process of memetic evolutionary selection.

Institutions like language can never remain constant throughout time. Culture will always evolve even though those who currently benefit may wish to hold onto the status quo. As Price and Shaw explain, 'past habits, in time, give way to new ways – particularly where we can expand our capacity to let go; otherwise, as ever, newcomers, not enslaved to habit, will not only have but will keep their advantage' (1998: 354). Culture, like biology, has evolutionary pressure guiding development toward an evolutionary stable strategy, which as we have highlighted before is by nature constantly in flux. These changes in cultural habits can be incredibly complex or fantastically simple – 'from a visual trigger such as a candy bar or a television commercial to a certain place, a time of day, an emotion, a sequence of thoughts, or the company of particular people' (Duhigg, 2012: 25). No single human can change the development of society without a group of supporters. The change comes when an idea or *meme* inhabits the minds of a group with a habit that rewards the inhabited mind with 'physical sensations or an emotional payoff, such as the feelings of pride that accompany praise or self-congratulation' (Duhigg, 2012: 25).

If indeed the thought is father of the action then groups form around the sharing of an idea, *meme*. The idea must be, or be perceived to be, of benefit of the individuals within a group. The benefit may not be equal, but the trade-off must be seen as being the lesser of two evils. To paraphrase George Orwell, 'all people are equal, only some are more equal than others'. So how do we relate issues of selfish freeloading and altruistic behaviours within the framework of an evolutionary stable strategy? Neuroscientists have studied mirror learning behaviour in primates (Premack & Woodruff, 1978) and goal directed behaviours that show symptoms of predictive learning in the premotor cortex (Gallese, et al., 1996), extending Pavlov's work in classical conditioning. Womble & Wermter write, 'the neuroscience evidence reviewed in (Gordon, 1999) suggests that mirror neurons are involved in the comparation of "goal

directed actions" and the perception of them during competent performance by others' (2002: 353). Not only do mirror neurons allow for humans and some animals to perceive the actions of others but also to empathise emotionally. 'The concept of mirror neurons postulates a neuronal network that represents both observation and execution of goal-directed behavior and is taken as evidence for the validity of the simulation theory, according to which human subjects use their own mental states to predict or explain mental processes of others' (Gallese & Goldman, 1998; McGlone, Howard, & Roberts, 2002: 134). Empathy brings people emotionally together. A lack of empathy or psychopathy allows people to harm or neglect without emotional cost. This discrepancy in behavioural states is just one more cultural component evolving culture toward an evolutionary stable strategy.

Emotion is integrally linked to behaviour and our self-image. We build a persona based on our moral values yet use that very same persona to hide socially taboo parts of our psyche. Our morals and taboos are gauged by the social values we hold. Our morals are flexible and change over time and are influenced by social outliers. Social influence often directs our thought and behaviour alongside instincts developed over our evolutionary past. Emotion is literally embedded into the body's chemical functioning. Health and mental wellbeing are one process, and part of mental health is social exchange; hence penance is often associated with solitary confinement (Shirky, 2008: 15). To be ostracised or banished from a group often leads to depression. This is not to say that being in a group is all we need to be happy. Strong group members will pick on the weaker members who often choose subservience or deny or adapt their opinions rather than leave the group. Group members often jostle for dominance within a group until a hierarchy is formed – a hierarchy often adorned with symbolism. In nature we see behavioural posturing, visual display and nest building. In human hierarchy symbolism takes the form of objects with value. Advertising aims to associate a product's mythology with hierarchy categories. If a consumer wishes to provide visual evidence of their success they must purchase a product from the appropriate category. Prestige purchasing is a vital part of the 'goldilocks pricing principle', which we will discuss later. One category serves cheap low-quality products, another category is aimed at delivering median-quality products and the last delivers prestige products, consumable only by the elite. Symbols provide evidence of social status, but there are now alternative ways of expressing status within a group. In a modern social environment *social capital* is becoming a dominant symbol of power within a group. Easley & Kleinburg write, 'Consensus is growing in the literature that social capital stands for the ability of actors to secure benefits by virtue of membership in social networks or other social structures' (2010: 61).

Habits affect both individuals and groups. We are evolutionarily disposed to seek acceptance within a group. We are motivated and discouraged by positive and negative feedback emanating from the group. Our habits are goal directed by group feedback thus defining our role and reputation within the group. The repetition of habit further develops our skill sets in accordance with the group's behavioural dynamics, so motivating the evolutional direction of our persona and sense of self. This process has little to no relation to biological survival fitness outcomes and can be so divergent as to weaken the survival fitness of the group, due to an accumulated group ideology. The discrepancy between biological and behavioural fitness may seem problematic when suggesting such behavioural traits are useful, evolutionarily speaking. But these same behaviours have been a very useful survival tactic up until we were able to place pressure on the environment at a global scale. As Shennan writes, 'adopting the characteristics of successful individuals you see around you is a pretty good rule-of-thumb for being successful yourself without too much effort' (2002: 59). This adoption strategy can be a very useful learning method, often structured into apprenticeship and mentoring models of training.

Hierarchies | *Behavioural Power Dynamics within Groups*

Humans, like other animals, form hierarchies for reasons of group strength. The dominant members can be dominant through leadership qualities. Strength and cunning are often used but the leader is constantly kept in check by rivals from both within and outside the group. Human intellect is directly linked to survival and it has become one of our best survival techniques. Easley & Kleinburg describe negotiation between humans in terms of status. People who believe themselves to be of higher status tend to impose their outward opinion on those they feel to be of lower status than themselves. If a person believes they are of lower status, they will submerge their opinion among people they believe to be of higher status. Easley & Kleinburg explain that, 'overall, for these and other reasons, the subject who was believed to be of higher status by her partner tended to achieve significantly better bargaining outcomes than the theoretical predictions' (2010: 312). Group hierarchies are one example of many emotionally governed social functions that stem from predator vigilance and mate choice, as Dutton writes: 'The human mind, is "a crowded network" of innate routines, "programs" in their computer metaphor, for solving problems that confronted our hominid ancestors' (Dutton, 2009: 25). This crowed threat detection network is a

platform that can be exploited by propaganda, public relations and advertising. This is not to say that the exploitation is inherently dangerous, merely that it can be used to influence individuals and groups. Advertising focuses threat vigilance toward issues of control and status, while presenting the solution offered by their product.

The brain, like any other organ, develops due to its useful application to the animal's survival. The brain produces thoughts or ideas that benefit survival but these have to be first produced within the brain by a neurological process. Johnson explains, 'a good idea is a network. A specific constellation of neurons – thousands of them – fire in sync with each other for the first time in your brain … A new idea is a network of cells exploring the adjacent possible of connections that they can make in your mind' (2010: 45). The brain rewires itself due to repeated physical and mental activity. Often the physical and mental are linked but this does not mean that the activity has to be prompted by an external stimuli. Thought in itself can trigger the rewiring of neural circuitry (Carr, 2011: 32). We live our lives developing a *self* that we and others help construct. There comes a point when we have lived in that *self* for so long that we recognise, and are recognised as being, that person. This seems a very obvious point; however, the *self* is really a construct of experiences, training and repetition over which we have little control. This is not to say that we have no control over who we are or how we behave. We have just become so accustomed to our version of our *self* that we believe it is inherent rather than nurtured. Johnson suggests that 'we come into the world with a genetic aptitude for building "theories of other minds," and adjusting those theories on the fly, in response to various forms of social feedback' (2004: 196).

In online behaviour, social status can become a physical asset. The more popular your online presence, the more traffic will be driven to your website or blog. The popularity of your website or blog can enable you to sell advertising space. The value of your influence can now be calculated and monetised. Your persona becomes a way of making money as well as a way of popularising an opinion you hold. This persona, however, is not entirely in your control as the 'power is not so much a property of an individual as it is a property of a relation between two individuals' (Easley & Kleinburg, 2010: 302). A high status persona only raises the negotiation status of an individual or brand. If the individual or brand violates culturally appropriate behaviour their influence and negotiation status can suffer. Communication at every level will continue to be a negotiation. Social capital will always fall within the vectors of negotiation status and sociocultural moral norms. If a group leader strays too far out of alignment with a sociocultural

norm, the populace may be motivated to retaliate against the individual. However, if only a few low-ranking members retaliate against the leader they run the risk of being ostracised by the group. Persona hierarchy development is a Machiavellian arms race played out within a cultural environment over time, evolving cultural hierarchy structures toward an evolutionary stable strategy.

Group Dynamics | *Behavioural Categories within Groups*

Holt's model of group behaviour posits a variety of behavioural types: *feeders*, *spreaders* and *stiflers*. These behavioural types form the dynamics within group behaviour. A *feeder* provides new information – often a position held by an advertiser. A *spreader* distributes that information and could be considered as a brand loyal consumer. And finally the *stifler* questions or blocks information it does not deem correct or useful. The *feeder*, such as a promotor of a product or the propagator of a myth, is often only superficially connected to a group. The *spreader* will distribute the product or myth in order to generate popularity by being proactive within a group. The *stifler* will research the advert or myth and discount or block its propagation within the group, hoping to generate popularity by upholding group standards, acting as an authority. All three types desire to be part of the group dynamic by adapting their behavioural approach to benefit themselves within the group. Holt suggests that the feeder is 'attracted to the status and social ties that the brand produces, they use the brand as a vehicle to build social solidarity with friends and colleagues, as an interaction lubricant, and as a status symbol' (2004: 147). Holt describes the spreader behavioural type as an *insider*, and suggests, 'Insiders create myth experiences for themselves through their extraordinary dedication to continually updating massive amounts of facts, figures, and personal insight' (2004: 146). Price & Shaw describe stifling behaviour in a more passive way which they describe as an *observer*: 'observers can be great, and self-reinforcing, comfort in such commentaries. In observing, we "grow more partial to our observations"' (1998: 247). Whichever role we prefer to play within a group, *feeders*, *spreaders* and *stiflers* all aim to achieve authority status by developing strong ties and trust thresholds within the group, and are all variants of self-promotion.

The behavioural process can be summated into two paths of informational transfer. One of these paths leads to a cycle of continued transfer and the other path restricts or stifles transfer. At first a user is unaware of a piece of information, in the state of *ignorance*. The user is then provided with information, so becoming *infected* with that information. The information will then be *spread* or *stifled* by the user dependent of their opinions about the information; that is, the user may then *infect* other users with the information and so continue to be *infected*, or *stifle* the information, so preventing further information spread. In the latter case the user could be seen to *recover* and become *immunised* to the information. This is a strong way of viewing information transfer as most information is benign or of little consequence. Nevertheless, information transfer should be seen in terms of infection and immunisation as memetic cultural transfer spreads across populations in this way. Even if information is stifled, the infected user still retains the stifled information in memory and so is changed in a small way. We must remember that exposure to both good and bad information develops a regulatory repository that helps the user to make better judgements on future decisions. This regulatory repository could be considered as a process of cultural infection and immunisation, both strong indicators of an evolutionary process. Given the complexity of modern network systems we should consider the process of information transfer in epidemiological terms. As Easley & Kleinburg write, 'the spread of information can be modeled this way, as an alternative to the approaches based on explicit decision rules' (Easley & Kleinburg, 2010: 585). Advertisers should be aware of these epidemiological aspects in user groups because the more connected consumers become, the more conscientious they will be when disseminating new information.

Trust often requires evidence of trustworthiness. This may take the form of past behaviour or recommendation. Past behaviour is a slow process that needs time to develop. This may not be appropriate if a newcomer or brand wishes to be trusted within a short time – often the main challenge to advertisers that are trying to win consumer confidence. Recommendation is a good second-best approach because an already trusted member of the group can stake their reputation against the newcomer's lack of past history. Recommendation is a form of *triadic closure* between the *newcomer*, the *referee* and the *group*. The group and the individual benefit in this exchange as the group can expand more quickly while limiting issues of trustworthiness. Online social networks assist this process further by enabling the group to connect and further bond and transfer opinions at minimal cost. As Easley & Kleinburg describe, 'the basic role of triadic closure in social networks has motivated the formulation of simple social network measures to capture its prevalence' (2010: 44). Triadic closure is the foundation of a group's hierarchy. A

group without a hierarchy can often collapse because of a power struggle within the hierarchical vacuum or drift without any goal direction. As Shirky writes, 'the biggest threat to group action is internal, voluntary groups need governance so that we can defend ourselves from ourselves; we need governance to create a space we can create in' (2010: 179).

Group dynamics legitimise the group institution. Dominant and recessive members of the group share common goals. 'Institutions further imply historicity and control. Reciprocal typifications of actions are built up in the course of a shared history' (Berger & Luckmann, 2011: 54). All members share a form of legitimacy. Each member is a referee for others in the group. The larger the group, the more legitimate the group becomes. This of course does not mean the group is right or wrong, it just means the group has more power to impose on others. As Berger & Luckmann explain, 'we define legitimation by this function, regardless of the specific motives inspiring any particular legitimating process, it should be added that "integration," in one form or another, is also the typical purpose motivating the legitimators' (2011: 92). If a group member wishes to gain power over other members or if a group wishes to gain power over another group, the tactics remain the same. For example, 'one way to interrupt passivity is for an active minority to cajole, motivate, threaten, persuade and manipulate the passive majority' (I. Price & Shaw, 1998: 248). Social groups that contain active members will tend to drive others to their opinion not only to gain power but also to legitimise or consolidate their position within a majority – the process of democratic governance. Democracy however is corruptible because of group dynamics. Vote counting can never be a true depiction of an individual's personal opinions; the vote count can only depict legislated choices based on the supposed legitimacy of an individual within the agreed-on hierarchical structure, normally imposed by the people at the top of that same hierarchy. Shirky describes governance as '"mutual coercion, mutually agreed upon." This solution prevents the individual actors from acting in their own interests rather than in the interests of the group' (Shirky, 2008: 53).

Repetition encourages consolidation within groups but it also consolidates the individual's own sense of self. The persona of an individual is physiologically rewarded for having a good reputation because others in the group give positive feedback. This positive feedback not only develops our external persona but can change neuronal connectivity within the brain. Learning a new skill takes time and is hard at first. If we are berated while learning a new skill we are less likely to continue learning that skill. If we are given positive reinforcement we are likely to continue trying to learn. Learning, to a large extent,

is the repetition of a skill until the brain develops neuronal pathways that preserve the skill routine in long-term memory (Kandel, 2007). In this way we can draw a distinction between reputation and brain development. We define ourselves by the labels we are given or give ourselves. Being social animals, we wish to be part of a group and if this involves adapting to fit into that group we will. But if we are isolated from that group we may form an opposing group with other disaffected individuals and so adapt our beliefs to the disaffected group.

Advertising Practice | *Modern and Traditional Practices within Networks*

Populations have an inherent tendency to form collective opinions. Once we have formed an alliance with a social group we are likely to align ideologies through habit reinforcement over time. We will tend to defend the ideology as we would defend ourselves from any form of perceived threat. We would also be motivated to defend the ideology because we are invested in it. To admit your ideology is incorrect would suggest that both you and your investment are incorrect. This is an unhelpful by-product of threat detection that often stifles social developmental change. We filter out what we don't wish to know by interest, taboo, disgust or ideological alignment. Pariser writes, 'personalized filters limit what we are exposed to and therefore affect the way we think and learn' (2011: 83). To relate this idea to modern advertising practice, there are various ways of connecting people to product. *Mind-share branding* connects people's ideologies with the product or brand. An example would be a cleaning product that protects your family from germs. The product is useful and aligns the idea of 'clean and safe' with the brand and family. *Emotional branding* aligns people's emotions with a brand. A fast car evokes the freedom of the open road or exudes power and prestige. And now, 'with the recent rise of the Internet, another challenger has become popular as well: *viral branding*' (Holt, 2004: 13). These techniques work well and target motivational areas of the brain. As Holt writes, 'when managers seek to build the identity value of their brands, they draw on some combination of these three approaches' (2004: 13).

A brand requires consumers to purchase its products. By retaining the loyalty of consumers the brand is likely to survive within a market. Brand loyalty is developed in the same way as status. A group develop trust with a company or individual until the group is willing to align with and elevate the status of the company or individual within the group. As Holt describes, 'brand loyalty is the customers' willingness to stay with the brand when competitors come knocking with offerings that would be considered equally attractive had not the customer and brand shared a history' (2004: 149). The consumer group first show 'fealty to charismatic authority' (Holt, 2004: 142) and then over time align their opinion with that of the brand in the form of 'institutional legitimacy' (Holt, 2004: 145). As a brand develops its consumer relationships it is in a vulnerable position but when institutional legitimacy is achieved the brand holds a solid consumer base on which it can build. The final stage a brand can achieve is the state of omnipotence. Coke and McDonalds are traditional examples of omnipotent brands. They can be purchased anywhere in the world, are intricately knitted into the routines of their consumers, and are often known for being of a base standard product that does not innovate. A modern omnipotent brand would be a company like Facebook. There is little that Facebook offers in the way of innovation and most of the technologies could be replicated by any website. Facebook's success is in the quantity of users. If a competitor wishes to dominate the social media market it would need to innovate social interactivity, as Twitter did with its micro blogging format. So long as the brand retains an ideological status quo with its consumers it will be able to minimise its effort and let the consumers' purchasing habits continue in their favour. And if your company's name becomes a transitive verb – such as, 'to *Google* something' – you have etched your brand into the very linguistic heart of society.

We have the ability to be assertive or passive consumers. Some purchasing decisions are of little consequence to us and other purchases are well researched and evaluated. Some consumers would say that they do not purchase for prestige and others may say that buying a prestige item provides evidence of their success. We must remember that the individual's ego is guiding their purchasing behaviour to some extent. Even the most rigorous critical thinkers purchase on the basis of emotional, functional or brand values. If you deliberately avoid purchasing from a brand because you disagree with its ethical practice or brand value, it is still part of your purchasing behaviour. As Holt writes, 'Followers, as the moniker suggests, are those customers who identify strongly with the brand's myth. They rely on the myth as a panacea for the desires and anxieties they experience in their everyday lives. As a result, followers become devoted to the brand's mythology because it provides for their identity needs and acts as a moral compass' (2004: 140). The idea

of being a follower may not sit well with us but we should remember we are writing the story of ourselves all the time. *I am a nice person, I like gardening and I am worried about the expanding global population.* One of our beliefs will align with a product at some point, so to say that we are unaffected by what we purchase and how it is sold to us is a con that our ego has developed to protect our true opinions by projecting a persona we are comfortable showing to the world.

We can identify and control our purchasing but we cannot control other people's judgement of our choices. If I wish to look like a top executive I would need to buy a suit. Entering a boardroom in a tee-shirt and shorts would not be acceptable. We all align ourselves with cultural icons of one type or another to be part of a group. The need to provide evidence of a heightened status has been used by brands for a long time but if a brand can sell you a substandard product that retains its brand prestige, then the brand can continue to sell you new products as the old product begins to fail. This is known as *planned obsolescence*. 'Keeping ahead could stimulate endless desire for the new "in thing" in such everyday objects as clothing, crockery, furniture, transport ... you name it' (Claxton, 1994: 112). You can force the habit further by planning a product's life span in favour of a steady profit. Most computer software and hardware are designed to be developed. One reason for this is that technologies progress at an ever increasing rate. However, computer companies produce their hardware to suit a planned timescale of progression. Planned obsolescence is often directly related to profiteering but with computer development there is a justification for timing product release. Software is constantly being advanced so the hardware has to keep up. But when looking at the build quality and the huge waste produced by technology companies one might well suggest that planned obsolescence is an integral part of their industry practice.

Duhigg writes that only since the invention of computational technologies have 'scientists and marketers really begun understanding how habits work and more important, how they change' (2012). This is because of our ability to match stimulus to response feedback. In Claude Hopkins' 'scientific advertising' Hopkins lays out a set of rules that influence everything from consumer purchasing behaviour to the tools governments use for eradicating disease. His work focuses on creating new behavioural routines (2014). Again we see behavioural habits being identified. Hopkins' focus was on more traditional advertising practice but he too identified that group dynamics work as a form of contagion. The replication and spread of a behaviour or idea between connected individuals. Now online contagious replications can

memetically transfer ideas within groups. One modern term for this kind of transfer is known as 'viral marketing' (Leskovec, Adamic, & Huberman, 2007; Moreno, Nekovee, & Pacheco, 2004) but viral marketing is a very ineffective way of rebroadcasting information. If a viral advert targeted a consumer with adverts that are not wanted, the consumer is likely to retaliate – by using spam filtering, for example. A more appropriate approach would be to form a s*ymbiotic marketing* strategy that could develop co-adaptively with its consumer base. This approach to consumer engagement is beneficial and relevant to both brand and consumer.

There are two levels of symbiotic marketing. The first level is easy to implement and a good example is Amazon's product recommendation system. The second level of symbiotic marketing is far more challenging to implement and goes beyond our focus of discussion, but I make mention of it as it may become a prominent area of discussion in the future and naturally extends from this conversation. The second symbiotic marketing level may at first seem contradictory to marketers but both society and brand would ultimately benefit. This approach is aimed at tackling what Alain de Botton calls 'status anxiety' (de Botton, 2005) and its effects upon populations, described by Clive Hamilton as 'affluenza' (Hamilton, 2009). The second level approach would seek to regulate extreme prestige-focused advertising, and would require a controversial piece of legislation akin to the bans on tobacco and alcohol advertising. Prestige purchasing is a symptom of social inequity, and prestige marketing is designed to segregate consumer groups into a wealth based hierarchy. Marketing practices, like financial systems, need regulation because their motivation is based on capital wealth rather than public welfare. One of the main problems facing humanity is over-consumption. Over-consumption is linked to social inequity, unsustainability and climate change. Shennan describes the problems associated with status anxiety thus: 'If the average person prefers to accord high prestige to and imitate the behaviour of people with above average values of some indicator trait (e.g. people with expensive cars), the preferences can continue to evolve, dragging the indicator trait up another notch as well. We know this process as "keeping up with the Joneses". In imitating the Jones' new car purchase, we may also have acquired the Jones' heightened sensitivity to cars as markers of status, doing our bit to feed the further evolution of the system' (2002: 59). This is the cycle of prestige purchasing that many people get hooked on as a form of persona egotism. Prestige brands have developed a three level *goldilocks pricing* system to suit all levels of consumer income brackets: high-price exclusive products for the wealthy, midrange products for the moderately wealthy and cheap accessories for the lowest wealth bracket. The prestige brand makes a great profit from all three

wealth brackets but also plants the insidious idea that their product relates to the consumer's level of success in life. It would be interesting for a government to research levels of social mobility against rates of depression, suicide, crime and social inequity (Wilkinson & Pickett, 2010) as we would likely find correlations between prestige purchasing and sociocultural inequity. If a correlation is found then one corrective course of action would be appropriate regulation focused on symbiotically aligning a brand's ethical practice with consumer and ecological welfare.

The more educated we become about the way we are persuaded to purchase, the more likely we are to be able to make informed decisions. It is up to us as consumers to select and reject products or companies that we deem unsuitable for us. Persuasion, however, is becoming more and more sophisticated and more and more aligned with our beliefs, even to the point of subtly shifting our beliefs over time. This is known as a consumer's *persuasion profile*. Pariser writes, 'your "persuasion profile" would have a pretty significant financial value. It's one thing to know how to pitch products to you in a specific domain; it's another to be able to improve the hit rate anywhere you go' (2011: 121). Internet companies data mine every search term and click through. This is particularly apparent on sites like YouTube. If you search for a tutorial on a topic, the next time you return to YouTube on that computer, the videos that are presented relate to your previous searches. This demonstrates that YouTube monitors your actions even if you are not signed up to their service. It tracks you by your computer's internet protocol address – a method of tracking without any form of contract. Technologies have even been developed to predict a user's emotional state. With this sentiment analysis, Pariser notes, it is 'now possible to guess what mood someone is in. People use substantially more positive words when they're feeling up; by analyzing enough of your text messages, Facebook posts, and e-mails, it's possible to tell good days from bad ones' (2011: 121).

Social Networks | *Behavioural Dynamics within Social Media*

Humans have evolved to cooperate in groups so we are instinctively hierarchical. Online social networks tap into this trait by making the process of networking easy and fast. The reason so many people get hooked on social media sites is because they allow natural social and hierarchical behaviours to flourish at minimal cost. The social media platform will naturally wish to keep communication and profiles

as public as they can, motivating us to view and judge ourselves against others. This may seem like a transparent and open policy but it also allows persona status anxiety to flourish and motivate us to develop our online status, so using the social media platform more: 'social networks are structured to make high-status individuals much easier to find than low-status ones' (Easley & Kleinburg, 2010: 553). The true beneficiary of our connectivity is of course the social media platform. We must remember that the social media platform only survives because it is used. Facebook overtook Myspace as the number one social media platform and now Twitter is taking a share in the social media market. An individual user's reputation also applies to a social media platform, and a user's and platform's reputation is directly related to its value and its survival. In 2012 Facebook set up a study to better understand emotional contagion. The study involved 700,000 Facebook users without the users' knowledge and tampered with the algorithm used to place posts into their news feeds to study how this affected their mood (Kramer, Guillory, & Hancock, 2014). This sparked outrage among Facebook users and the media. Facebook proclaimed that their study was legal because all users accept a contract when signing up that allows Facebook to conduct such studies. The practice may well be legal but it is unlikely to be considered ethical. Facebook remained unharmed on this occasion but there is always a limit to a consumer's tolerance, and user defection could also become a contagious idea. As Pagel describes, 'reputations are valuable, so we have to earn or pay for them. We do so by engaging in altruistic acts, costly to us but beneficial to others. Once purchased, a good reputation can then be used to buy cooperation from others, even people we have never met, just as we can use money to buy goods from people we have never met, economists call this *transferability*' (2012: 218).

Let us now look at these group reputation dynamics within an online environment. Twitter and eBay are two seemingly different reputation systems. Twitter users build reputations by communicating with other users and making connections with interesting topic information. When Twitter first emerged it 'was widely derided as a frivolous distraction that was mostly good for telling your friends what you had for breakfast' (Johnson, 2010: 192). Now of course Twitter is a widely accepted platform that is 'used to organize and share news about the Iranian political protests, to route around government censorship, to provide customer support for large corporations, to share interesting news items, and a thousand other applications' (Johnson, 2010: 192). Twitter's reputation has developed in direct relation with its users. Likewise users can develop an online presence measured by the level of followers they interest. Brands can also use social media platforms to generate product popularity but only if their message is accepted

by a group of consumers. Information connectivity and opinion are the traded resource on the Twitter platform *hub* (as described in Chapter Two). Twitter, like users, develop their reputation based on the trending qualities of the information or conversation they provide.

EBay's reputation system works from the ground up. Buyers and sellers are placed into the online marketplace or *hub*. The buyer cannot truly trust the seller as they have no direct contact with each other or the product. 'Web sites like eBay offer a certification mechanism … The evaluations received by a seller are synthesized by an algorithm at the heart of the system to provide an overall reputation score for the seller' (Easley & Kleinburg, 2010: 632-633). The seller can sell a bad product but their reputation will highlight that they sell bad products. If the seller wishes to continue selling they will only succeed if they provide a good quality product. The rating applies to all sellers in the market but the reputation of the market environment also relies on the market being safe and therefore also a good product. Easley & Kleinburg highlight, 'if a site like eBay can convince buyers to have confidence in the reliability of the reputation system, then the resulting scores can reduce some of the strong information asymmetries inherent in the site' (2010: 632-633). In this regard both sellers and eBay have to act altruistically to survive. The shadow of future reputation damage motivates the market *hub* and the sellers in that market *hub* to work together for mutual benefit. As Shirky describes, 'People will behave if they sense that there is long-term value in doing so, and short-term loss in not doing so' (2010: 178). Again we see behavioural reputation systems developing in an organically evolved hierarchy.

Cooperation Theory | *The Emergence of Cooperation from Selfish Behaviour*

The *Nash equilibrium* (Nash, 1950) describes an evolutionary stable set of behaviours within people. People will cooperate if the outcomes are mutually beneficial. Two people with opposing views may wish to compete, but if the cost of competing outweighs the end reward it may be worthwhile aligning views for mutual benefit. An example of this would be predators and prey drinking from a water hole. The predators and prey both need water, and so have to time- and space-share the resource. Time spent on drinking over predation or flight can generate a tentative truce. The Christmas Day truce of 1914 saw a series of unofficial ceasefires along the Western Front. The resource was not water; it was a cultural

and humanitarian need set against the relentless degradations of World War I. John Maynard Smith developed Nash's stabilising strategy to form the *evolutionary stable strategy* (Maynard Smith, 1982). Both Nash and Maynard Smith used the Prisoner's Dilemma model to test and describe how strategies develop under differing conditions. Their work has informed the fields of game theory, behavioural ecology and evolutionary psychology.

Shennan observes, 'the altruistic strategy is open to infiltration and exploitation by cheating' (2002: 103). Altruistic strategies can be exploited when engaging in a single exchange as the risk of retaliation is minimal. This single exchange is representative of the traditional method of advertising engagement. The brand wishes to make a single sale so there is little chance of reprisal if the product is inadequate. Of course this can change if the product's cost or the inadequacy are too high. However the risk of retaliation dramatically increases when engaging in repeated exchange or within groups. This incentivises a brand to consider producing higher quality products or aligning lifestyle indicators between brand and consumer in the hope of developing brand loyalty. Repeated contact exposes your behavioural propensity, so if you exploit others your behavioural lineage will betray your intent. The cost of exploitation becomes counterproductive and weakens your ability to benefit from that behavioural trait. If all members of a group are trying to exploit one another then no one benefits, thus dissolving the benefit of being in that group. 'Cooperation can get started by even a small cluster of individuals who are prepared to reciprocate cooperation, even in a world where no one else will cooperate' (Axelrod, 1984: 173). Axelrod set up a computer simulated experiment to find the best tactical strategy to resolve conflicts. The *durable iterated Prisoner's Dilemma* tournament aimed to find the best strategy of attack and defence when facing an arms race. Leading mathematicians, economists and other analytical professionals were asked to submit their best strategies to compete within a set number of rounds in a Prisoner's Dilemma scenario. After each tournament the winners were allowed to compete in a second tournament. The second round took into account the success of the first round and allowed the most successful to statistically breed so the volume of the successful strategies developed much like a dominant group of animals would within an environment. I will not expand on Alexrod's work here but it is important to identify the winning strategy, identified as *Tit for Tat*.

Tit for Tat sounds like a simple formula in the context of behavioural ecology but it is a fundamental building block of group behaviour. Tit for Tat's rules are simple: in the first round it will always cooperate, and in subsequent rounds it will imitate the competitor's last move. If we look at the result of this we realise that if a competitor cooperates then it will reciprocate the cooperation. If the competitor defects (*non-cooperation*) then Tit for Tat also defects. Tit for Tat can be both altruistic and defensive. The only problem with Tit for Tat is that it produces an echo. Echoing cooperation is good for both competitors but echoing defection is damaging for both. Axelrod points out, 'when a single defection can set off a long string of recriminations and counter recriminations, both sides suffer' (1984: 38). Tit for Tat's strategy is therefore useful up to a point but what is needed to countermand negative echoes is the ability to apply cooperation strategically to try to break the cycle of recrimination. This is where deductive intelligence is needed. When do you cooperate with a competitor to produce the best outcome for yourself or, better still, both parties? 'It is also a matter of shaping the characteristics of the interaction so that over the long run there can be a stable evolution of cooperation' (Axelrod, 1984: 141). Deciding when to cooperate is the main problem. This is the real dilemma that the *Prisoner's Dilemma* presents. All of the tactical pressure that this dilemma introduces is a major threat to an animal's or brand survival. Every warning call, every impulse to fight or fly, every element of biological evolution and brand strategy is in reaction to threat analysis, prevention and effective avoidance.

Pagel writes, 'if cooperation has been valuable in our past, then we might expect it to have given us strategies of forgiveness as a way of avoiding these cycles. And indeed a strategy of ignoring the first act of betrayal, then waiting before resuming cooperation, can be shown to work better than tit for tat' (2012: 193-194). Our intellect is derived from the myriad of possible outcomes found within strategic variation. Tit for Tat is just the diagnostic positive or negative apex of an infinitely variable set of situational outcomes. Brands should be aware that the behavioural traits of their consumers are not fixed; they can discontinue cooperation when feeling exploited. The behavioural strategies we hold have already been judged worthy of survival by natural selection, by the survival of our genes. 'Cooperation in your own best interests is too good a trick for a selfish gene to ignore' (I. Price & Shaw, 1998: 304). From a survival standpoint the Prisoner's Dilemma is useful as a tool of modelling human interaction but it may not work in larger-scale forms of human or cultural organisation, referred to by Shennan as 'superorganisms' (Shennan, 2002: 264). The individual has learnt strategies of cooperation and defection and has developed due to the outcomes of those encounters. Groups work collectively, which may not

benefit every individual though the group is likely to have been guided by the individual. However, each individual seeks to develop their persona and so advance their social standing or *social capital*. Individuals need to amalgamate or align their personal views with that of the group, but this has been happening throughout the individual's life. The individual imitates the values and opinions of those around them or compartmentalises opposing opinions in a processes of *cognitive dissonance* (Festinger, 1962). They have worked symbiotically (*cooperatively*) and parasitically (*non-cooperatively*) throughout every engagement in their lives, all with the goal of building social capital. 'The norms and behaviors that instantiate the shadow of the future is social capital, a set of norms that facilitate cooperation within or among groups' (Shirky, 2008: 193).

Network Stimuli and Feedback | *Reputation and Digital Saturation*

In relation to our topic of behavioural strategy within online groups, the resource of mutual benefit is reputation. As Pagel writes, 'if forgiveness and generosity are like investments in keeping a cooperative relationship going, our sense of fairness is more like a police force' (2012: 195). But regardless of whether the motivation is fear of rejection or a tactic for developing reputation and power within the group, if a person's behavioural history is filled with forgiveness and generosity then that person's reputation benefits. This is simply based on our empathic understanding that allows us to predict other people's behavioural reactions thus affecting our future behavioural tactics. Similarly if a brand develops an empathic relationship with its consumers the outcomes of such a connection may improve future product design due to feedback, thus consolidation consumer loyalty. In short, if we wish to be liked or have people help us in the future then it is better for us to act altruistically. It does not matter if our intentions are selfishly derived, the outcome of the act and the consequence retain the altruistic value. Our behaviour is very likely to be reciprocated because either the receiver of our kindness will feel obliged to reciprocate to retain their reputation within the exchange or, at a more basic level, will simply imitate our style of behaviour. In a very real way your behaviour is often reflected back at you.

Now that more of our time is spent online or on social media we are more likely to inherit social behaviours that suit this new behavioural environment. In 2008 the research consulting firm nGenera released a study after interviewing 'some six thousand members of what it calls "Generation Net" kids who have grown up using the Web. "Digital immersion," wrote the lead researcher, "has even affected the way they absorb information"' (Carr, 2011: 9). Digital immersion may seem to be a strong term but we are talking about the first generation of humans that have had continuous access to internet-enabled wireless devices. They have been one click away from any information they require; one click away from learning resources, social networks, gaming environments, pornography, religious fanaticism or videos of talking cats. This generation is saturated with choice to such an extent as to paralyse their ability to choose. Content loses meaning as we click through and through until the habit of clicking through becomes habitual. The use of the internet may well reinforce neural circuits such as visual acuity and speedy object evaluation, as Carr suggests: 'It seemed ludicrous to think that fiddling with a computer, a mere tool could alter in any deep or lasting way what was going on inside my head. But as neuroscientists have discovered, the brain and the mind to which it gives rise is forever a work in progress. That's true not just for each of us as individuals. It's true for all of us as a species' (2011: 38).

One change that has been noticed by researchers in the field of education is the way in which students have shifted from a linear way of thinking to a more spatial way of collating information. This is not so surprising given that students use the internet for research rather than gaining knowledge from books or papers. The linear formation of text has been replaced by short segments of text that link information. Carr writes, 'most books still use the old model of a sustained narrative as their organizational principle. Here, we've used a web-like model of standalone pages, each of which can be read alone (or at most in a group of two or three). The "modular architecture" reflects the way people's reading practices have changed as they've adapted to online text' (2011: 105). This could be considered a bad sign of things to come. Children and adults may lose the ability to hold focus on a subject without being distracted. Similarly information alerts may distract until the checking of devices becomes a habit or addiction. 'Duke University professor Katherine Hayles confessed, "I can't get my students to read whole books anymore." Hayles teaches English; the students she's talking about are students of literature' (Carr, 2011: 9). Anyone who has a mobile device has to make a choice: do they delve into the world of constant communication or separate themselves from it? It is not a black and white decision but there is feedback pressure between social capital and social engagement habit loops.

Persuasion Profiling | *The Use and Abuse of Aspiration*

A further, major concern is that we build our own persuasion profile without fully understanding the consequences. This concern should also be applied to companies as well. 'Consuming information that conforms to our ideas of the world is easy and pleasurable; consuming information that challenges us to think in new ways or question our assumptions is frustrating and difficult … As a result, an information environment built on click signals will favor content that supports our existing notions about the world over content that challenges them' (Pariser, 2011: 88). Populations may not want to see poverty or suffering, but to dismiss it from your world view means you are unlikely to participate in redressing the problem. If a whole population does the same, the internet feedback would also rank poverty or suffering as unimportant. As Pariser suggests, 'news consumption will be very personal, very targeted. It will remember what you know. It will suggest things that you might want to know and it will have advertising' (2011: 61-62). As you search, your view of the world will narrow – what Pariser calls 'the you loop' (2011: 125). Of course you can study and wish to gain insight on a vast range of subjects if you wish, but online search technologies will tend toward popularity over diversity. The more you are guided towards popular content the less diverse your thought habits become. If we condense our world view we are trending toward a monoculture of opinions at the expense of diverse creativity. At the moment it could be argued that online technologies allow for a great range of creativity and collaboration, but the more we coalesce the more we are likely to sound the same. A lack of creative diversity is never good for society and 'in the wrong hands, persuasion profiling gives companies the ability to circumvent your rational decision making, tap into your psychology, and draw out your compulsions' (Pariser, 2011: 123). The next obvious step for data mining technologies would be to collate all of your internet activity and search for linguistic and behavioural online habits. This would enable companies or governments to track individual users from any computer just by your behavioural traits. This sounds like a practical way of tracking criminals, but an equitable model of privacy and human rights would have to be defined by humanity as a whole rather than by self-interested elites.

We have a threat that we must face now and into the future. Not from without but from within. Due to our ability to predict future outcomes based on past outcomes, we have developed a form of self-fulfilling prophesy. We are not destined to repeat the past but our past sets up a predetermined tendency toward habituating past behaviours. We learn by imitative replication, which can mutate or be stifled but the

cultural tendency for replication still remains. This form of pattern seeking and learning was and is still useful but our world has changed with developments in industry and technology. We now have the power to advance our development far beyond the speed and relative structural integrity of Darwinian evolution. This provides us with great benefits but also poses a great threat to our species: the problem of *Supernormal stimulus* (Tinbergen, 1989). Supernormal stimulus is a term used to describe how animals and humans can be tricked by exaggerated stimuli. For example, if a bird's egg is grey with light blue dots and you present the bird with a plastic ball that is larger and has more exaggerated bright blue spots the bird will try to incubate the plastic ball. Obviously the plastic ball needs to be similar in size and shape or the difference would be too great for the bird to recognise it as an egg. Supernormal stimuli are exaggerations of natural stimuli, as Barrett describes: 'From pornography to advertising models, from plastic surgery to old fashioned cosmetics, cinched waists, and padded bras can be seen as people amplifying nature's signalling' (2010: 30).

Incubating a fake egg instead of its own egg is tragic for a bird and embryo. But apply similar trickery to humans and they can build exponentially upon the original tragedy. Our psychology often transcends the real, and when applied to threat detection we build stories that compound the real threat. As Barrett writes, 'what else are King Kong, Godzilla, Frankenstein's monster, vampires, werewolves, aliens, radioactive mutants, zombies, or the Devil if not supernormal stimuli exaggerated versions of the menacing human or wild animal' (2010: 142-143). Over the course of human evolution we have told stories to pass on knowledge; stories about good hunting grounds or what animals you should hunt or run away from. These stories were rooted within the natural world. Spirituality is likely to have developed because of the relationship between humanity and nature. As tribes developed, battles may have broken out and so stories about other clans developed. The stories would be told from the perspective of Us and Them, thus relegating the opposing tribe into a pseudo species. Similarly in the modern world 'threat strengthens national pseudospecies' identity and mobilizes instincts to follow a leader in time of crisis with less evaluation than when there's time to think' (Barrett, 2010: 124). Interestingly, the similarities between groups allow us to recognise surrender signals and feel empathy with the suffering of our enemies. Yet we must always remember that the narrator is our ego and when the opinion is idealised by a group the same denial of responsibility often applies. 'Countries have "Departments of Defense" not "Departments of Aggression" … the narrator is never the aggressor, always the defender' (Barrett, 2010: 116).

Our desire to survive has led to our dominance of our world but we seem unable to stop there. As Barrett describes, 'political leaders play to this instinct because whipping up paranoia about enemies consolidates their power. Leaders on two sides of a conflict take turns demonizing each other ... literally' (2010: 124). Defence through fear does not need to be our guiding foreign policy. We can mutually choose cooperation over defection at any time. 'Costa Rica has disbanded its army and directed that money into environmental concerns. Far from being overrun by aggressors this stance has afforded it peace with its neighbours' (Barrett, 2010: 130-131). Socially we do not need to view others as aggressors or our work colleagues as competitors. This fear is directly related to our evolutionary past but our ability to cooperate is part of that process. Although the hierarchical structure works well in groups, we must be vigilant when 'the powerful and rich can direct these instincts at supernormal family estates, trust funds that endure for generations, and, in the case of monarchies, permanent rulership for the family … We decry vicious land feuds but we don't stop to question the unnaturalness of the whole premise' (Barrett, 2010: 114-115). Inequity within populations has allowed poverty and a stifling of technological innovation due to inappropriate ownership laws that serve the few. Price & Shaw write, 'the ownership meme has been influential in shaping the conduct of human affairs. It has so infected the collective mind, and is so deeply embedded in culture, that an emergent philosophy, or way of life, materialises, namely that "to have is to be". People become valued, their relatedness and relationship shaped, according to their material possessions' (1998: 360). This is a form of self-imposed tyranny for all mankind at all levels of society, all due to a self-inflicted fear of an unprovoked retaliation. Yes, we should be cautious in life, but we must not let caution stop us from breaking down barriers of difference or from cooperatively working toward protecting our species through diverse innovation. As Barrett suggests, 'government where those people are chosen from among the most cooperative rather than the most competitive might lead more wisely' (2010: 130).

Network Collectivism | Open Source Collaboration

Online groups work in similar ways as offline. People have the ability to abuse others without direct reprisal but when people work together on projects the abusers are soon rejected by the group. When a group reaches a dynamic of cooperation the group can focus on a decided outcome. This group collaboration

is now often called 'open source'. This form of organisation often has little or no management other than selection by popularity. Ideas are presented by individuals but beyond that the crowd takes over. This form of collective action may replace or modify traditional organisations or political institutions. As Shirky suggests, 'open source is a profound threat, not because the open source ecosystem is out-succeeding commercial efforts but because it is out-failing them … The most important reasons are that open systems lower the cost of failure, they do not create biases in favor of predictable but substandard outcomes, and they make it simpler to integrate the contributions of people who contribute only a single idea' (2008: 245). The problem with open source organisation is that there is often no payment or trade structure in place. An organisation such as Wikipedia has only a small number of staff and it relies on user development and regulation for the most part. Most open source models are now using innovative ways of raising and distributing capital. Crowdfunding platforms allow users to advertise their ideas, to which other people may donate capital. Crowdsourcing platforms work inversely to crowdfunding. People advertise their skills online so other users can source and employ them by relevant skill set. Open source projects can also sell advertising space on their website, newsfeed or other online space, however it is often social media companies that tend to use the more traditional advertising model to raise revenue.

Open source models of project development are often more open to altruistic collaborative behaviour due to the lack of cost to the individual. Each collaborator contributes as much or as little as they want and gets the benefit of networking with other collaborators. The capital exchanged is social capital which often outweighs the cost of collaboration. Users invent as well as test and develop other users' work, so strengthening the outcomes. The model works 'because it doesn't have employees, it doesn't make investments, it doesn't even make decisions. It is not an organization, it is an ecosystem, and one that is remarkably tolerant of failure' (Shirky, 2008: 246). Open source organisation does not require success to survive nor does it need to sell a product. Company organisation requires profitable outcomes and that requires the need for data protection. The protection of data effectively stifles innovation. One large problem companies have to deal with is the protection of their investment though patents and copyright laws. This need for data protection will become more prone to spillover or 'cultural drift' (Barrat, et al., 2008: 233; González-Avella et al., 2006; Hölldobler & Wilson, 1990; Klemm, Eguíluz, Toral, & Miguel, 2003) as cultural ideas and communication platforms allow information to transfer at great speed over large populations. 'When you share a common civic culture with thousands of other people, good ideas have a tendency to flow from mind to mind, even when their creators try to keep them secret'

(Johnson, 2010: 53). If an individual rather than the company benefits financially the company model would shift dramatically. Necessary staff would be elevated to the correct positions within the hierarchy. New innovations would produce new hierarchies. The elevation-of-invested-staff model works in direct relation to the group dynamic model. Management structures are governed by the group dynamic, which allows cooperative development to accelerate for the benefit of the group.

Humans have changed habits of communication since the rise of information networks. We may feel a sense of nostalgia for older technologies such as mail but the benefits of digital information transfer have clearly been accepted by the global population. The internet is the global meeting point where, as Carr describes, 'people gather to chat, gossip, argue, show off, and flirt on Facebook, Twitter, MySpace, and all sorts of other social (and sometimes antisocial) networks' (2011: 85). We can do business or chat with friends and family from anywhere in the world. 'Satellite television, text messaging, and all other new media have potential to help a person on one side of the world bond with someone on the other' (Barrett, 2010: 129). As we have seen in recent years, social networks have been able to bond people, groups and often ideologies together, 'but this is as true of terrorist networks or criminal gangs as of Wikipedians or student protesters' (Shirky, 2008: 210).

It is vital to remember, though, that while the power to make networks has an ability to bring people together for an ideological or political cause this does not mean it has power in the physical world. The 'Arab Spring' was expected to herald revolutionary change helped by social online collectivism. This was not to be the case because the physical infrastructure needed for true reform was not in place. Online organisations can emerge and atrophy with little cost to the users involved, however if the group wants to influence the physical world, real world infrastructural issues need to be addressed. It is easy to suggest, 'we are seeing these tools progress from coordination into governance, as groups gain enough power and support to be able to demand that they be deferred to' (Shirky, 2008: 292). But there remains a gap between online and offline collectivism due to the infrastructural and physical problems which become real as you transition between collective ideas and action.

Another threat to a user's security is that 'epidemic-based protocols for information spreading may be used for data dissemination and resource discovery on the Internet' (Odum & Barrett, 2005; Wiener, 1961). Governments and law enforcement can use data about collective groups to target potential

threats to their course, helping to identify, subdue or eradicate collective opposition. The same could be true of corporations that use big data to guide their marketing strategy. Data mining the behaviour of populations would enable brands to target new consumer groups as well as map market shifts. However, this knowledge would be inherently incentivised and appraised in favour of profit over environmental or ethical concerns, unless or until environmental or ethical factors started to directly affect profit margins in favour of adaption. This is a real danger that populations and free market systems should heed.

Cooperation Solutions | *Mutually Beneficial Reciprocity*

When considering what we as a human culture can do we should start looking at mutually beneficial cooperative dynamics. This study has sought to examine the dynamical properties of human behaviour in relation to advertising practice upon sociocultural groups. The focus has been necessarily broad because the issues that relate biological, cognitive and sociocultural networks are intricately connected and to discuss any one of these areas without the others would be misleading. As Barrat explains, 'many physical, social, and biological systems are the result of microscopic dynamical processes determining the occurrence of the various configurations. The creation of a social relation, the introduction of a hyperlink to a web page, and the peering of two Internet service providers are dynamical events based on local interactions among individuals that shape the evolution of the network, (2008: 60-61). We are now coming to understand that dynamical systems are found throughout both the natural and artificial worlds. Social media technologies can and do affect human cognition and human cognition can affect biological fitness. We continue to evolve biologically but now 'social influence is at the core of social psychology and deals with the effect of other people on individuals' thoughts and behaviors. It underpins innovation adoption, decision-making, rumor spreading, and group problem solving which all unfold at a macro-level' (Barrat, et al., 2008: 216-217). This can now be monitored online due to social network technologies and the marketing needs of profit-driven companies. If social technologies affect human cognition we should seek to find a better motivational alternative to network development than profit or prestige. This is beyond the scope of this project, but as Shirky describes, 'when it becomes simple to form groups, we get both the good and bad ones. This is going to force society to shift from simply preventing groups from forming to actively deciding which existing ones

to try to oppose' (2008: 211). If we wish to develop efficiently and productively into the future, we will have a much greater chance of survival if society and industry work symbiotically.

Advertising strategy began with the simple premise of informing consumers about a product. The second stage focused on seducing consumers into purchasing the product. In light of the phenomena examined in this study, I would argue that the next phase in the evolution of advertising strategy will be one of cooperation with consumers. We must not forget that we as individuals as well as cultures are evolving. We are becoming better informed as we become better connected. This progressive drive is continually aided by technology and the adaption pressures technologies place on social structures. These technologies allow brands to study consumer behaviour but also allow consumers to be better informed about the brands they choose to engage with. Brands, like humans, become complacent or delusional at their own peril. As Wagner writes, 'the process of self-perception is by no means a perfect one; the intentions we confabulate can depart radically from any truth about the mechanisms that caused our behaviour' (Wagner, 2003: 181). If brands continue to build elaborate persuasion strategies they will continue to paint themselves into a corner. Brands who seek profit over product quality will find that other brands can exploit and take their market share and consumer audience by working closely to address consumer needs and concerns. Advertising agencies will find cooperative advertising practice alongside the traditional creative process works more effectively, thus winning new business. To survive into future markets, brands will have to focus on quality, innovation and sustainability as well as profitability. The future success of a brand will inevitably become more reliant on reciprocal engagement with networks of consumers rather than individuals. Brands that have relied on techniques such as planned obsolescence or other forms of malicious profiteering may shortly face a resultant weakening of the consumer loyalty they have worked so hard to attain. In short the money spent on persuasion may soon be better spent on cooperative engagement.

Human history is full of war and poverty but, when looking at that same history in totality, humanity has continued to benefit through innovation. In Gleick's words, 'memes can replicate with impressive virulence while leaving swaths of collateral damage' (Gleick, 2011: 315). One could focus on any idea or innovation and highlight its good and bad points but it is society as a whole that truly accepts or rejects its implementation. If an idea, strategy or behaviour works well for the many then it will continue to flourish within that society, as Pagel notes: 'Violent and antisocial people are increasingly being pushed to

the margins of society, where they have fewer job prospects and fewer opportunities to reproduce … The world can sometimes seem a violent place, but we are steadily becoming a more democratic and peaceful species, more cooperative, kinder, more empathetic, and more generous, descended from more aggressive ancestors in our not-too-distant past' (Pagel, 2012: 266). We are continually being tamed by our culture, and this also applies to advertising practice. If a brand wishes to survive, develop and thrive it would be wise to develop cooperative strategies and try to mimic cultural behaviour. To not do so is to neglect an adaptive process that leads to cooperative success.

Conclusion

Evolutionary Thinking | *The Long Dance of Descent*

Over the course of this work, the conversation has traversed a variety of topics that have built one upon another. This format has not been without reason as the topic is a consolidation of many areas of study. My overarching aim was to identify a successful advertising strategy for the development and survival of a brand. This first necessitated identifying and analysing the environment enveloping this process – the arena in which the advertising strategy must compete. We were then able to discern the elements of an evolutionary successful strategy that could be implemented into advertising and brand management. I believe that to combine evolutionary theory with advertising practice will invigorate a discussion about new approaches to consumer engagement. These approaches could be applied to all subsets of human activity and interaction; however, given my professional background and interests I have focused on the field of advertising practice. I also believe that advertising and brand management are at the forefront of social technologies and would therefore benefit most from the strategy presented.

Central to my study have been networks that interconnect the biological, cultural and electronic realms. We have examined their constituent elements and the pressures that guide their development. Even though these biological, cultural and electronic networks occupy different domains, I have argued that there is an evolutionary correspondence between all three systems and that each influences the others. I do not doubt that anthropology and semiology have their place in the study of cultural evolution; however, I have chosen to use memetic terminology as it explicitly focuses on the connections and similarities between biological, cultural and technological selection pressure from an evolutionary perspective. It should also be noted that there are many areas of duplication and overlap between the fields of memetics, anthropology and semiology. I have no wish to champion any one doctrine over another and have no objection if the reader wishes to re-appropriate the conversation into their preferred field of study.

The Environment

Our first area of discussion was to ascertain the structure of the environment. The environment is of vital importance from an evolutionary perspective as it is that which places selection pressure upon the entities developed within. Our initial goal was to identify the internet as a search environment, and elucidate the similarities between *internet search lineages* and *biological genetic lineages* as well as the selection pressures placed upon them. Each internet search term, when valued in linguistic relation to a past history of search terms, soon builds a lineage that forms a cluster of correlating terms. In isolation each search term has a value, yet in combination these search terms can accumulate additional search value. This memetic process classes each search term as a meme and each term cluster as a complex of memes or memeplex. To return to our biological analogy, memes are the cultural equivalent of genes, while memplexes are the equivalent of co-adaptive gene complexes such as cellular organisms. Both genetic organisms and memetic memeplexes are fundamentally objects that can be identified by their cellular barrier, separating themselves from the biological or cultural environment. Within this defining cellular barrier, each gene works co-adaptively to enable the organism to feed, utilise nutrients and protect itself from infiltration. Similarly a memeplex forms a conceptual barrier between correlating ideas or concepts. Each meme works co-adaptively to enable new concepts to combine, strengthening core memeplex concepts and warding against conceptual slippage.

From there we applied memetic lineage to the interconnectivity between the user and the information. Each search term may be considered as a meme that connects a user to a piece of information. The meme as we now understand is a replicator – it is not the idea in itself but rather the force that both values combinational relevance and provides combinational memory in the form of a lineage of relevance or trend. Each search is ranked by the search engine, forming a rank lineage that can be developed and augmented by future searches that further refine its rank lineage. Rank lineage, as we have seen, shares similarities to genetic selection at a procedural level as they both survive and develop due to selective replication. Whether you prefer the terminology of lineage or heredity, both cultural and biological processes lead to acquired characteristics as a direct consequence of environmental selection pressure. Certainly there are differences between cultural and biological selection pressures, the main difference being the environmental properties of each. The biological environment is predominantly biochemical, whereas the cultural environment is adapted by the pressures of ideas and opinions, including such

specific elements as social behaviour hierarchies and profit-driven advertising. As we have seen these latter elements influence group behaviour but are still governed by environmental selection pressure. Even rich-get-richer dynamics are found in both natural and cultural environments, causing fluctuations in favour of certain groups in a population; however, these are often temporary if maladaptive to the health of the population. Dictatorships will rise and fall as will cultural revolutions but all are elements of an evolutionary stabilising strategy. The more parasitic the hierarchy, the more likely the populace will rebel. All hierarchies and ideologies develop if they work symbiotically for the good of the populace. If they do not, they will over time be replaced or adapted until they do.

The Organism

Our second area of discussion involved describing online network groups as organisms within an environment and identifying the similarities in structure and process between digital and organic clusters. A biological organism is a complex of DNA that is isolated from the environment by a barrier. From the view of network groups I suggested that users or *nodes* are akin to single cells, while groups of users or *clusters* are the equivalent of organisms with multiple cells, and *hubs* are vast multicellular organisms. These are the structures that allow us to identify *individuals*, *user groups* and *large collaborative infrastructure* within complex networks. At yet another level, from a brand advertising perspective the node represents a single advertising campaign, a cluster is the continued brand advertising strategy; the hub, the complete brand ideology and engagement with its consumer market. This *node-cluster-hub* structure is dependent on the interaction of the various elements. Biological organisms use biosemiosis as a process of exchange; cultural exchange, as I suggested, is based on *mimesis* or memesis. Ideas spread among individual users and user groups within the social media infrastructure. Brands advertise on these platforms but it is then up to individual users or user groups to assess and decide which ideas they wish to retain. This cultural feedback can be assessed by brands, allowing them to evaluate the success of a campaign and predict future consumer behaviour. However now the cultural feedback also guides consumer opinion as groups are able to evaluate and adapt their opinions within vast global networks.

Conclusion

It seems we have reached a point in technological advancement where the individual can be directly influenced by mass opinion – what is sometimes called the hive mind. Neuroscience suggests that thought and behaviour is developed by imitation, repeated performance and emotional engagement. The limbic system working alongside the neocortex allow for senses and emotions to form memories that contribute to our consciousness and understanding of the world. Memetic imitation and memory look at this system and suggest the ideas themselves working in combination form consciousness. The ideas we learn throughout our lives develop both our knowledge and the story we tell ourselves. We now know that when faced with an external stimulus the limbic system in turn stimulates different areas of the brain, which react in combination to form emotions that categorise the experience alongside previous experiences. In effect our thoughts are triggered by external stimuli or a combination of past experiences. Very few of our thoughts are new, and even creativity is often a reconfiguration of past thoughts. The mind is a stochastic system, yet from this random noise harmonic structures emerge. These structures emerge and atrophy, moving from chaos, to form, back to chaos. This process is how thoughts emerge out of the neuronal noise of axonal firing within the brain. If the thought is repeated over time the tendency towards this thought is reinforced. The thought itself is not physically developed; rather the synaptic network is developed through repeated use. This process continues throughout our life, allowing us to build upon past experience in the process of learning.

Thoughts, like languages or ideologies, become institutions of the mind. We need to regulate our thoughts and behaviours in order to work effectively with others. From language to law and order, institutions arise because they are a successful strategy in the process toward regulating social civility. Institutions may be manifest in the world but they are still instituted in the mind. Each individual upholds the ideology of the institution or the institution would fall out of use. Due to the density of social networks, advertising practice has been with us for generations as an institution and has changed over time to suit the environment. This environment is now undergoing major change. Advertising practitioners can no longer get by with direct advertising. Developing emotional contact with consumers will continue but will now increasingly involve a two-way conversation rather than the traditional one-way, presenter-to-audience model. The conversation will become a negotiation between brand and audience, so brands will have to develop more cooperative tactics of engagement. The consequences of poor or exploitative consumer engagement may lead to unforeseen retaliation so brands must view their engagement as an evolutionary arms race. Brands will benefit from co-adaptive behaviour and suffer from maladaptive

behaviour as consumers become more conscientious through social network engagement. Advertising may once have been a process of "the spider catching the fly" but now we are looking more at "the web that caught the spider that caught the fly". If a brand believes it is immune to social media collectivism it is likely to miss out on a profitable advertising engagement and may be unable to react effectively to its audience if a public relations issue occurs.

Symbiosis

Our third area of discussion looked at how we might utilise cooperative behaviour to develop symbiotic relationships between a brand and its consumers. We have seen that hierarchical power and ownership can be as corrosive to human welfare as they are catalytic to cultural development. Networks like communities develop hierarchies. This is a natural part of group behaviour and is as much part of social innovation as is mate selection. Now that most individuals can collaborate in global groups, network collectivism is likely to adjust or replace existing hierarchy models. What we are seeing today is a shift in our cultural ecosystem. Individuals, companies and governments have to shift and adapt their behaviour to match. Our discussion has focused on the social economics of brand engagement but the same evolutionary pressures apply to all aspects of culture. Social hierarchies, when inclusive and equitable, motivate symbiotic cooperation, but when a hierarchy becomes exclusive and inequitable the likelihood of retaliation increases. Sociocultural ecosystems that are divided by price thresholds will always promote social segregation and status anxiety. Power, when held exclusively by the few to the detriment of the majority, is not only unethical but also economically inefficient. Corporate psychopathy and regulatory apathy are parasitic economic behaviours that benefit the few for a short period of time at the expense of the economy as a whole. Significant disparities between the wealthy and the impoverished have often been corrected by collective petitioning or revolutionary upheaval. But the true definition of a stable, efficient and ethical market system is when lifestyle and equality become sustainably equitable. When this is not the case the process of destabilisation will continue until stability is re-established. Culture and economics are both stochastic ecosystems that fluctuate in accordance with evolutionary stable strategies. If we could minimise equity fluctuations we would minimise the costs involved in rectifying cultural inequity.

Conclusion

Applying Machiavelli's principles of gaining and retaining power within seditious hierarchies (1532) to the broader context of cooperation within power plays, I would suggest that cooperation without the threat of retaliation would never work. The evolution of our consciousness provides the evidence of our need for threat prevention, just as our evolutionary struggle with threat avoidance provides the selection pressure leading to cooperative behaviour. Machiavelli himself makes very clear that to be openly seditious is a foolish endeavour. You must be seen to cooperate when in a position of weakness and only reveal your true intent when you have sufficient leverage to suppress reprisals. In effect Machiavellian tactics rely on Axelrod's iterated prisoner's dilemma model as a process of success. Cooperation is ultimately derived from selfishness and is a fundamental evolutionary counterpoint. However, one fundamental difference between Renaissance Italy and the modern world is that of global connectivity. In relation to the *co-operator-defector* group dynamic, powerful individuals still wish to achieve and retain power but the effects of non-cooperation within the populace can now be observed in real time by the populace. Machiavellian teachings have been used to suggest that selfish empowerment is a safe long term strategy. Yet the degree of malicious deceit used to gain power will be in direct proportion to the exposure to retaliatory reprisal. The choices involved in maliciously gaining power fundamentally weaken the infrastructure of that power base. For an individual or a brand to truly develop a strong and long-lasting power base they must cultivate the cultural and economic ecosystem around them. Prosperity when circulated stabilises populations and further contributes to diplomacy and civil liberty. It is easy to label Machiavelli a malevolent tactician but he merely provided a frank assessment of the troubling nature presented to humanity by its own ego.

We have seen that cooperation is a positive, effective and efficient evolutionary strategy. Of course cooperation needs to be reciprocated for both parties to benefit, so retaliation is a necessary element of such interactions. The efficiency of mutual cooperation often negates the short term gains of non-cooperation. Advertising has used fear and status to motivate consumers for a long time to the detriment of the individual consumer and the wider cultural psyche. Status inequity promotes depression, crime and segregation. Status inequity does not nurture either the society or the individuals within it, but fortunately it is also not an inexorable truth. Companies use John Nash's *non-cooperative equilibria* or *Nash equilibria* to improve mutual cooperation between one another. I have suggested this process should be expanded to include consumers by using Axelrod's evolutionary cooperation model. There is no need for brands or their advertising strategies to become pillars of ethical conduct but rather they should seek

to engage with their consumers for mutual benefit. As consumers will continue to connect with each other in ever more complex online social groups, brands should acknowledge this cultural shift and respond proactively to engage it. If a brand is to survive into the future it must work symbiotically with its consumers. An evolutionary cooperative strategy benefits both brand and consumers, and has the added benefit of developing a more efficient, stable and innovative marketing communication environment.

The Shadow of Our Future

Perhaps the most obviously pertinent application of evolutionary theory to advertising practice concerns how ideas evolve. In researching the topic, I found one of the most interesting expressions of an evolutionary process applied to an idea involves the idea of *evolution itself*. Evolutionary theory has been rigorously tested again and again against other theories only to dissolve the competing theories – a process described by Dennett as 'Universal Acid' (1995). If an idea is correct then it will win out over any opposing idea over time. The idea takes on the properties of a universal acid that dissolves all other ideas away, leaving only the truth. As time passes no falsehoods will remain, only the universe and the true understanding of it. This appears a long step away from applying evolution to advertising practice but not when we realise that nature and culture are intrinsically connected.

Memes cannot be measured directly but that does not mean that memetic processes do not affect the evolution of culture. Indeed, this effect on culture may be the key to their quantification. Like a black hole, a meme's power can be understood only by studying the forces exerted upon the objects with which it engages, such as ideologies, language, fashions and other cultural trends. The measure of cultural drift provides us with the method of assessing the extent of a meme's replicative value. Memetics is and may remain a discussion that describes cultural evolution as a process of emergence, survival and atrophy but that by no means diminishes its importance as an extension to the process of human evolution. It would be hard to argue that biology does not affect culture and likewise culture does not affect biology, given the evidence all around us such as infection and genetic inheritance on one side, and cultivation and hierarchical mate selection on the other. We are, at a fundamental level, a summation of our ideas and the behaviours in which we engage based on those ideas. Every day we live our lives and tell others and ourselves

the story of our lives. The stories we tell ourselves become who we are. We may believe we are in control of our ideas but every one of them was handed down to us by our forebears. All we have control of is the combination in which those thoughts float through our consciousness, and even that is conditioned by the processes of habit and institutionalisation.

Our environment and everything within is part of a stochastic system. Each element within such a system has the opportunity to emerge from the background radiance of chaos through a process of reciprocal commonality. This is an inherently symbiotic process. Once the process of emergence has developed a barrier between the organism and its environment, the former is subjected to evolutionary selection pressure. If that organism develops to the point at which it forms reactive defence mechanisms, be they biological or intellectual, these defence mechanisms likewise become subject to selection pressure. Furthermore, if an intellectual organism works collaboratively with other intellectual organisms then the group mechanism is subject to selection pressure, and if that group works collaboratively with other group then the cultural mechanism itself is subject to selection pressure. At every stage of this process evolutionary selection pressure ensures that the ineffective die off and the effective survive. This process also elevates a myriad of survival niches that allow innovation and exploitation. The process of evolution is never truly stable or finite and all living organisms are subject to the continual sculpting force of an evolutionary stabilising strategy. Environments, organisms, cultures and the ecosystems that connect them are all in a process of emergence or atrophy. Between emergence and atrophy lies the immeasurable opportunity of replication.

Our ability to cooperate or retaliate is also evolved through evolutionary selection pressure. The outcome of every conscious decision shapes our future in incremental ways. Most of our decisions make very little impact but some can produce profound changes that may affect our future and the decisions of others; furthermore, the effects of choices accumulate over time. Thus we shape our future by affecting our survival fitness and the survival fitness of our descendants, making this an issue of vital importance to humanity. We can choose to act selfishly or cooperatively but we may wish to view such choices differently. For example choosing profit at the expense of the environment seems to fall under the category of selfishness but I would suggest that it could be considered as a choice to self-harm. To be viewed as such this would, of course, require environmental damage on a vast scale. But if millions of individuals chose to profit at the expense of the environment, the individual decisions would be selfish but the collective choice would be one of self-harm. As a species we have the choice to engage symbiotically with the environment or to parasitise it.

Conclusion

Advertising is not only the mouthpiece of a brand; it also affects the consumers with which it engages. Contemporary advertising compounds issues of status anxiety and social segregation but this is not the only approach available. Brands can choose to work symbiotically with consumers and gain the benefits of such reciprocal behaviour. As I have suggested advertising is in a perfect position to shift its practice from seductive to symbiotic engagement. Brands should be proud of their products, so when engaging with consumers they should not have to fall back on hard-sell tactics. With the density of networks, the hard sell will become more and more intrusive. Brands should become friends with their consumers, a friend that listens as well as informs. This would allow brands to develop and change their advertising strategy to enhance the lives of their customers while guiding product development. The age of big data allows brands to become even more powerful and most people would agree such power should not be abused. However I would suggest that to abuse this new power would be of no long term benefit. Brands would benefit far more if they engaged cooperatively purely because cooperation has been evolutionarily shown to be the best tactic for survival.

Evolution may not be popular with people who have an investment in an established belief, but as Dawkins writes, 'The total amount of suffering per year in the natural world is beyond all descent contemplation. During the minute it takes me to compose this sentence, thousands of animals are being eaten alive; others are running for their lives, whimpering with fear; others are being slowly devoured from within by rasping parasites; thousands of all kinds are dying of starvation, thirst and disease. It must be so. If there is ever a time of plenty, this very fact will automatically lead to an increase in population until the natural state of starvation and misery is restored' (R. Dawkins, 2008: 94). This fact disturbed Darwin greatly but he also realised that it is an unavoidable part of natural selection. Dawkins suggests that when we look at animals like cheetahs and gazelles they seem to be amazingly well designed. Cheetahs are perfectly adapted for catching gazelles and gazelles are perfectly adapted for escaping from cheetahs. We must understand that they are the outcome of an evolutionary arms race in which millions of animals have perished. The development of all animals has come about through millions of unsuccessful animals being caught while the successful ones make it through to reproduce and pass on the genes that helped them survive. The sheer number of deaths that lie behind the development of creatures is horrifying yet at the same time it has a kind of savage beauty.

We must not forget however that animals spend vast amounts of time and energy working cooperatively, providing food and support for family and other members of the group. Natural selection is a stabilising pressure that is harsh, but works in favour of tactically moderated cooperative behaviour. We cooperate because it is a successful survival strategy, allowing us to benefit as part of a group. Our instinct to be selfish is balanced by an instinct that realises selfish behaviour can also do us harm in groups. We have domesticated ourselves; we have imitated others in the group over the course of generations until it has become an inherited trait. As a culture we work together in businesses or on projects. The team members that succeed do so because they cooperate. This is not blind obedience; there is a sting in the tail. Cooperation is reciprocal, not given freely, and people or companies that do not comply with this social contract suffer the consequences of the shadow of the future. Behavioural ecology is reciprocity with a gloved fist; our future is always predicated upon the habits of the past. As Steven Strogatz says, 'we see this version of morality around the world, be upright and forgiving, but retaliatory. That is Old Testament, it's not, turn the other cheek, it's an eye for an eye, but not ten eyes for an eye' (2010). To misunderstand or remain ignorant of the deep and intrinsic complexities of both malevolent and cooperative models of evolutionary selection is to grossly misunderstand the world in which we all live. It does not matter if we agree with this opinion or not. Our opinions make no difference to the process of evolution. Cooperation was not constructed by our teachers or by god. It was handed down to us by our biology. I personally like that idea and believe it will continue to influence the evolution of humanity.

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