CHILDREN'S COLLABORATIVE MUSIC COMPOSITION:

COMMUNICATION THROUGH MUSIC

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Louise Morgan

ABSTRACT

The present research looks at peer collaboration and creativity, an area largely neglected by previous peer collaboration researchers, where goals are ill-defined and measures ambiguous. In previous (science based) peer collaboration research, the crucial factor promoting group productivity appears to be the 'social instrument of language'. Groups achieving intersubjectivity, or mutual understanding, through dialogue out-perform those groups who do not. The recurring theme is one of sharing ideas verbally with other group members, arguing through alternatives and providing justifications for accepted and rejected solutions. It was suggested that in collaborative music composition tasks an alternative medium exists for the communication of ideas and for the establishment of a shared understanding of the task, namely communication through the music itself. It was hypothesised that, rather than talking about their ideas, children would be more likely to try them out directly on the musical instruments. It was also predicted that this form of interaction would be significantly related to group productivity.

The present research also considers three key gender issues: firstly, the recurring finding by previous researchers that boys in mixed gender groups take control of the task by dominating verbally and non-verbally over the girls; secondly, suggested differences between the genders in communicative styles; and thirdly, the relative productivity of single gender and mixed gender groups.

Three studies were carried out with children aged 9-10, working in groups of four of varying gender compositions. Each study involved a distinct type of music composition task. Evidence was provided for the occurrence of interaction through music, and its importance for group productivity was found to be dependent on the nature of the task. Important gender differences were observed, including female domination in mixed gender groups. The implications of these findings are discussed in relation to previous peer collaboration research and classroom practice.

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CHAPTER 1: INTRODUCTION

1.1 Aim of Thesis

Since the introduction of the National Curriculum in England and Wales in 1988, all children are now required to study music up to the age of fourteen, and composition forms a large part of this. Since children are required to compose in groups for a majority of the time, it is important to establish how they progress through working in groups and which features of the children's interactions are important for group productivity.

This issue of what can be learned or gained from working in groups has been studied extensively in the context of a variety of science-based tasks, such as logical reasoning, mathematical problem solving and so on. There is a notable absence of peer collaboration research with reference to creative tasks, or specifically music composition, in which goals are less clearly defined and measures more ambiguous. In music composition tasks there is no right or wrong answer, music is a subjective experience. Thus, children working on a music composition task will not be working towards an absolute end product or towards a correct answer, they will be working towards the acceptance of one solution from a potentially infinite number of solutions. It is important to establish whether the processes necessary to achieve this differ significantly from the processes required to complete the science-based tasks.

The aim of the thesis is therefore to bring together the two areas of research, i.e. peer collaboration and music composition. This chapter provides an overview of the music education system within the primary school as it stands to date, specifically the philosophy behind the inclusion of music in a compulsory curriculum. Examples of composition tasks are then presented in order to clarify exactly what is meant by the term 'music composition'.

1.2 Music Composition in the Primary School

Music composition is defined very broadly in the primary school and refers to the briefest musical utterances as well as to more sustained inventions. Music composition could be thought of as the act of assembling these utterances (Swanwick, 1988). For John Cage (1968), "The material of music is sound and silence. Integrating these is composing" (p.62). The term 'composing' is used to encompass all acts of musical invention which take place whenever a person or a group of people devises a piece of music.

People of every culture have found a need to express and share feelings, thoughts and ideas by ordering sounds into forms which symbolise and interpret their experience. This is how the National Curriculum Music Working Group interim report (1991) defines music. The report states that the creation of music stems from a need to communicate through patterns of sounds which have significance. It goes on to suggest that music derives from and contributes to culture and society. Music education aims to develop the aesthetic sensitivity and artistic ability of all pupils through an active involvement in performing, composing and listening. This moves away from a past teaching tradition based almost exclusively on singing, to one which includes appreciation, instrumental work and composing.

All primary schools in England and Wales teach a National Curriculum in music (DES 1992a, 1992b), introduced to pupils in Year 1 (age 4-5) and Year 3 (age 6-7) in September 1992, and thus in place throughout the primary age range by summer 1996. Teachers are required to teach programs of study and assess the achievements of pupils by end of Key Stage statements at the end of Year 2 (age 7) and Year 6 (age 11). There are four Key Stages in total (ages 7, 11, 14, 16), although music, art and physical education differ from the other eight compulsory subjects in being curriculum requirements only until Key Stage Three. In England, two attainment targets (ATs) form the basis of the music curriculum: performing and composing (AT 1) and listening and appraising (AT2). In Wales, there are three ATs: performing (AT1), composing (AT2) and appraising (AT3). Thus the basic

balance is the same in England and Wales. (This information was correct at the time of carrying out the research, however there are changes underway at the time of writing).

Thus it can be seen that music in schools consists of the interrelated activities of composing, performing and listening. Although this thesis looks specifically at composing, there is a sense in which all of these aspects of the curriculum are studied. The performance of the composition is an essential part of the research, and in performance, listening to others' and to one's own musical utterances plays a crucial role.

Under the guidelines of the Curriculum, composing refers to three levels of activity: spontaneous musical creation through improvising, refining original ideas to a finished state, and altering and adapting existing music by re-arranging it. An expected outcome of composing should be performing the resulting music, both in the various stages of its development and in its finished state. Compositions should be stored by means of recording, signs, symbols or cues, or conventional musical notations. Children should gradually learn techniques and conventions for storing the improvisations, compositions and arrangements they undertake. Children tend to compose together either as a whole class activity, or in small groups, firstly for practical reasons and secondly because "group composition offers more opportunity for learning" (Mills, 1991, p.25). Composition is seen as a form of problem solving, where a problem is set up, decisions are taken to solve the problem which results in the satisfaction of having answered them (Salaman, 1988). Group composition is not an activity specific to the primary school, but is prevalent in the whole of society. Much jazz, rock and pop is collaborative composition.

1.2.1 The Rationale Behind Music in a Compulsory Curriculum

"All children can grow through music, so music education is for all children" (Mills, 1991, p.1). The inclusion of music in a compulsory curriculum stems from the assumption that everyone can perform, appreciate and enjoy music at any level, and

a distinction is therefore made between this generalist approach to music education and the specialist approach (Hargreaves, 1986). The specialist is usually classically trained, aims to develop high levels of musical skill and may go on to become professional. The aim of generalist education is to optimise normative development, to encourage that which occurs naturally. Composing is accepted by the curriculum as a means of self - expression for everyone, not just those who aspire to greatness in the field. The process of composing is seen as a valuable aid to the development of musical understanding as a whole.

However, music in school is not seen as a subject in isolation, distinct from all other aspects of the compulsory curriculum. Theorists agree that the music curriculum should cover a wide range of topics including understanding and appreciating the artistic qualities of music, transmission of the cultural heritage, fostering of creativity, social education, provision of worthy recreation, improvement of physical and mental health, the development of intellectual capacities and so on. This suggests that music education ought to contribute to intellectual, emotional, sensory motor and social development.

Participation in music is seen as contributing to the whole curriculum by enhancing the development of transferable skills, including a sense of individual and collective achievement; aesthetic appreciation and discrimination; listening skills and sensitivity to sounds; imagination and inventiveness; intellectual and artistic skills; the ability to analyse and solve problems; study skills, including attention to detail, accuracy, memorising and the interpretation of sounds and symbols; verbal and non-verbal communication skills; social skills such as co-operation, resourcefulness, perseverance, tolerance and self-confidence; self motivation, self-discipline, self analysis and self-evaluation; and awareness of a wide range of cultural traditions (National Curriculum Music Working Group, 1991).

Music is further thought to play an important role in the learning of the core subjects, including mathematics, science and technology, history, language studies, physical

education and so on. It is thought to be the transferable skills which are acquired through music-making that will prepare the child for the world of work and life.

1.2.2 Music Composition Activities

1.2.2.1 Theoretical Background

Within the area of music philosophy, a distinction is drawn between semantic, syntactic and pragmatic approaches to understanding meaning in music. A musical phrase or tone has many possible kinds of signification and significance, i.e. 'meaning'. To get at any object's meaning, there are three avenues of approach which correspond to the main divisions of semiosis, namely semantics, syntactics and pragmatics. Semantics looks at the relations of signs to their contexts and to what they signify. Syntactics is concerned with the kinds of signs, their orderings and their relations to one another. Pragmatics focuses on the relations of signs to their interpreters. To discuss the meaning of something is to consider the object of interest in terms of its relations in one or more of the dimensions of semiosis. To explain fully an object's meaning requires that the whole complex of dimensions be considered. Thus to regard a phrase as it refers to another phrase or as it suggests an extramusical object or event is to consider the semantic dimension of the phrase. The syntactical dimension of that same phrase would concern such matters as the kind of formal unit it is, its ordering and the mode of its connection to or separation from other formal units. The effect the phrase has on its composer, its performer or its listener are in the realm of the pragmatic dimension.

Coker (1972) suggests that in addition to these three dimensions, all signification and meaning essentially involve an affective component "because all sensory perception, the cognition and recognition of stimuli as significant, brings attitudes and the affective processes into play" (p.3). The primary function of any object as a sign is emotional, and all other significatory effects of a sign are dependent on this prior affectivity.

Barrett (1995) suggests that just as we may interpret music within the framework of semantic, syntactic and pragmatic, we may also set composition tasks which focus children in on one of these aspects. She alters the terminology slightly, but the underlying concepts remain the same. An example of a semantic task, which she calls representational, could be "Compose a work about a trip to the seaside". A syntactic, or formal, composition task could be "Compose a work with a beginning, a middle and an end", and a pragmatic, or expressive, task could be "Compose a work about loneliness". These three distinct types of task form the basis of the present research, and Chapters 6, 8 and 9 deal with children working on a representational composition task, a formal task and an emotion-based task respectively.

Given this distinction between types of music composition task, it is of interest to examine whether the National Curriculum and primary music teachers operate within this framework, and this is the focus of the following section.

1.2.2.2 Theory in Practice

The Music Working Group's (1991) interim report prescribes a program of study which will develop certain skills. Under the skill 'composing', an example they suggest is; choosing speed, dynamics and duration appropriate for sounds to match a painting the children have produced, or portraying a journey through the night. Young children in schools are encouraged to experiment with sounds such as rustling paper and the sounds of various musical instruments. Children may be encouraged to bring interesting sounds to school and to share them with the other children, enabling them to find a variety of sounds from the same sound maker, thus developing their association between physical action and the nature of sound (Mills, 1991). It is thought that extensive opportunity to play with sound can facilitate the composition process. Children who have played extensively with sound makers will know what sounds are available to them and how to control them. Materials available include the voice and other body sounds such as clapping and stamping, percussion instruments, the piano and orchestral instruments, recorders and so on.

To further clarify the exact nature of music composition in the primary school it is
important to look in more detail at the types of task teachers give to the children.
Mills (1991) gives an example of a representational task given by one teacher to Year
5s (age 9-10). The teacher wrote a poem about the sea. After reading and discussing
the poem with the children, it was read again line by line and the children were
invited to improvise suitable music at the end of each line. For example, a boy who
was playing the xylophone interpreted the poem as follows;

Waves lap gently on the seashore	Slow upward glides over six or seven notes.
Fishes dart	Fast upward glides over ten or eleven notes. Gaps between glides.
Black clouds bring a raging storm	Loud rapid succession of single notes using hands alternately.
Out peeps the sun and shines upon a rainbow	Gentle slow succession of upward and downward glides, interspersed with isolated notes.
Waves lap gently on the seashore	As before with a few downward glides.

This involves music as representation, where it could be argued that what the children
produce is simply a series of sound effects. However, Mills suggests that these types
of task do not necessarily elicit sound effects, rather they involve the transformation
of experience in some medium, other than sound, into music. Sound effects directly
mimic an external stimulus and are literal representations of that stimulus. On the
other hand, representing the sea, for example, through music involves a more
abstract approach. An individual's experience of the sea can be projected in infinite
ways and does not require the music to sound *like* the sea.

Mills points out that children can compose without an external stimulus as well. They are not always depicting 'the sea' - they are stringing sounds together for the fun of it, or for the sound of it. Mills warns against making the assumption that music has to be about something, that it can only be composed in response to a stimulus. Children may lose the ability to work with sound for sound's sake.

Mills gives suggestions of further tasks, for example:

i) producing a continuous piece of music as opposed to just chunks to illustrate parts of the Narnia Chronicles by C.S. Lewis (representational and formal);

ii) composing a piece of music that has a beginning, a middle and an end (formal);

iii) one child had painted a picture of himself outside his house, surrounded by blue sky and sunshine. The teacher asked him how he was feeling in the picture and he answered that he was happy. He was asked to make some 'happy' music to go with the picture which he did with a xylophone (emotion-based and possibly formal, although it is unclear whether emphasis was placed on the form and structure of the piece);

iv) composing a piece of music with the intention of evoking a mood in the listener, for example happiness, sadness, anger (emotion-based);

v) producing a series of cold, smooth and curly sounds to represent the impressions they had of a seashell that a child had brought into school (representational).

1.3 Thesis Overview

The aim of the thesis is to examine the role of verbal and musical interaction among children in the production of a music composition, and to look at the effects of the gender composition of the collaborating group on both the composition process and the resulting musical product. Before systematic research can begin, it is important to

understand how children develop as musicians and what can be expected of them during the primary school years. The focus of Chapter 2, therefore, lies with the development of musical competence. A number of theories are discussed which have emerged as a reaction against the so-called talent model of musical development, which suggested that only those children who are musically gifted would develop as musicians. Developmental models are preferred over this approach, and research has identified a number of age-related patterns to musical development.

Chapter 3 discusses the highly problematic issue of the assessment of creativity. Given that the present research is concerned with identifying those factors within the group which lead to the production of a good music composition, a definition of a 'good' composition has to be provided, and it will become apparent that this is near impossible. Issues considered include formative (process) or summative (product) assessment, and the problems associated with the inherent subjectivity of musical experience. The chapter concludes that the assessment of composition must be intimately related to the task.

Chapter 4 introduces the literature on previous peer collaboration research, and looks specifically at the role of dialogue in group productivity. It has been suggested that the most important element of task activity in groups is the dialogue among group members. It emerges that the important feature is the establishment of intersubjectivity, or a shared understanding of the task, and verbal interaction is repeatedly cited as the mechanism for achieving this. It is argued here that this may not always be the case, and that in music composition, an alternative medium exists for the communication of ideas, namely communication through the music itself. Potential support for this idea is discussed and it emerges as a very plausible hypothesis.

Chapter 4 also discusses the findings of the previous research in relation to the gender composition of the collaborating group, and suggests that this is a highly salient factor. Three main issues are considered: firstly the finding that the boys in mixed gender groups dominate over the girls; secondly possible differences in

communicative style between the genders; and thirdly, the suggestion that mixed gender groups are 'more problematic' and less productive than single gender groups.

Chapter 5 presents a questionnaire study of 60 primary school teachers, undertaken to establish exactly how music composition was being taught in the primary school. The questions related to methods of grouping children for music composition, the most frequently used musical instruments, types of composition task and methods of assessment of the musical products. The aim of this was to provide a rationale for the subsequent empirical research, and to provide a framework within which to develop ecologically valid research practices.

The information gathered by the questionnaires was used as the basis for the design of four ecologically valid studies designed to look at children's collaborative music composition, and these are reported in Chapters 6, 8 and 9. The studies differ only in the nature of the task given to the children. Studies 1 and 2 (Chapter 6) were based on a representational music composition task, Study 3 (Chapter 8) a formal music composition task, and Study 4 (Chapter 9) was an emotion-based composition task. Due to the problems of the assessment of the finished product, Chapter 7 reports a study to assess the validity of a rating scale developed specifically for the assessment of the compositions in Studies 1 and 2. The compositions in Studies 3 and 4 were assessed by previously validated rating scales.

On the basis of previous peer collaboration research, the principal aim of the studies was to explore the importance of interaction among the children during the collaborative working period. Specifically, the focus rested with determining the importance of verbal and musical interaction in relation to the productivity of the group. It is important to clarify these terms.

Verbal interaction refers to the amount of talk occurring among the children. **Musical interaction** requires more explanation. While it is accepted that 'musical interaction' could be used to refer to 'talk about music', this is not how it is intended

here. Musical interaction is operationally defined to refer to the behavioural play of the children, that is the time spent playing the instruments.

The **productivity** of the group is defined with reference to a series of rating scales which aid the assessment of the finished product. It is argued that assessment of music composition is task specific, therefore this will be discussed in further detail within the context of each of the studies.

It was proposed that the amount of musical interaction occurring among the children during the collaborative working period would be significantly related to the productivity of the group and that there would be significantly more musical than verbal interaction. It was further proposed that verbal interaction would show no relationship with group productivity, as it is suggested that the children will communicate their ideas with each other through the music itself and not through verbal interaction.

A second aim of the research was to assess the effects of the gender composition of the collaborating group on the composition process (the collaborative working period) and the subsequent musical product (the finished composition). It was proposed that;

i) the boys in the mixed gender groups would dominate over the girls by showing higher levels of verbal and non-verbal interaction

ii) differences in communicative style between the genders would be found, with the boys engaging in significantly higher levels of individualistic behaviour, and the girls demonstrating a more co-operative approach.

iii) the single gender groups would achieve significantly higher evaluations for their finished compositions than the mixed gender groups.

All of the studies revealed that communication through music does occur and its importance for group productivity depended on the nature of the task. In the representational composition task with a verbal stimulus, both verbal and musical interaction were important for productivity. In the formal and emotion-based music composition tasks, while musical interaction was related to productivity, verbal interaction showed no relationship.

Important gender effects include female domination in the mixed gender groups in Studies 1 and 2, and differences between the genders in communicative styles in all studies. Single gender groups emerged as the most co-operative and the most productive.

Chapter 10 discusses the research findings in relation to previous peer collaboration research, and summarises the implications of these findings for both theory and classroom practice.

CHAPTER 2: THE DEVELOPMENT OF MUSICAL COMPETENCE

2.1 Introduction

Before a systematic attempt at music teaching can be made, it is important to establish how children develop as musicians in the primary years. Firstly it needs to be kept in mind that there is a distinction between developmental changes that are a product of enculturation and those resulting from learning. The former occur spontaneously in a given culture, without any conscious effort or direction, and the latter are the result of self-conscious directed efforts. A second issue to consider is whether the development of musical competence is viewed in line with developments in other artistic domains, or whether musical development follows its own path. This review will not look in depth at the links between musical development and the development of competence in other art forms, rather it will focus specifically on how children develop as composers and what can be expected of them in the primary years. A final issue to keep in mind is that there are many aspects of musicality, such as production (composition or improvisation), perception (listening or appreciation), performance and representation, for example in other art forms. It needs to be established whether theories of musical development provide a framework to explain developments in all these areas, or whether they refer to one specific area. Again, the focus will rest with the development of composition abilities.

This chapter discusses a number of theories of children's musical development. The principal aim is to determine how children develop as composers over the primary school years and what can be expected of them by the time they reach the end of their primary music education.

2.2 Developmental Models

Davidson (1985a) points to the limitations of the once popular 'talent' model of musical development, which proposes that musical abilities of gifted pupils develop naturally, with little need for intervention by adults. Within this view, differences between people in musical ability are assumed to be directly caused by inherent biological variability. From birth some individuals are supposed to have an inborn potential to be musical, or have a natural talent or gift for music, or an innate aptitude for it (see Sloboda, Davidson & Howe, 1994, for a full discussion on this issue). However, people normally classified as 'non-musical' do in fact possess many musical skills, with most children acquiring many of the basic skills needed for perceiving and performing music (Hargreaves, 1986), leading Davidson to suggest that a developmental model is more appropriate.

Some researchers (e.g. Parsons, 1987) have attempted to apply Piagetian - style 'stage' theories of cognitive development to the development of musical knowledge. Piaget (e.g. 1932) suggested that there exists four main, qualitatively different stages of cognitive development through which all children pass. The sensori-motor stage (ages 0-2) is divided into six sub-stages, which move from the primitive use of reflexes in early infancy through to the beginnings of internal representation, or symbolism. Symbolic development provides the essence of the second, pre-operational stage (ages 2-7). A major revolution in the child's thinking occurs around the age of seven, with the transition into the concrete operational stage. The acquisition of formal operational thinking, or the final stage, occurs at around the age of eleven. Using this stage approach as a starting point, researchers have sought to establish whether the acquisition of musical skills proceeds in a smooth continuous way with age, or whether it is discontinuous, proceeding in a series of qualitatively different steps that are not necessarily accumulative. This has implications for the curriculum. If children pass through a series of stages, each one a preparation for the next, there is little point in attempting to introduce them to skills and concepts that exist at a higher level.

On noting these seemingly common developmental progressions in music, Hargreaves & Galton (1992) propose an age - based theory of 'phases' through which the child progresses. The authors intended the model to be a descriptive account of these developmental progressions rather than an explanatory theory. They were conscious to avoid the term 'stage', as they would have had to face the problem that Piaget's theory primarily emphasises the drive towards logical-scientific thinking, which may well be inappropriate in the arts. The theory begins with the sensorimotor phase (age 0 - 2 years), which includes babbling, rhythmic dancing and recognition of melodic contours. Compositions at this age are sensory and manipulative by nature. The figural phase (age 2 - 5 years) sees the assimilation of cultural music. During the schematic phase (age 5 - 8 years) vernacular conventions become apparent before idiomatic conventions develop at the rule systems phase (age 8 - 15 years). Finally the professional phase (age 15 + years) sees enactive and reflective strategies used in composition.

2.3 The Spiral Model

Swanwick (1988) suggests that there is a sequence of musical behaviour, that there are cumulative stages through which the musical behaviour of children can be traced. He argues that the essential elements of artistic engagement are mastery, imitation and imaginative play, and that these psychological processes have corresponding artistic elements, namely the handling and perception of sensory materials, expressive character and structure. Swanwick & Tillman (1986) propose a model accounting for developmental progressions in music composition. Although the authors talk about a 'spiral' model of development rather than linear stages, many of their assumptions are in line with the Piagetian approach. They studied the compositions of children aged 3 to 11 from three London schools of mixed cultural origin. The children were given the opportunity to make music in a variety of ways of increasing complexity and their compositions were recorded nine times each year, resulting in the collection of 745 compositions from 48 children over four years. Three independent judges were asked to listen to the compositions of a sample of three to nine year olds and were asked to rank their ages from only the tape evidence.

These estimations were found to correlate with the actual age of the children. The authors questioned the nature of these perceived age differences and sought to determine whether the compositions could be grouped into and interpreted by a coherent theoretical framework. Their model has three main organising principles. The first is based on an analogy between musical development and three aspects of children's play, namely mastery, imitation and imaginative play. Swanwick & Tillman suggest that these follow a developmental sequence, such that the bottom loop of the spiral is concerned with mastery in that children are primarily dealing with the simple sensory response to and control of sound; the second loop is concerned with imitation, in which children attempt to represent or illustrate aspects of the world about them by musical means; and the third is based on imaginative play, in which the child makes a creative musical contribution rather than merely imitating what already exists. A fourth loop is added to the spiral, called "metacognition" which refers to children's increasing awareness of their own musical thinking and experience.

The model is intended to be specific to the development of musical competence. This is done with the inclusion of their second organising principle, represented by descriptions at the back of each loop of the spiral. These refer to what the authors describe as the musical phenomena that are prominent at each of the levels, namely materials, expression, form and value respectively.

The four levels, which have been described in two different ways, are now described in terms of a third organising principle: that there is a developmental shift away from the more individual, personal aspects of musical experience, and toward more schematised forms of "social sharing" on each level. This gives rise to eight distinct developmental modes which appear on the spiral, moving from left to right. On the bottom level of mastery, there is a gradual developmental shift from sensory to manipulative musical behaviour: from purely exploratory reactions to sound and its production, toward those that show an increasing control of technique. On the second level of imitation, the move is from personal expressiveness to the vernacular. On

this level, the child's initially spontaneous, uncoordinated statements of imitative expression gradually become more attuned to musical conventions, such as short melodic and rhythmic sequences organised into phrases.

On the third level of imaginative play, the move from left to right describes the shift from speculative to idiomatic composition. The former is based on a firm knowledge of vernacular conventions and involves a deliberate attempt to experiment with and to deviate from those conventions. In the latter, comparable deviations are integrated into a coherent musical style. Finally within the fourth level of metacognition, there is a shift from symbolic to systematic expression. The former involves a strong, personal sense of self-awareness, which may be idiosyncratic and highly intense, whereas the latter incorporates a full understanding of the stylistic principles underlying the chosen musical idiom.

The authors repeated the study in Cyprus (Swanwick & Tillman, 1990) to assess the validity of the theoretical model underpinning the developmental spiral. The children in this study were asked to make a piece of music using 'contrasts'. Four music educators were then asked to assign each of twenty eight compositions to one of four age groups; age four to five, seven to eight, ten to eleven or fourteen to fifteen. From this the authors concluded that it is possible to identify the age of children from their musical compositions with a high degree of confidence and that the evidence supports their spiral model of development. These findings were supported by Ross (1982), who went on to outline four periods of development in music. The child does not pass through these modes, but carries them forward into the next. Up to the age of two, the child is concerned with pure sensuous engagement, experimentation, and is beginning to relate music to feelings and mood. Age three to seven sees the beginning of anticipation in music, and between ages eight and thirteen, the child shows a desire to become conventionally proficient. At age fourteen plus, music takes on greater significance as a form of personal expression.

The frame of reference of the spiral model is therefore the compositions of a group of children. Generalisations from this model should still be attempted with caution, as a

model that works well in one situation is not necessarily true of all musical activity. It remains unclear whether composing, performing and listening spirals can be combined to talk about a spiral of musical development. Mills (1991) suggests "we should be testing the spiral, not using it as a frame of reference" (p.101). Similarly, Hargreaves and Zimmerman (1992) suggest that while Swanwick and Tillman's coding of the compositions reveals that the higher order developmental modes are attained by the older children, this is not to say that the modes themselves are reliable and valid. They come to a similar conclusion as Mills, claiming that the model "stands as a very useful stimulus for further research and refinement" (p.381).

Kratus (1994a) suggests that it is only at the age of nine years that children with no prior compositional experience begin to compose "with meaning" (p.119), that is with significant use of development and repetition. This finding supports Swanwick & Tillman's assertions that the compositions of children between the ages of four and nine are characterised by a concern for materials and expression, with form only appearing at age ten. The seven-year-olds in Kratus's study concerned themselves predominantly with exploration whereas the older age groups used significantly more development and arrived at a replicable composition early on in the working period. This resulted in significantly more stable compositions in the older age groups who demonstrated a greater ability to replicate the compositional product than the seven-year-olds. Kratus felt that the younger children's compositions were more like improvisations, resulting from an inability to develop and review their musical ideas. He suggests four main reasons for the seven-year-olds' lack of use of development and repetition: inability to hold a melody in their memories while working on it; lack of strategies for developing musical patterning; lack of understanding of the musical problem-solving process; greater interest in the process of making sounds than in the development of a single product.

Barrett (1995) suggests that alternative factors may be responsible: lack of familiarity with the instruments; lack of familiarity with the genre of music associated with the instrument; lack of familiarity with the task; lack of purpose. Although Kratus claims that children aged seven are unable to compose with

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meaning, other studies contradict this finding. In a study of the invented songs of five to seven year olds, Davies (1992) found that children as young as five years of age were capable of composing with meaning. Davies' use of a genre (song) and an instrument (voice) with which the children were very familiar may well have contributed to the greater use of structural devices, such as repetition and development (Barrett, 1995). Furthermore the focus of Davies' study, children's invented songs, is a well documented aspect of the young child's musical life (e.g. Moog, 1976; Dowling, 1982), thus the children were working in familiar territory. Davies comments particularly on children between the ages of five and seven who were able to invent ideas, organise four-bar phrases, use patterns of alternation and repetition and, in some instances, use sequence, inversion and augmentation. They were found to 'borrow' from other song material, suggesting that they do not just imitate at this age, but "... abstract from the borrowed song, not just the surface features but, more significantly, the underlying structure" (p.46).

This suggests that young children are able to use musical structures in their compositions significantly earlier than is suggested by the Swanwick & Tillman model. It should be pointed out that there is a difference between Davies's focus on invented songs and Swanwick & Tillman's largely instrumental compositions. Davies suggests that there may be an inhibitory effect due to limited instrumental technique, whereas much of young children's exposure to musical experience before schooling is through singing, with invented or spontaneous songs central to this experience. This inhibition factor will undoubtedly influence the ease and skill with which the children will compose.

2.4 Generic Cognitive Processes

Serafine (1988) provides an alternative approach by attempting to identify generic cognitive processes that underlie musical thinking. She firstly proposes that musical communication occurs between a person (composer, performer or listener) and the piece of music, implying that communication among individuals is not an issue. Secondly, she suggests a set of core cognitive processes that are present in musical

composing, performing and listening, such that there is a direct correspondence between those events that occur "in the head" and those patterns of organisation that can be identified "in the music". These processes, thirdly, are of two types, namely style-specific and generic processes. The latter, thought to occur universally in all musical styles, are central to Serafine's theory. Fourthly, Serafine claims that cognition in music is an active, constructive process. This leads to the question of the extent to which musical properties can be said to pre-exist in the pieces themselves, or whether they are primarily constructed by the listener. Serafine strongly favours the latter explanation, leading to her fifth claim, that "tones and chords cannot in any meaningful ... way be considered the elements of music" (p.7). She sees tones and chords as the materials with which the composer works to produce sounds that are coded into cognitive units that are then recognised by the listener.

Serafine's radical theory is at loggerheads with many of the current theoretical approaches, and also with much music theory. However it is still worth establishing how she sees the progression of musical development in children. Before this can be discussed it is necessary to outline further aspects of the theory. She proposes two basic types of cognitive processes that are believed to cut across all styles, namely temporal and non-temporal processes. Temporal processes involve relationships among discrete musical events in time, and non-temporal processes are those that deal with the more formal and general properties of a given piece of music. There are two distinct types of temporal process based on succession and simultaneity (or, in western terms, counterpoint and harmony), and four types of non-temporal process, including closure (the presence or absence of resolution of a musical pattern), transformation (two related musical elements may be perceived as either similar or different), abstraction (where some property of a musical event is abstracted from its original context and applied elsewhere) and hierarchic levels (the perception of the deep structure of a given piece).

To operationalise these concepts, Serafine gave a battery of 16 tests to a sample of 168 participants ranging in age from 5 years to adulthood. Her aim was to establish a general profile for the acquisition of the core processes and to search for

developmental trends in the ability to complete the tasks successfully. An example of the tasks is 'motivic chaining', which is classed as a successive temporal process. In this task, participants need to understand that Motive A combined with Motive B yields phrase AB. Participants were presented with Motive A then Motive B, then a third longer phrase. This third phrase was either AB, AX or ZB. For the younger participants, this was modified slightly and was presented in the form of a story about an elf to facilitate their comprehension. As comparison measures, participants were also given pitch discrimination tasks, a Piagetian number conservation task and a human figure drawing task.

From the results of this study, Serafine concluded that most of the temporal and non-temporal processes had been acquired by the age of 10, except for the ability to identify the number of simultaneous parts constituting a complex texture, which did not become apparent until adulthood. The 5-year-old children displayed virtually none of the processes although there were signs of emerging abilities, such as recognition of phrase boundaries and some transformations. The 8-year-olds possessed some of the abilities but not all. They could perceive hierarchical melodies, identify the simultaneous combinations of timbres and discriminate random melodies as well as the 10-year-olds. These results show that at different ages, music is processed in qualitatively different ways. Surely this proves problematic for a theory which begins with the assumption that music resides in cognitive constructions rather than in the notes themselves (Huron, 1990). If children and adults construct distinctive representations of the same piece then surely the essence of music must reside in those notes. Serafine was surprised by this finding and initially proposed that children would have the same perception of temporal events as adults. However the qualitatively different modes of processing indicated by her results, such as might be predicted by a Piagetian model, do not form an integral part of her theory. She deals with developmental processes but does not put forward a specifically developmental account of age related changes in music processing. There are therefore many gaps in the theory and although Serafine provides an important new perspective on musical development, the issues raised need to be studied in much greater detail.

2.5 Symbol System Approaches

A further alternative approach is that of the symbol system theorists, who represent a large body of research rather than one specific approach. Gardner's (1973) theory centres on the use of symbols. Symbols used in domains such as mathematics, language or music are organised into different systems which are either denotational or expressive, and vary in the precision of their correspondence with the real world. For example, numerical notation in mathematics is highly denotational as it has a precise relationship with external events. Abstract art has no clear external reference and is therefore wholly expressive by nature. In line with Piaget, Gardner believes the acquisition of these symbols occurs in the early years of childhood. However he deviates from Piaget in claiming that artistic developments can be accounted for within symbol systems, and that there is no need to suggest general underlying structures such as logical groups and groupings. He believes that the concrete and formal operations proposed by Piaget are irrelevant to the arts. Within this approach, children are believed to move through a series of 'waves of symbolisation' (Wolf & Gardner, 1981). Infants' ability to organise their actions into symbolic sequences gives rise to representations of spatial relationships in media such as clay or drawing at age three. By age four, there is an increase in precision in, for example, counting and singing pitch intervals. By age five or six, children are able to use cultural symbol systems such as musical notation or written language.

2.6 Music as a Social Phenomenon

Gardner's theory, and the other theories falling within the symbol system approach (e.g. Davidson & Scripp, 1988), stresses the interactions between development and training. For example, children's spontaneous songs inevitably become enmeshed with songs of their culture, and this must be taken into account when describing development (Hargreaves & Zimmerman, 1992). The issue of cultural and educational influences is one that has been discussed by Stefani (1987), who defines musical competence as "the ability to produce sense through music" (p.7). Music is

defined as "every social practice or individual experience concerning sounds which we are accustomed to group under this name" (p.7). Therefore what constitutes music in one society may not do so in another, and theories about the development of musical competence need to take into account individual musicality, musical techniques possessed and understood by performers, musical culture and social practices. He goes on to emphasise the importance of the cultural, artistic and educational traditions of particular societies and proposes a developmental theory of musical competence based on a series of 'codes', or correlations between the content and expression of particular cultural elements. These range from 'general codes', which are the basic cultural conventions through which one perceives and interprets sound experiences, through 'social practices', 'musical techniques' and 'styles', to the most detailed level of 'opuses', which are single musical events. Stefani's theory therefore incorporates a social dimension, which is useful for studying current pedagogies in music education.

In line with this, Gaston (1968) claims that the potency of music is greatest in the group. Music is a social phenomenon which invites and encourages participation. It provides group activities which bring together individuals who otherwise may not come into contact with one another and provides opportunities to interact in intimate yet ordered and socially desirable ways. For Merriam (1964), music in all societies functions as a symbolic representation of other things, ideas and behaviours and its most important function is its contribution to the integration of society. Music is a social phenomenon, inviting, encouraging and sometimes requiring individuals to participate in group activity. Music is used as a signal to draw people together, or as a point around which individuals gather to engage in activities which require group co-operation and co-ordination. These ideas would seem to support the prevalence of music composition in groups in the primary school.

2.7 Conclusions

On the basis of the above, it can be seen that there are many different approaches to understanding children's music learning. It needs to be kept in mind that the theories reported have emerged from different aspects of music: Swanwick and Tillman base their theories on children's composition; Serafine looks at composing, performing and listening; and Gardner deals with the four key modalities (musical production, perception, performance and representation) by forming principles at a relatively high level of abstraction. In spite of these differences, what seems to have emerged is that there are regular age-related patterns of musical development that occur in the four modalities, and in practise the Curriculum adopts an age-based sequence. The four phases of Swanwick & Tillman's spiral model are explicitly linked to age and although the authors state that the phases are not Piagetian-style developmental stages, they are certainly grounded in Piagetian theory. Serafine's core cognitive processes do not specify developmental mechanisms, rather she looks at age differences in the possession of the core processes. Gardner rejects the need for Piagetian type stages to account for artistic development and talks about the development of symbol systems. Davies (1992) warns that by following a Piagetian-based approach to children's musical development "such as that developed by Swanwick and Tillman, we are in danger of seriously underestimating what young children can do" (p.47). It appears that, while the Piagetian type stage theories are not accepted as accounting for musical development, there is evidence for predictable age-related changes. Hargreaves & Galton's approach is an attempt to remove the connotations of the 'stage' theories by discussing development in terms of phases, as opposed to general, universal stages which explain development in all areas of mental life. The theories discussed are applicable only to music and do not account for development in other artistic domains. Serafine and the symbol system theorists go further with this specificity in that they are culturally specific and focus predominantly on western tonal music, whereas Swanwick & Tillman focus more on capturing the essence of children's compositions away from the influence of musical training.

Whichever approach one accepts, it is apparent that all children in the primary school are capable of more sophisticated levels of musical thinking than the talent model would have us believe. The children studied in the present research are aged 9-11, and by this age, according to all the theories, they should have a firm grasp on established musical conventions. They should be able to organise sounds around rhythmic patterns, repeat and develop musical ideas, express themselves through the manipulation of timbre and dynamic levels and include imaginative deviations. They should be able to compose 'with meaning'. The children will be familiar with a wide range of instruments, which has been shown to be an important factor in the ease with which the children compose. Given these capabilities, all that remains when developing composition tasks for research purposes is to liase with the children's teachers to establish the types of tasks on which they are used to working and the instruments available to them.

CHAPTER 3: THE ASSESSMENT OF CREATIVITY

3.1 Introduction

The present research is concerned primarily with determining the important features
of interaction among children for the production of a 'good' music composition.
Thus, a definition of a 'good music composition' must be provided. The aim of this
chapter is to show that, in attempting this, there are many issues that need to be
considered and that a broad definition of a good composition is not possible. Thus, it
is argued that assessment procedures should be context and task specific and must be
tailored to fit the needs of the researcher and the demands of the task.

The systematic study of creative thinking in music and its meaningful assessment are
relatively new concerns for researchers, predominantly due to the enormous problems
of definition and assessment validity (Webster, 1992). There is no right or wrong
answer against which to judge a composition; music is a subjective experience. In
the 1960s, it was thought that by assessing creativity, one was destroying its essence.
However most of today's educators agree that assessment and feedback are an
important, if not vital, part of the process of teaching and learning. It is therefore
necessary to establish reliable and valid measures in order to do this.

This chapter considers a number issues, firstly that of whether to assess the process,
the product or both, and secondly the extent to which objectivity in arts' assessment
can be achieved.

3.2 Process or Product or Both?

A distinction is drawn between formative and summative approaches to assessment
(Hargreaves, Galton & Robinson, 1996); the former is concerned with the processes
involved in composition whereas the latter shifts the focus to the assessment of the
finished product. Both are complementary aspects of assessment in the arts, though

researchers tend to concentrate on one rather than the other. For example, Kratus (1994) believes that "we should emphasise the processes of how to compose over the products of the finished musical works" (p.130). Ross, Radnor, Mitchell & Bierton (1993) focused on reflective conversations between teacher and pupil, with the emphasis on the pupil's self-appraisal. Studies of this type yield much rich and detailed information about the processes involved in creative thinking but are rather difficult to score quantitatively.

There are, however, those who believe that it is impossible to assess one without the other. Best (1992) talks of the interrelated nature of the creative process and the creative product, and stresses that "... the creative process cannot intelligibly be regarded as logically distinct from the creative product ... the process can be identified only by the product; the process can be described only by reference to the product" (p.89).

Similarly, Green (1990) asks "... should we assess outcome, that is the music composed by a (student), or should we assess input, that is the learning experience of the (student) in composing music" (p.193). She illustrates the problem through the examination of two compositions by secondary school pupils. The first student composed on paper a work based around concepts learned throughout the school term, such as ABA form, in C major, one harmony per bar, sequential melody with passing notes, and so on. The work was fully notated by the student and took two months to complete. The student was unable to play the work so the teacher played and recorded it. The second student composed on an electronic keyboard and developed the work with the use of pre-recorded electronic drum rhythms, a repeated chord progression with a composed inner part and melody, pre-set bass patterns and pre-set riffs. It took the form of "... repeated verses with an introduction, a textural interruption towards the end and a special ending" (p.193). When judging solely the finished products against the Australian syllabus criteria of variety, unity, balance and form, the second work far outweighs the first, in Green's opinion. Yet when the works are judged in terms of learning input, the first composer would score more highly than the second, as composer two acquired "... no linguistically based

understanding of theory, no notation reading or writing skills, indeed cannot discuss or write down her composition" (p.194). Barrett (1995) argues that composer two's assimilation of 'style' (that of the rock/pop genre) is as sophisticated as composer one's assimilation of 'style' (that of the classical theory genre). In terms of learning input, composer two would score highly if music education were conceived of as enculturation as well as training (Sloboda, 1985).

It is apparent that the focus of the teacher and the researcher may differ. The present research is concerned with looking at the artistic product (the finished music composition) *in relation to* the process (the collaborative working period), thus a separation of the two is inevitable. For the teacher who is concerned far more with taking account of the personal, expressive and collective, instructional objectives, a separation of the two is nonsensical. Teachers view the product from a number of perspectives and observe the pupils at work. They look at how the children perform the task, how they interact with others, how they interact with the artistic medium and so on. "What is left implicit and inaccessible to objective scrutiny .... is the subjective intention and inner emotional (affective) and intellectual (cognitive) struggle that makes up the creative process" (Ross, Radnor, Mitchell & Bierton, 1993, p.9). This suggests that, while to some extent the creative process can be behaviourally observed, there is a sense in which one can never really observe the creative process of others.

The present research will look at certain behavioural aspects of the creative process in relation to an assessment of the creative product, thus it is necessary to find ways of doing this and the extent to which one can establish objective procedures, and this is the focus of the following section.

3.3 Objectivity in the Arts

The Assessment of Performance Unit (APU) document "Aesthetic Development" (1983) rekindled the debate concerning the desirability of assessing children's art work. At the centre of the debate are contrasting views about the possibility of

identifying objective criteria appropriate for evaluating merit in children's art work. In the document, the view appears to be that the arts are not fundamentally different from other subjects in the curriculum, and that a high degree of consensus about criteria appropriate for judging art work is not only conceptually consistent with the notion of art, but also practically desirable. It proposes that judgements about the merit of art work can be justified with reference to publicly agreed criteria.

Heyfron (1986) suggests that the APU report contains a number of important insights. He feels that it rightly points to the logical possibility of inter-subjective agreement between persons about the meaning of a work of art, and the importance of grounding claims about a work's merit with reference to publicly available properties in an art work, and not exclusively in terms of the psychological states of the viewer (or listener). However, he points out that while the report tries to show that works of art can be objective, it relies too heavily on the similarities between science and art and in ignoring their differences, this obscures crucial aspects of arts' assessment.

Heyfron believes that the crucial difference between the arts and science is that science is conceptual and is concerned with spatial temporal features of an experience, whereas art is fundamentally imaginative. Thus objectivity in science is qualitatively different from objectivity in the arts: "The ontological status of their respective objects are governed by different logics" (Sartre, 1948, p.43). Science is governed by sets of rules which provide consistency of results, so assessment of a pupil's ability can be made objectively in relation to the application of those rules. The arts are not concerned with working towards particular solutions to problems but with finding varieties of solution as well as differences in ways of reaching them. This particular quality of arts education, its non-rule-governed nature and the expectation of diversified responses, is a main justification for its inclusion in the curriculum, as it provides opportunities for the development of thought patterns as well as particular expressive skills and abilities which are not much in evidence elsewhere in the curriculum (Allison, 1986).

The National Curriculum recognises these differences and tackles assessment in music with reference to attainment targets, which are expressed in terms of what is to be expected at the end of each key stage. It is suggested that these objectives "should not be prescribed in as much detail for music as for the core and other foundation subjects" (Music Working Group's interim report, 1991, p. 17). In line with this; "I think that all that matters in music education is that what we do is musical. I don't care what it is. I would applaud whatever was happening in a classroom provided it was actually involving children in musical experience" (Salaman, 1988, p.31). The above quote is from Salaman's discussions with John Paynter, who seems to suggest that what is ultimately important is children's musical development, therefore one can sacrifice elements of closely defined musical concerns in order to achieve this. By the end of Key Stage 2 (age 11), children are expected to use the voice and play instruments with understanding, perform in a group, and present their performances with sensitivity and commitment. Pupils should be able to communicate their musical ideas to each other, develop their musical ideas through composing, which includes improvising and arranging, in a group and/or individually, and be able to create music for a special occasion. Such guidelines do not really tackle the issues of day-to-day assessment of composition, or how does one objectively measure how *well* the children have composed.

Disagreement about quality of art is common even amongst practitioners trained in the arts. To understand assessment in the arts, we have to be prepared to accept two seemingly opposing claims; firstly that meaningful disagreement occurs in art discourse, and secondly that procedures for achieving genuine agreement about quality are possible. Adhering exclusively to one of these claims, according to Heyfron (1986), leads to unacceptable consequences, in the first instance to a form of relativism which undermines the whole notion of children's development in art, and in the second instance to a form of authoritarianism which stifles children's creativity. It is hard to see how objective procedures could be developed to resolve disputes between artists of comparable backgrounds who, whilst agreeing about the empirical properties a work possesses, disagree about its artistic merit. Several researchers have

attempted to evaluate music composition by focusing on its empirical, objective properties, and this is the focus of the following section.

3.4 Assessment of the Artistic Product

One of the first researchers in the field of artistic product assessment was Dorothea Doig (e.g. 1941), who looked at how children between the ages of 6 and 16 composed music before formal musical training. Although interested in the quality of the musical product, Doig's main concern was with the developmental nature of children's compositions. The children worked in classes arranged by age, and were encouraged to generate melodic phrases individually before the group voted on a selection of the best. Doig then notated the melodies and analysed them in terms of rhythmic, melodic and structural characteristics. From this, she was able to suggest certain developmental patterns across the ages, but has been criticised for being the only judge (Webster, 1992), therefore the extent to which she may have influenced the final products is unclear.

Kratus (1985) was interested in the developmental nature of children's compositions and studied those of children aged 5 to 13. Participants worked individually on creating a song on a hand-held electronic keyboard. Two independent judges rated the finished, tape recorded and transcribed compositions on a number of variables related to the use of rhythm, melody, motive and phrase. Examples include motivic strength, tonal strength, melodic and rhythmic motion and phrase repetition and development. Interjudge reliability ranged from .55 to .88. From the results, Kratus demonstrated significant developmental differences on ratings of tempo stability, metric strength, tonal stability and finality, melodic motivic development and rhythmic motivic repetition.

While this method was appropriate here given Kratus's focus on developmental changes in these variables, a music composition far exceeds the sum of these parts. If one accepts that "music is a product of man's unique, intuitive and irrational imagination" (Walker, 1987, p.167), to assess children's music compositions

Kratus-style would be to not even come close to capturing the essence of a music composition. Indeed if one takes this approach, there are many works written by the great composers that would not score particularly well, for example how much colour is found in Bach's The Art of the Fugue which specifies no instrumentation? What would Debussy score for harmony in Syrinx, written for unaccompanied flute? "Would Stravinsky be penalised for his Greetings Prelude because it lasts for 35 seconds only? Could Wagner be sent to the bottom of the class for lack of harmonic variety in the Prelude to Rhinegold?" (Salaman, 1988, p.19).

To refer back to the differences between objectivity in art and objectivity in science, Heyfron (1986) believes that in equating the two, one is somehow 'missing the point'. Subjectivity in art, and not in science, is essential to an understanding of artistic phenomena. The notion of quality in music would be unintelligible without reference to a work's capacity, or lack of, to move, absorb, transfix, entrance, excite and captivate its audience. These subjective states are not reducible to objective features of a work. It is possible to look at subjective states (e.g. absorption, enjoyment, excitement) with reference to objective qualities (e.g. balance, pattern, composition) to examine the extent of the relationship between them. But to adhere exclusively to the subjective or the objective elements of artistic engagement distorts the evaluative process.

Langer (1953) suggests that "The first principle in music hearing is not, as many people presume, the ability to distinguish the separate elements in a composition and recognise its devices, but to experience the primary illusion, to feel the consistent movement and recognise ... the commanding form which makes this piece an inviolable whole" (p. 27).

Judgements in artistic domains are essentially holistic, and it is the total patterning of a work which exhibits criteria appropriate for its evaluation. Wollheim (1973) suggests that it is useful to think of a work of art as a series of layers hierarchically organised from the general to the specific, and the abstract to the concrete, with aesthetic qualities (such as profundity and expressiveness) and non-aesthetic

qualities (such as tempo and melodic contour) interpenetrating one another. However, it is the total context of art which provides the necessary information for imaginative constructions. The ability to identify evaluative criteria for particular works is dependent on the degree of understanding of its artistic background. It therefore seems impossible to imagine how appropriate criteria for assessing works of art can be established from the outside. Surely to be able to assess adequately, it is important to be initiated in the particular field.

Thus it is clear that the assessment procedures used by Doig and Kratus may be inappropriate for the present research. On the basis of the above discussion, it seems vital that assessment procedures arise in response to the whole composition and not just to specific structural elements. Criteria for assessment should emerge from the task itself. It is therefore important to look at exactly how this ideal state of assessment can be achieved, and this is the focus of the next section.

3.5 Evaluative Criteria and Intersubjective Agreement

To understand the concept of the 'goodness' of a work of art, it is necessary to understand deductive and inductive strategies of assessing truth. Deductively, a square is a figure with four straight lines of equal length joined together to form a right angle. This is analytically true, that is it is true by definition. Inductively, the statement "there is a table in the corner of the room" is true if it is confirmed by observation of the said table. There are agreed procedures for establishing the truth of the statement, for example if one person denies seeing the table that ten other people can see, one assumes that either the ten people are hallucinating or that the one person is wrong. It is absurd to suggest that the two claims deserve equal consideration. However, the case is more complicated if one is concerned with making value judgements. It is common to find ten people who think a particular piece of music is good that one person thinks is not so good. Neither deductive or inductive strategies can be used to resolve the dispute about the merits of the music composition. The disagreement in this case is not to do with what physical or logical properties the work

possesses (such as the tempo or rhythmic stability), rather it is to do with evaluative criteria, and there is no external authority with which to consult.

The criteria of 'good' carries many problems. What is good for one person is not good for another. One person may rate highly a car that is easy to park, consumes little petrol and has plenty of leg-room. Another person may prefer a car that travels fast, has a stereo with eight speakers and attracts women. The disagreement over what makes a good car is occurring because different criteria are being used. Heyfron argues that it is necessary to establish a less arbitrary relationship between qualitative judgements and their grounds. But this raises a further issue, namely that if a music composition is seen as a "unique particular" (Aspin, 1982), how can general criteria be generated to evaluate other unique particulars? Hampshire (1954) claims that when we move from general 'good-making' properties formulated in precise terms independent of artistic contexts, we move towards mediocrity, the cliché and the predictable. When a person is described as 'aesthetically sensitive' to a piece of music, this is not to say that he or she is sensitive to the general features of the composition which it shares with other compositions, rather it implies a sensitivity to its unique patterning which distinguishes it from other compositions.

Heyfron (1986) concludes that an account of 'objectivity' in art should include at least the possibility of intersubjective agreement, truth to the nature of the phenomenon under investigation and the identification of 'reasonable' grounds for supporting judgements. He states that what constitutes 'reasonable' grounds will depend on the methods that are considered appropriate and most suitable for the artistic product in question. Assessment in art must encourage co-operation and active participation between teacher and pupil in negotiations about meaning and quality. 'Goodness' in artistic contexts presupposes sensitivity and expertise on the part of the teachers, and also their willingness to respect the distinctive view of the individual child. Through this the child learns to question consensus and to see that the truth in art "lies in its power to break the monopoly of established reality" (Marcuse, 1973, p.149).

Heyfron goes on to say that it is neither practically nor logically possible to formulate precise evaluative criteria for judging art work independent of the context of application. Features cannot be pre-specified in sufficient detail to enable teachers to apply them to children's work. For example, to suggest the teacher looks for the vitality, poignancy, delicacy and stability in a work is about as useful as suggesting they look for the 'goodness' of the work. Such general criteria presupposes a certain degree of aesthetic sensitivity on the part of the teacher, and it overlooks the fact that the teachers are best placed to identify appropriate criteria for evaluating specific works. Consensus between educators at a general level may not be realised in particular art contexts. Objectivity in art depends not on any set of general criteria articulated independently of the context of their operation, but almost wholly on the ability and sensitivity of teachers recognising their presence in particular art contexts, i.e. it is task specific. Stuart Hampshire (1954) points out that "when we travel in art from the general to the specific we travel in the wrong direction" (p.97).

Mills (1991) believes that it is better to have objectives that make sense to the teacher and deal with music as an holistic experience than to set only clinical objectives which could be measured by a machine and have little to do with music. However, she does attempt to tackle the issue by discussing assessment in relation to the nature of the task. Bearing in mind that children tend to begin playing when you ask them to and carry on until you ask them to stop, she suggests looking for whether the children have worked out how to start, how to stop, and having thought about the beginning and the end, what about the bit that comes in between? Is the composition going somewhere or are the ideas disjointed and not developed? But she points out that even this is problematic; for example, if interested in whether the child can maintain a steady rhythm for a short period of time, one has to determine how steady is steady and how long is a short period. She suggests that within the context of a lesson, this does not matter. Rather than trying to set a national standard of 'steadiness', the teacher will develop standards to suit his or her purpose: "the personal validity ... is sufficient" (p. 121). The teacher's responses will help set future objectives, thus the purpose of assessment has been fulfilled. This is in line with the idea of flexibility in the Curriculum. This approach may work well for the

teacher, but for the present research, which places a great deal of emphasis on the finished product, the 'personal validity' is not sufficient.

While all of the above provides an engaging discussion of the issues, we are still no closer to establishing what exactly makes a good music composition. Certain points can be extracted from Heyfron's arguments which may help in this quest. Firstly his notion of intersubjective agreement between those who are sensitive to artistic contexts (in this case, music teachers) suggests that asking a group of teachers to rate the compositions will provide a certain degree of collective agreement. Heyfron also suggests that it is not a good idea to enter the assessment process with a set of pre-defined criteria. These criteria should emerge from the task itself, only when the researcher has considered carefully the aims of the task. The Task Group on Assessment and Testing (TGAT) (1988) Report states that "....the term 'assessment' is used to refer to an individual component of the total assessment process or to a particular method of assessment. Hence, it encompasses all procedures used to make an estimate or appraisal of an individual's achievement. Which of the many methods of assessment may be appropriate in particular circumstances will depend on the purpose of the assessment" (Para. 42).

For the present purposes, the validity of the assessment procedure is vital, particularly as a great deal of weight is placed on the marks awarded to the finished product. Heyfron argues that "What matters most in the arts as in sciences, is that judgements and interpretations should be informed with considerable consensus about the criteria to be applied when determining quality" (1986, p.5). The use of rating scales generated from a variety of music composition tasks may help in the search for valid and reliable assessment procedures, and this is the focus of the following section.

3.6 Rating Scales

Several researchers have attempted to assess children's musical products with the use of rating scales, most notably Hargreaves, Galton & Robinson (1996). They aimed

to derive a taxonomy of the constructs used by primary teachers in assessing children's work in visual art, music and creative writing, and to investigate the extent to which these constructs were used consistently by different teachers. They carried out repertory grid type analyses of teachers' descriptions of arts activities and artistic products. Sixteen teachers were asked to give examples of activities that they had used in visual art, music and creative writing, and that they had considered to be beneficial to the children. Fifteen activities in music were suggested and these were typed onto separate cards. Ten teachers (nine from the original sample) were asked to look at triads of these cards and to say in what ways 'two members of the three are alike and thereby different from the third' (p.201), thus generating a series of bipolar constructs which can subsequently be used as rating scales for further elements. For music, a final list of 73 constructs was obtained, and these are summarised below.

Create new sounds (improvise)/reproduce existing ones

Instrumental/vocal

Requires musical knowledge/does not require musical knowledge

Needs discussion and preparation (teacher input)/does not need discussion and preparation

Multi-media (e.g. based on story, poem)/single medium

Skill learning/expression

Individual/group

Listening/producing (playing, singing)

Functional (e.g. personal development)/non-functional

Repetitive/non-repetitive

Individual interpretation/restricted by others

Based on concrete object/abstract

Familiar/unfamiliar music used

Game-based/not game-based

Easy/difficult

Uses pre-recorded material/does not use pre-recorded material

Enjoyable/not enjoyable

Correct answer/no correct answer

Eleven teachers (nine from the original sample) carried out an activity from each of the artistic domains with their classes of children. In music, the sessions were videotaped. The teachers were then gathered together and watched triads of children's products and asked to generate repertory grid type constructs in the same way as they had generated constructs for the activities themselves. Each triad of products consisted of comparable examples of different pupils' work carried out within the same activities. Fifty constructs were generated which were then studied by two independent raters and edited to eliminate overlaps and to form a composite list of 14 seven-point bipolar rating scales. These are presented below.

1. Unevocative/evocative (of mood or emotion)
2. Dull/lively
3. Unvaried (repetitive, limited)/varied (wide-ranging)
4. Simple/complex
5. Unoriginal (safe, conventional)/original (imaginative, innovative)
6. Ineffective/effective
7. Rhythmically simple/rhythmically complex
8. Non-representational/representational (descriptive, illustrative)
9. Unstructured/structured (organised)
10. Uninteresting/interesting
11. Unambitious/ambitious (adventurous)
12. Disjointed/flowing (articulate)
13. Aesthetically unappealing/aesthetically appealing
14. Technically unskilful/technically skilful

Nine teachers were then asked to rate a different set of compositions using the above criteria, and the results suggested a high level of intercorrelation among individual teachers' ratings of different pieces of work across all scales. This suggests a high level of agreement among the teachers, leading the authors to conclude that this

"vocabulary of assessment" (p.210) can be used consistently by different individuals. Furthermore, the authors found a high level of intercorrelation between scales across the teachers, suggesting that the teachers were applying all of the scales in essentially the same way. "It may not be too oversimplistic to suggest that a single 'positive-negative' scale might have accounted for a considerable proportion of the variance in these ratings: that teachers broadly agree on what is good work and what is not, and that this judgement is predominant in their assessments" (p. 210). For the purposes of the present research, the findings of Hargreaves et al's study are very promising. The rating scales they have developed provide tangible guidelines for assessing not simply the physical characteristics of the music compositions, but also the *quality*, which is something that appears to be lacking in previous assessment research.

3.7 Conclusions

To summarise, the present research is concerned primarily with determining those factors within groups of children that lead to the production of a good music composition. The collaborative working period (the composition process) will be looked at in relation to the finished composition (the musical product), thus it is of central importance to this research that valid and reliable methods are used to determine which of the compositions are successful.

This chapter has drawn attention to fundamental differences between objectivity in art and objectivity in science, and argues that to equate the two is to obscure the essence of artistic works. Subjectivity in art is essential to an understanding of artistic phenomena, so, rather than searching for objective assessment procedures, the focus was shifted to establishing inter-subjective methods. It was suggested that evaluative criteria could be agreed upon by a number of raters initiated in the field. Most importantly, it was suggested that criteria for assessing creative products must develop from the nature of the task itself. Consensus of opinion appears to be that to enter into the assessment procedure with a set of pre-defined criteria, developed independently of their context of operation, is to "travel in the wrong direction". Assessment criteria should emerge from the task itself, and this is evident in the work

of Hargreaves et al, who developed sets of rating scales from a variety of composition tasks on the basis of teachers' criteria.

The present research takes into account the issues discussed in this chapter. Chapter 6 reports two studies of children's collaborative music composition, and in this instance, a rating scale was developed specifically to assess these compositions. Chapter 7 deals with the validity of this scale. Chapters 8 and 9 report a further two studies of collaborative composition, and for these studies, the rating scales developed by Hargreaves et al. were found to complement the nature of the tasks.

CHAPTER 4: COMMUNICATION, GROUP PRODUCTIVITY AND THE GENDER COMPOSITION OF THE COLLABORATING GROUP

4.1 Introduction

The aim of this chapter is to discuss the importance of verbal interaction among children in a collaborating group, and to examine the effects of the gender composition of the group. Peer interaction has been found to have a positive influence on cognitive development and group productivity and previous research into this is vast. However, this previous research has focused predominantly on scientific tasks, or tasks where there is an objective measure of the productivity of the group (e.g. Damon & Phelps, 1987; Tudge & Rogoff, 1989). Few researchers have looked at peer collaboration and creativity, where goals are less clearly defined and measures are more ambiguous. Research on collaborative music composition is therefore an important part of the jigsaw, as it may be that the factors responsible for productive interaction in the objective tasks differ significantly from those important in creative, or subjective, tasks.

There are two main explanations for the beneficial effects of peer collaboration, namely Piagetian and Vygotskian. The Piagetian approach cites socio-cognitive conflict as the mechanism responsible for cognitive growth (e.g. Piaget, 1932). The Vygotskian approach refers to the zone of proximal development, or the distance between that which the child can achieve individually and that which the child can achieve with the help of a more experienced other. Vygotsky defines this as "the difference between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86). Both approaches suggest an important role for dialogue in

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productivity. Although Piaget was primarily concerned with individual development, he believed that discussion between children has a role to play in cognitive development. Vygotsky's theory emphasises the importance of social interaction as a medium through which children develop, with those who are more skilled in specific areas assisting children in learning. The basic assumption is that in co-ordinating their ideas with those of others, children can reach a higher level of understanding than any one child could reach alone (Doise & Palmonari, 1984). Research has since sought to explain what is learned through social interaction and how the interaction takes place.

It has been suggested that the most important element of task activity in groups is the dialogue among group members (Tolmie, Howe, Mackenzie & Greer, 1993). The recurring theme of many studies is one of sharing ideas verbally with other group members, arguing through alternatives and providing justifications for accepted and rejected solutions. The more of this that occurs during the collaborative working period, the greater the productivity of the group as determined by individual learning or group achievement.

The concept of sharing ideas verbally and establishing a shared social reality will be discussed in some detail as it is later argued that this shared understanding of the task can be established through music rather than through words, as previous research suggests. It is important to have a clear understanding about what is meant by the term 'shared social reality' before one can understand how this may be established musically. Before focusing on specific research findings, it is important to consider the theoretical basis behind these claims.

Attention should be drawn to an apparent division between researchers interested in individual learning and those concerned with group productivity. The two are perhaps separate concerns, and this thesis will look specifically at group productivity, however to gain a full insight into the precise nature and function of peer collaboration, both approaches will be discussed.

In sum, the aim of this chapter is to consider the previous peer collaboration research, paying particular attention to the importance of establishing a shared understanding of the task through verbal interaction. It is then argued that children working in groups on music composition tasks may establish this shared understanding through the music itself rather than through words. A second aim of the chapter is to look at the gender composition of the collaborating group, and three principal areas are covered: firstly, verbal and non-verbal interaction patterns in mixed gender groups; secondly, possible differences between the genders in communicative styles; and thirdly, the relative productivity of single gender and mixed gender groups.

4.2 Theoretical Perspectives

The Piagetian approach to cognitive development proposes that differences in opinion or skill, known as disequilibrium, motivate the individual to restructure his or her understanding to accommodate the alternative. This results in a more co-ordinated and objective understanding of the original task. Under this approach, social interaction stimulates a private cognitive process within the child. The more disagreement there is between individuals, the greater the likelihood of cognitive change. Socio-cognitive conflict is cited as the mechanism (see Doise & Mugny, 1984). Alternatively, the Vygotskian approach proposes that children solve problems together by establishing a joint definition reflecting each person's perspective, and co-ordination and integration are seen as the key processes. The resulting cognitive product was created socially and remains social, thus co-operative interactions are more likely to result in cognitive growth than conflictual interactions.

The aim of this review is not to attempt to determine whether conflict or co-operation is the mediating factor in group productivity, rather it is to look at the evidence relating to the importance of dialogue in general. The reason for this is that it has become apparent that the distinction between conflict and co-operation is not as clear-cut as it appears, leading Kruger (1992, 1993) to propose a conceptualisation of collaboration that focuses on dyadic or group consideration of multiple perspectives. She suggests that in studies claiming that conflict promotes growth, conflict is not the

simple confrontation of opposing ideas but is extended discourse that explores the reasoning behind the various viewpoints. Similarly, definitions of co-operation include explanation and revision of ideas, thus resembling the conflict measures. Group achievement is predicted by engaged discussion of the issues, including explanation, clarification and revision of ideas, thus revealing a common ground between the two theories (these suggestions are based on those originally discussed by Berkowitz & Gibbs, 1983, and Berkowitz, Gibbs & Broughton, 1980). Kruger suggests that the dispute over whether conflict or co-operation promotes cognitive development is more a difference of semantics "than of substance" (1993, p. 167). So from Kruger's approach, it can be concluded that the important aspect is the discussion of ideas, and whether this is defined as conflictual or co-operative is irrelevant (see also Kruger & Tomasello, 1986).

4.3 Intersubjectivity and Shared Social Reality

Both Piaget and Vygotsky emphasised the importance of a common frame of reference, or intersubjectivity, in social interaction. However, Forman (1987) contrasts intersubjectivity as a process that takes place between people from the Vygotskyan perspective (e.g. Rogoff, 1980), with perspective taking or decentering as individual processes working on socially provided information from the Piagetian perspective (e.g. Howe, 1981). Cognitive development from a Piagetian view is a product of the individual, perhaps sparked by having to account for differences in perspective with others, whereas cognitive development from a Vygotskyan view involves the individual's appropriation or internalisation of the social process as it is carried out externally in joint problem solving.

Rogoff (1980), working within the Vygotskian tradition, considers children to be apprentices in thinking, active in their efforts to learn from observing and participating with peers and more skilled members of society, developing skills to handle culturally defined problems with available tools, and building from these to construct new solutions within the context of sociocultural activity. "Children's cognitive development is embedded in the context of social relationships and

sociocultural tools and practices" (p.7-8). Central to Rogoff's theory is the concept of guided participation, which suggests that both guidance and participation in culturally valued activities are essential to children's apprenticeship in thinking. Underlying this guided participation is the notion of intersubjectivity, or a sharing of focus and purpose between children and their more skilled partners and their challenging and exploring peers. Progress occurs when children internalise or appropriate social processes. The Piagetian approach to understanding the role of dialogue suggests that social interaction works as a catalyst for internal, individual processes of development (e.g. Howe, 1981), that is the social interaction stimulates a private process.

Kruger (1993) stressed the importance of what she calls transactive discussion, which is defined as "a dialectical process in which one's own reasoning confronts the other's antithetical reasoning in an ongoing dialogic dynamic" (Berkowitz, 1980a, p.16), or more simply, reasoning about one's partner's reasoning. Kruger suggests that the opportunity to learn that is provided by collaboration is the opportunity to analyse multiple perspectives and to draw a conclusion from that analysis. "Collaborating children are working at the level of ideas; they are finding errors, finding powerful differences, agreeing to disagree, conflicting. They are also labouring together, communicating their ideas to each other, making discoveries about what works, creating a good solution. Collaborative learning is learning from analysis of the other's perspective, and from the other's analysis of one's own perspective, and from a new synthesis of those analyses. It is both dissection and creation" (p.179). Kruger's ideas appear to incorporate both Piagetian and Vygotskian explanations.

The elements of dialogue which Kruger believes to be important for productivity relate to what has been called intersubjectivity. Intersubjectivity is defined differently by those using the term (Behrend, 1990). For Rogoff, "The prototype of intersubjectivity is a symmetrical dialogue .... in which each partner accords the other equal latitude and in which exchanges resemble smooth and fair turn-taking between partners of equal status engaged on the same topic" (p.204). The process of

communication is a social activity that can be regarded as the bridge between one understanding of a situation and another. By its very nature, communication presumes intersubjectivity, that is a shared understanding based on a common focus of attention and some shared presuppositions that form the ground for communication (e.g. Rommetveit, 1985). From guided participation involving shared understanding and problem solving, children appropriate an increasingly advanced understanding of and skill in managing the intellectual problems of their community.

Tudge (1992) bases his definition on the view that individuals come to a task, problem or conversation with their own subjective ways of making sense of it. If they then discuss their different viewpoints, shared understanding may be attained. This is supported by Rommetveit (1979), who states that "Communication aims at transcendence of the 'private' worlds of the participants. It sets up what we might call 'states of intersubjectivity'" (p.79). He is saying that in the course of communication, participants may arrive at some mutually agreed-upon, or intersubjective, understanding.

The above definitions would seem to indicate that if partners already have the same understanding of a task, that is they share the same subjective sense of it, then there is little benefit in them working together, they would do equally well working alone. On the other hand, initial differences in perspective will be of little use if one partner simply agrees with the other and makes no attempt to understand the other viewpoint. In this case, intersubjectivity would not have been attained. Similarly, development would not occur if the gulf between partners were too great to allow for shared understanding. Much research has been directed towards participants of equal or unequal ability, but is beyond the scope of the present discussion (see Mugny & Doise, 1978; and Pozzi, Healy & Hoyles, 1993, for examples).

The concept of intersubjectivity is philosophically problematic. Arguments stemming from Wittgenstein (e.g. 1953) assert that dialogue cannot be viewed as the reliable exchange of mutually understood messages. On the contrary, two conversants can never be sure they have a common understanding of what has been said. The

involvement of a further individual, i.e. that of the observer, poses further problems. These ideas cast doubt on the use of dialogue as an indicator of the beliefs of individuals, yet evidence for the importance of peer interaction mediated by dialogue in conceptual development can be found, and this is the focus of the following section.

4.3.1 Evidence for the Importance of Dialogue in Group Productivity

The most productive interaction appears to result from arrangements in which peers' decision making occurs jointly, with a balanced exploration of differences of perspective (e.g. Glachan & Light, 1982), thus providing support for the notion of intersubjectivity. Light & Glachan (1985) found that children working together on a logic game made significant advances in skill from pre- to post-test if they discussed their differences of opinion, but not otherwise. The collaborative process seems to lead to a level of understanding unavailable in solitary work or non-collaborative interaction. Barbieri & Light (1992) showed that pairs of children who negotiated most explicitly and made most extensive use of verbal pre-planning while working collaboratively on a detour task tended to be the most successful at individual post test. The pairs whose members had different patterns of outcome in the post-test did not share in their elaboration of the task. Furthermore, participants who were not allowed to talk to each other during group conservation tasks made little progress (Doise, 1978), thus reinforcing the emphasis on the vital role of verbal communication.

Damon & Killen (1982) studied the effects of peer interaction on children's moral reasoning. Children (aged 5 and 6) who showed a developmental change were those who engaged in social interactions often characterised by a "reciprocal quality of acceptance of transformation of one another's ideas" (p.365). In other words, these children behaved in a reciprocal manner, either agreeing with one another's statements, or working constructively with them by extending, clarifying or compromising with the other's statements. The reciprocal nature of these interactions was highlighted by the finding that either performing or receiving accepting and

transforming acts did not predict change. Those who changed were those who did both, suggesting that these children were participating in two-way interactions of an accepting or transforming quality.

Bos (1937) observed joint problem solving and its impact on individual perceptual judgements. Children aged 11-13 were asked to group sets of pictures by different artists on the same subject, either in pairs or individually, over two sessions. The children working in pairs in the second section achieved more than they did when working alone in the first session whereas the controls, who worked alone in both sessions, improved less. Bos found a certain amount of advantage in simply having a partner, but the greatest advantage was found to be gained from sharing a problem and co-constructing a more sophisticated approach. An example is given of a boy and a girl working together, who each propose a different way of combining the paintings. Neither is convinced by the other's suggestions, explanations and justifications, so the solution they end up with is one that was not initially proposed by either. Both children are satisfied with the end result.

The factors Bos felt were responsible for success were initiative, critical faculty and concentration. In joint work, the will to take the initial step flows naturally from the pressure of having a group goal. The presence of a partner promotes a more open attitude to the work, making it easier to take risks. A critical approach is thought to be more easily applied in a collective situation, since judging another's work is easier than judging one's own as a partner can notice features of a solution that have escaped the attention of the other. Concentration is facilitated as the partner may take up the task when one individual gives up temporarily. Thus, in collaboration, the partners engage in a creative process in which the achievement of intersubjectivity leads to new solutions.

Tudge & Rogoff (1989) also suggest that shared thinking, involving co-ordination of joint activity, is central to the benefits of social interaction. For them, the most important factor is the possibility for participants to understand another perspective or

to participate in a more advanced skill, either through active observation or through joint involvement in problem solving. Children who gained the most from peer interaction in mathematical, spatial and balance beam tasks have been shown to be those who more frequently shared ideas about the logic of the tasks with each other, focusing on solutions and strategies for handling the problem (Damon & Phelps, 1987) (see also Barbieri & Light, 1992; Doise & Mugny, 1979; Doise & Mugny, 1984; Gauvain & Rogoff, 1989; Glachan & Light, 1982; Light, 1991; Light, Foot, Colbourn & McClelland, 1987; Light & Glachan, 1985).

In a Piagetian conservation experiment, Weinstein & Bearison (1985) assigned children to one of three conditions: social interaction, social observation (where children observed others interacting but did not actively participate) and individual control. The purpose of the social observation condition was to control for the effects of task relevant information that was expressed during dyadic interactions. Children who were initially non-conservers and collaborated with intermediate conservers made substantial pre- to post-test gains as compared with those who worked alone. The intermediate conservers in this condition also improved. The children in the social observation condition did not improve significantly more than those working individually, suggesting that cognitive gains could not be attributed to subjects' simple exposure to task relevant information expressed during interaction, "but was a function of the dialogical confrontations and reciprocal co-ordination of mutual perspectives that were interactively generated in the process of children's social discourse" (p. 340). These findings provide support for the importance of active verbal participation in collaborative problem solving.

The above collection of studies provides support for the claims that language is a key mediator of learning outcome, and the most important aspect of language appears to be reciprocity between individuals. A further group of researchers have taken this one step further to look at specific types of talk and the effects of these on learning outcomes, and this is the focus of the following section.

4.3.2 Types of Talk

Roschelle & Behrend (1996) argue that a number of linguistic structures can function to maintain a shared and mutual understanding of a task, which has been shown to be crucial for group progress. They carried out a meta analysis, and concluded that learning was most noticeable in children who were communicating responsively, and who listened and responded to their partner's statements. Dawes, Fisher & Mercer (1992), Fisher (1993) and Mercer (1994) investigated the nature of primary school children's talk when working together at the computer, and identified three qualitatively different types of talk in their data: disputational, cumulative and exploratory talk. Disputational talk is effectively unproductive disagreement characterised by an initiation followed by a challenge. Such challenges lack clear resolution or else result in resolution which is not supported by agreement. Cumulative talk simply adds uncritically to what has gone before. Initiations are accepted either without discussion or with only superficial amendments. In contrast, exploratory talk demonstrates the active joint engagement of the children with one another's ideas. Whilst initiations may be challenged and counter-challenged, appropriate justifications are articulated and alternative hypotheses offered. The alternative accounts are developments of the initiation, and progress therefore emerges from the joint acceptance of suggestions. Dawes et al. conclude that exploratory talk offers a potential for learning over and above that offered by the other categories, therefore in accordance with their analysis, collaborative activities should be designed to foster children's use of exploratory talk. These authors did not look explicitly at the relationship between the types of talk and the subsequent productivity of the group, therefore it is still unclear as to how this talk facilitates learning or productivity.

Wegerif, Mercer & Dawes (in press) have looked at these types of talk in relation to learning outcomes. They studied children's reasoning abilities before and after a social interaction period, and found a significant relationship between reasoning

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ability and exploratory talk, defined as that in which joint reasoning is made explicit. Specifically exploratory talk is that in which all relevant information is shared among the group, the group seeks to reach agreement, the group takes responsibility for decisions, reasons are expected, challenges are acceptable, alternatives are discussed before a decision is taken and all group members are encouraged to speak by other group members. The authors found that the use of exploratory talk can improve group reasoning, that exploratory talk can be taught, and that coaching in exploratory talk significantly improves individual results on a non-verbal reasoning test. This research again shows the importance of a specific type of talk in learning outcomes.

Garton & Renshaw (1988) argue that communication style is an important factor in productive interaction, and report that learning was most noticeable in children who were communicating responsively, who listened and responded to their partners' statements. In light of this, Joiner, Messer, Light & Littleton (1995) examined the linguistic structures that are thought to support productive interaction, with the use of a computer based problem solving task. Children worked on a complex route planning problem in the form of a computer adventure game. The study involved a pre-test, an interaction period (or individual session for the controls) and a post-test. Joiner et al. looked specifically at four key conversational features: firstly repairs, which were defined as the repair of a breakdown in mutual understanding following a period of conflict; secondly collaborative sentences, which refer to linguistic structures supporting the co-construction of problem solving knowledge; thirdly collaborative plans, when one participant starts a plan and the other participant completes it; and fourthly, simultaneous utterances, when both participants make the same utterance simultaneously. Their results showed that the more successful pairs used more of these linguistic structures than the less successful pairs, leading the authors to conclude that the more successful pairs had a more productive communicative style. The findings support Roschelle & Behrend's arguments for the importance of language in productive interaction.

Kruger (1993) also sought to establish which types of interaction are conducive to cognitive change. Her main interest lies with understanding transactive interactions,

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defined as criticisms, explanations, justifications, clarifications and elaborations of ideas (Berkowitz, Gibbs & Broughton, 1980). She predicted that dyadic discussion of accepted solutions would be strongly related to post-test scores on the basis that the individual's post-test performance reflects a socially constructed understanding. In previous research, she had found that transactive reasoning in general predicted cognitive outcome (Kruger, 1992), but in this instance found that transactive reasoning about accepted solutions had no relationship with outcome. Only discussions about rejected solutions showed a significant relationship with the post-test performance. Her results pointed towards two styles of dyadic interaction which were related to post-test performance, namely Egalitarian and Persuasive. In both styles, a focal participant (one of the pair) discussed and eventually rejected a solution. The partner also discussed the rejected solution, although the partner behaviour was different in the two styles. In Egalitarian style, the partner's other-oriented transactive reasoning about the solution was the definitive behaviour; in Persuasive style the partner offered information about the eventually rejected solution. Both types of discussion prompted the focal subject to abandon the solution, to change the topic and to suggest a new solution. When the discussion developed in this way it was strongly related to focal outcome.

Kruger discusses the implications of these findings for the conflict or co-operation debate which is beyond the scope of the present research. What is of interest here is that, once again, evidence is provided for the importance of responsive verbal communication between participants.

4.4 Peer Collaboration and Creativity

As previously mentioned, very little of the peer collaboration research has focused on creative tasks. This raises the question of whether the factors identified as important for progression in scientific areas will be important for development in creative areas. Within Rogoff's (1980) discussion of guided participation and intersubjectivity, she briefly talks of how she sees the creative process occurring among individuals. She suggests that the mutual involvement of people working on similar issues is part of

the social context of creativity. Dialogue, collaboration and building from previous approaches often provide the catalyst for putting two ideas together that would not have occurred without the need for the individual thinker to carry out, explain or improve on an approach. The analogical thinking that is so powerful in creative thought is central to the achievement of intersubjectivity, as participants in a dialogue stretch to make their perspectives mutually comprehensible. The need to make new connections between ideas may be an inherent aspect of communication, sparking ideas for elaboration and discovery by the individuals involved. Rogoff's discussions would seem to suggest that the establishment of a shared social reality is as important in creative tasks as it is for the science-based tasks.

Johnson, Crook & Stevenson (1995) examined the use of the computer as a tool to facilitate the creative writing processes of eight-year-old children. Children were recruited to a computer club where they engaged in writing activities with a view to producing a journal. The authors' interest lay not with individual performance on particular tasks, but how participants worked together to support individual development in the writing process. Analyses of the composing and conferencing sessions revealed that peer interaction can expand evaluative perspectives by providing a sense of audience. Children using word processors wrote longer, more complex manuscripts than those produced in school settings, and it is suggested that this was because the children viewed the computer in the same way that they view any other tool - as an instrument of play. The children constantly evaluated themselves and each other in their quest to discover what constitutes good literature. The computer played a fundamental role in creating a learning environment in which a community of writers played with and against each other as authors. The interweaving of play and discipline could be said to structure the activity and sustain the social group. It is the continual movement between a rule-governed and an imaginary world which provides the basis of learning and development. These findings are in line with both Piaget's (1932/1965) and Vygotsky's (1933/1967) views that play has an important role in fostering rule systems implicit in the process of learning and cognitive development. Britton (1985) observed that "In taking part in rule-governed behaviour...the novice, the individual learner, picks up the rules by

responding to the behaviours of others, a process precisely parallel to the mode by which the rules first came into existence" (p.96).

A second study to examine the role of the social environment in creativity is that of Baker-Sennett, Matusov & Rogoff (1992). They looked at the processes (rather than the products) of children's collaborative creation of a play and the sociocultural nature of creative planning, and argue that in order to plan collaboratively, children need to develop ways of managing both social relations and the cognitive problems inherent in the project. Creative planning processes are grounded in practical considerations of sociocultural activity, "in a wedding of imagination and pragmatics" (p.93). Original, workable ideas evolve from the synthesis of spontaneous improvisation and organised, directed activity, as individuals participate with others in sociocultural activities. The authors suggest that the key to success was the ability to flexibly anticipate change and adapt to unexpected occurrences throughout the course of the planning process. Creativity relies on planning during action, involving flexibility and alertness to new opportunities and problems.

In line with previous (science-based) peer collaboration research, Baker-Sennett et al. found that progression through the task resulted from the co-ordination of often discrepant ideas. They talk specifically about one group in which, on many occasions, the children elaborated on an idea mentioned by another, with the collaborative product reflecting a creative advance that was more than the sum of individual contributions. Even when they attempted to work independently by writing their own lines or developing their own characters, they consulted each other constantly on how to fit their contributions together. They assisted each other with spellings and reminded each other of decisions that had already been made or of the basic story model on which they were working. The group worked together on a shared task, with shared attention, shared communication and the ability to adjust individual activities to facilitate the group. The social-cognitive collaborative methods of division of tasks and shared decision-making that the group used to create their play served as both a planning process that moved the group further towards its goal and as a tool that facilitated the creation of the play.

4.5 Communication Through Music

While all of the above research suggests that the crucial factor in promoting group productivity or individual learning is the amount and type of verbal interaction between the children during the collaborative working period, it is suggested here that this may not be entirely accurate. The key to success has been shown to be the establishment of intersubjectivity, or a shared social reality, and verbal interaction is cited as the mechanism responsible for this. This may be due to the types of tasks on which the children have been required to work; they have all necessitated verbal interaction and communication of ideas if the group is to proceed. None of the research has looked at tasks where another medium exists for communication of ideas, and this is perhaps where music finds its place.

For Chomsky (1990), "The structure of language does not allow direct expression of our thoughts" (p.146). We know far more than we can tell, in that the knowledge we posses is not always reducible to words. "There are, indeed, things that cannot be put into words. They make themselves manifest" (Wittgenstein, 1953, p.151). Language has the limitation of *representing* what one thinks without necessarily *being* what one thinks. This relates back to Wittgenstein's argument that we can never be entirely sure that we do in fact correctly understand precisely what is intended, that language is not simply a matter of transmitting intentions and knowledge.

It is proposed here that within the context of peer collaboration and children's music composition, a more enlightening medium exists for representation of thoughts and presentation of ideas. Knowledge can be demonstrated as well as stated verbally, so children working in groups on music composition might establish a common understanding of the task by projecting their thoughts and ideas directly onto the musical instruments rather than verbalising them. In this way, their ideas will be apparent without words. The children may engage in some form of 'musical discourse', that is discourse *through* music rather than discourse *about* music. If one accepts Chomsky's ideas that language is vague and does not directly express thought,

the expression of musical ideas through the music itself is surely more enlightening than the expression of musical ideas through words.

In support of this, Mills (1991) states that "When composing, we often try out ideas by performing them, and make judgements about them as a result of listening" (p.9). And, "Music has its own meaning, not all of which can be expressed in words. When we talk about music, we comment only on parts of it. The whole is more than the sum of the parts. Thus a verbal description of a piece is never more than a pale copy of the original. Talking about music is valuable because it enables us to communicate some of our ideas. But it is never a substitute for the experience of music itself" (p.49). Music has been said to "provide a unique framework with which humans can express...the structure of their knowledge and social relations" (Sloboda, 1985, p.267).

Furthermore, the National Curriculum Music Working Group's interim report (1991) states that one of the main aims of music as a foundation subject is to develop the capacity to express ideas, thoughts and feelings through music. Music is seen as an important mode of communication and understanding, which has its own rules and conventions. For Gamble (1984), "Composing...is thinking in sound" (pp.15-16). This would seem to suggest that if one can think in sound, one can communicate one's musical ideas in sound, and this idea is reiterated by Swanwick (1979), who claims that "Music seems to possess a remarkable ability to speak for itself. Our problem is to try to understand how this happens" (p.15).

Further support for this idea of communicating through media other than language to verify common understanding can be found in computer-based problem solving tasks. For example, Pheasey & Underwood (1995) report evidence of peer facilitation effects but low levels of verbal interaction. They observed that pairs of children working at the computer preferred to test their ideas directly on the computer, rather than discuss whether a suggestion was correct with their partners. This is supported by Blaye (1988), who again found very little verbal interaction among children working on a computer based task requiring joint decision-making. Pheasey &

Underwood explain their findings with the suggestion that the children try their ideas out directly on the computer because the computer "has all the right answers and the children may not" (p.111). An alternative explanation is that the children do not need to discuss their ideas because they become apparent through direct action. It is through this direct action that a common understanding of the task and of the children's ideas is established.

4.6 Peer Collaboration and Gender

Recent research in collaborative group work has shown that gender is one of the salient factors which may influence the activity of the group and the nature of the work produced (see for example Underwood, 1994; Lee, 1993). Three specific aspects are to be considered here: firstly, verbal and non-verbal interaction patterns in mixed gender groups; secondly, possible differences between the genders in communicative styles; and thirdly, the relative productivity of single gender and mixed gender groups.

4.6.1 Verbal Interaction Between Boys and Girls in Mixed Gender Groups

It has been found that in mixed gender groups, boys dominate verbally over the girls. Swann (1992) claims that boys take up more 'verbal space' than girls, have more say in what goes on and receive more attention from teachers, whereas the girls in mixed gender groups are less likely to talk. Boys usually make the most interruptions to speakers and take longer speaking turns. Similarly, Pheasey & Underwood (1995) put children into pairs for a computer-based language problem-solving task and monitored their discussions. They found that in the majority of mixed pairs, it was the boys who made the majority of the decisions about when to move on in the task.

Siann & Macleod (1986) report a study of five mixed gender pairs working on a computer-based task which required them to draw simple geometric shapes. Detailed observations of the gender differences over four sessions of interaction revealed that in four of the five pairs, the boys took control of the task by making more suggestions

about the direction of the work. In the one pair where this was not found, there was virtually no social interaction at all.

The gender composition of the collaborating group is a relatively new concern and has been highlighted as a salient factor by the above computer-based studies. Little of the peer collaboration research has looked at gender and other types of (non-computer) task, with researchers organising children in either same-sex pairs or groups (e.g. Dimant & Bearison, 1991; Roy & Howe, 1990) or on the basis of ability in a certain domain (Azmitia, 1988; Ames & Murray, 1982). However, Fitzpatrick & Hardman (1995) compared children's performances on a computer and a non-computer task. The computer task was a language-based computer program, requiring children to match the beginnings and endings of words and perform spelling tasks. The non-computer task was designed to "tap the same understanding" (p.49), and was presented as a board game with a Snakes and Ladders theme, requiring the solution of similar language puzzles. The children were paired on the basis of verbal ability. The boys in the mixed gender groups working on the computer task initiated more assertive interactions than the girls, however it was the girls in the non-computer task who initiated more of these interactions. The authors conclude that girls can be equally assertive as boys when in mixed gender groups, but seem to have a problem with the computer based task. This is interesting because they do not conclude that boys had 'a problem' with non-computer tasks, yet if their conclusion is accepted, this would follow.

4.6.2 Non-Verbal Interaction Between Boys and Girls in Mixed Gender Groups

Boys also frequently maintain dominance in mixed gender groups by non-verbal means, such as taking control of the mouse in computer-based tasks (e.g. Barbieri & Light, 1992). This is supported by many other researchers, for example Siann, Macleod, Glissov & Durndell (1988). A further computer-based study is that of Underwood & Underwood (in press). Children were required to work through the screenpages of a CD-ROM storybook prior to completing a cued-recall comprehension test and a free-recall story-writing exercise. In this case, the boys

took control of the pace of the task, as assessed by mouse control when turning the page. The boys were found to make twice as many page-turning decisions as the girls.

Barbieri & Light (1992) report a study of children working in pairs on a computer-based problem solving task. Pairs of girls had short and frequent turns with the mouse, whereas pairs of boys tended to switch less often and had longer turns. The study also revealed mouse switching to be negatively related to pair productivity, leading the authors to propose that the boys may have had a higher level of competence initially, or at least the boys were able to work through longer sequences of actions at one time.

Pheasey & Underwood (1995) monitored mixed gender pairs of children's keyboard activities and found that it was the boys who moved the cursor most often. These results are supported by Littleton, Light, Joiner, Messer & Barnes (1992). Siann & Macleod (1986) report that in mixed gender pairs the boys took control of the task by pressing the computer keys when it was the girl's turn. The authors report three key tendencies in boy-girl interaction: firstly, the girls on the whole were less interested and motivated than the boys; secondly, the girls sought help from the boys more than the boys sought help from the girls; and thirdly, although the girls did seek help from the boys, they resented it when the help was given practically (i.e. when pressing the computer keys) rather than verbally.

Fitzpatrick & Hardman (1995), in the study reported above, found that in the computer task, boys dominated in their use of the return and arrow key and in the non-computer task, the girls used the die and counter more than the boys. This again suggests that girls can be equally assertive as boys when in mixed gender groups.

In sum, the research suggests that in mixed gender groups, boys dominate verbally and non-verbally over girls. Research into this is limited and has mainly been concerned with computer based tasks. In a non-computer task, the girls initiated

more verbal and non-verbal interactions than the boys, so it could therefore be proposed that the nature of the task may be responsible for the gender differences. All of the above studies refer to computer-based tasks, where girls are thought to be at a disadvantage (Siann & Macleod, 1986) stemming from a type of self-selection where females exclude themselves from technological areas. It is not so much that girls are significantly less competent than boys, but that they are less interested and further are more prepared than boys are to accept direction and help from others in their use of computers.

Lee (1993) suggests that if a task is perceived as being within the domain of expertise of one particular gender, that gender will dominate in mixed gender groups. With the computer-based tasks, males may have, or be expected to have, greater influence due to their higher social status. In a survey of 158 children of nursery and primary school age (Hughes, Macleod & Potts, 1984), a vast majority reported that they associated computers more with boys than with girls. Computer tasks in general are often thought of as being activities at which boys will have superior performance, independently of any actual performance differences (e.g. Culley, 1988; Yelland, 1995), and this attribution may be responsible for asymmetric patterns of interaction.

Mehan, Riel & Moll (1985), in a study involving word processing software, observed that the patterns of interaction in terms of control of the mouse changed according to competence in the task. When competence was low, turns were short, but as competence increased, they became longer and coincided with meaningful parts of the task. Blaye (1988) suggests that patterns of mouse control might reflect the style of role division within the pair, rather than being associated in any simple way with competence on the task. Similarly, Lenney (1977) suggests that achievement motivation is only a function of perceived sex-appropriateness

Pozzi, Healey & Hoyles (1993) claim that the attitude that computers are a male domain may only be a short-term 'technocentric phenomenon' (p.238) which disappears when the computer is used as a means rather than as an end in itself. In their study of a computer-based mathematics problem, pre-existing attitude

differences between the genders were observed but this was found to have little influence on group processes. The girls were as likely to dominate as the boys, both positively as co-ordinators and more negatively in asymmetric patterns of interaction. It could be that a task may contain implicit gender biases which elicit attitudinal differences, or may evoke gender differentiated responses because they are associated with school subjects which already carry strong gender stereotypes. Pozzi et al. propose that their tasks had no such gender bias, and may therefore explain why no gender differences were found.

The previous peer collaboration research has been science-based, therefore if these subjects are perceived as more masculine, the status theories provide a good explanation for the research findings of male dominance in mixed gender groups. The implications for research into music composition remain to be seen. There is a lack of systematic studies of perceived masculinity and femininity of school subjects, but it has been suggested that music is seen by children as veering "towards the feminine" (Archer, 1992, p.67), which, if true, would stand music in opposition to the tasks of previous peer collaboration research. The main problem of assessing the extent of gender stereotyping seems to be that no standardised measure exists.

In sum, the previous peer collaboration research suggests that in mixed gender groups, boys dominate verbally and non-verbally over girls. This has been discussed in relation to the nature of the task, specifically it was suggested that because the majority of the research has been carried out with computer-based tasks, girls may feel at a disadvantage. In studies involving other (non-computer) tasks, girls are just as capable of dominating in mixed gender groups.

4.6.3. Communicative Style in Single Gender and Mixed Gender Groups

It has been suggested that males and females use language differently and differ in interactional style (e.g. Lackoff, 1973). Research findings about gender differences in communicative style include speech among girls that is deferential (Haas, 1984; Ahlgren, 1983) and among boys that is domineering and competitive (Sheldon,

1990). Girls tend to co-operate by mutually sharing ideas, whereas boys tend to show a more competitive and individualistic working style (Fitzpatrick & Hardman, 1995). In the majority of these studies, although actual ability is equal, the recurring theme is one of female deficiency in levels of overt confidence.

Thompson (1995) compared boys' and girls' spontaneous communication in a problem-solving setting and focused specifically on the frequency of help-seeking behaviours in relation to performance on the problem-solving task. Each child was asked to individually work on a jigsaw puzzle of a double-decker bus. The sessions were timed, videotaped and analysed for puzzle solving performance. Thompson found that girls said such phrases as "I can't do this", "Where does this piece go?" and "Will you do this one?" significantly more often than the boys. However, the children did not differ in their ability to solve the puzzle, nor in the time taken to do so. Thompson believes that the girls' greater amount of 'help-seeking' may be part of a "naturally fluent and spontaneous repertoire of socially engaging behaviour" (p.128), whilst for boys, help seeking behaviour may have a more limited, task orientated function.

Issrof (1995) compared pairs and individuals using a chemistry database to fill in a worksheet about the Periodic Table. The children were asked to rate on a five point scale how important it was that they got the correct answers, that they got along with their partner, that their group was successful and that they individually were successful. For the girls, getting along with each other was the most important factor, whereas the boys rated their own success as most important. Furthermore, the girls did not value the correct answer as much as the boys. These findings suggest different priorities for the sexes, in that girls and boys found different factors to be salient in their collaborative interactions. The emphasis was on social factors for girls, but on task related factors for boys.

Guntermann & Tovar (1987) studied children aged ten working on microcomputers in either single or mixed gender groups. Male groups were found to display more solidarity than the other two groups, defined as any friendly acts where the

participant showed sympathy and solidarity towards other group members. However, the boys displayed much more antagonism, aggression and unfriendliness than the girls. Boys showed no evidence of tension release, defined as joking, laughing, expressions of enjoyment and indications of personal satisfaction with other group members. The girls showed a certain amount of this behaviour. The authors conclude that females displayed appropriate co-operative, task related behaviour, whereas males, despite overt solidarity with their peers, also showed far more antagonism and off-task verbalisations. The boys rarely asked others for suggestions, opinions or information. These were generally given spontaneously, often in a manner indicative of an attempt to deflate the other member's status and attain individual rather than group achievements within the overall task. Girls focused on task-related verbalisations that led to other task-related or positive socioemotional interactions. For example, asking for a suggestion led to the giving of a suggestion, giving information led to the showing of satisfaction, culminating, after numerous such sequences, in the attainment of a goal upon which the group had decided.

Fitzpatrick & Hardman (1995) studied pairs of children working on a language based computer and non-computer task and found no difference between boy pairs and girl pairs in interaction styles. The authors explain this finding by referring to the results of Underwood, Jindal & Underwood's (1994) study, which found that instructions to co-operate have a limited effect on pairs of girls (who tend to co-operate regardless of what they are told) but have the most beneficial effect on pairs of boys, causing a change in their working style. Fitzpatrick & Hardman's instructions to 'work together' may have been effective, despite their concerns that this may not have been sufficient to encourage collaboration. These authors also found no differences in styles of interaction between the two tasks, suggesting that it is not the computer itself which generates individualistic or competitive styles of social interaction.

In sum, the research suggests that there are gender differences in communicative style. Girls tend to co-operate by mutually sharing ideas, whereas boys tend to show an individualistic working style.

4.6.4 Group Productivity

Teachers tend to favour mixed rather than single gender groups (Jackson, Fletcher & Messer, 1986), therefore it is important to establish whether this is an effective grouping method. The available empirical studies of group productivity and learning outcomes in same-sex and mixed-sex groups are small in scale and offer contradictory conclusions. Dalton (1990), in a science lesson learning task using an interactive video, found evidence of superiority of single-sex over mixed-sex pairs. Underwood, McCaffrey & Underwood (1990) and Fitzpatrick & Hardman (1995) report that mixed gender pairs perform less effectively than single gender pairs on language-based problem-solving tasks. Using a computer-based treasure hunt task, Barbieri & Light (1992) found that verbal interaction measures associated with productive pair interaction were not associated with pair type, but reported an association of gender and pair type with interactional style and task success. The performance of a pupil seemed to be influenced by the sex of their partner as much as by their own sex. It has been suggested that the above findings could be explained by the turn-taking style of mixed-sex pairs as opposed to the more beneficial mutual decision making in single-sex pairs (Hughes, Brackenridge, Bibby & Greenhough, 1988).

However, Hughes et al. (1988) found completely different results with a computer-based study requiring children to navigate a turtle around an obstacle. Boy-boy and boy-girl pairs did equally well and out-performed girl-girl pairs considerably. Individual post-tests revealed that the girls from the mixed-sex pairs retained their advantage over girls from single-sex pairs. A further alternative finding is that of Barbieri & Light (1992), who report no differences among the three types of pair in their study of a computer-based problem solving task.

Issrof (1995) and Thompson (1995) both report no significant differences between the boys' and the girls' actual success (as measured by pre, post and delayed post tests). Similarly, Guntermann & Tovar did not find any significant gender differences in the product measures, that is the ability to complete the task. Underwood & Underwood (in press) found no differences between pairs of boys and pairs of girls

in their ability to complete a comprehension test a week after interacting with a multimedia CD-ROM storybook. However, the Underwoods' results are a little more intriguing, in that a gender effect was observed one month later when the children were asked to write a story (individually) about the main screen character. This was designed as a free recall task in which the children's most prominent memories of the storybook would be relayed. Pairs of girls remembered approximately twice as many facts about the screen character than did pairs of boys. The authors also looked at mixed gender pairs and found that the children's comprehension and recall scores indicated that the girls understood the story just as well when they worked with a boy or with another girl, but that their memories were less durable when they had worked with a boy. The higher scores gained by girls were not a product of girls being more compliant with the researchers' requests, or the girls in the mixed pairs would have performed at a similar level, and the authors conclude that the findings are a residual effect of the working partnership.

Hughes, Brackenridge, Bibby & Greenhough (1988) provide further evidence for a relationship between differences in performance and differences in collaborative style. They found a performance deficit for pairs of girls working at the computer to be associated with greater emotionality relative to pairs of boys.

Yelland (1994) suggests that the nature of the task strongly influences the nature and extent of children's learning. Her research involved children in a language-based computer program in either boy pairs, girl pairs or boy-girl pairs. In track-type tasks (following instructions to take a turtle on a specific route), girl pairs took longer to complete the task and made significantly more moves than the other two pair types. However, no significant differences were found among the three types of pair for copying tasks (copying shapes presented on the computer screen). Yelland warns against making comparisons between the genders on the basis of one task in a restricted time frame, and suggests that differences in performance are related to the type of task presented and the frame of the research design.

In sum, the research provides contradictory evidence about the relative effectiveness of single and mixed gender groups. There is however a tendency for mixed gender groups to perform less effectively than single gender groups. The nature of the task and the instructions the children are given may be responsible for the contradictory findings.

4.7 Conclusions

This chapter has discussed the importance of verbal communication for productivity, and the gender composition of the collaborating group. Evidence has been provided to suggest that an important mediator of productivity is the amount and type of verbal interaction occurring among the children in the collaborating group. It has been shown that it is crucial that the children establish a shared understanding of the task and jointly work towards a solution, and it was suggested that children collaborating on a music composition task may establish a shared social reality through music rather than through words.

Three key gender issues were discussed, namely interaction patterns in mixed gender groups, communicative styles and the relative productivity of single and mixed gender groups. There seems to be an interaction between the gender of the individual, the gender of other members of the group, the nature of the task, the perceived gender-appropriateness of the task, the competence and perceived competence of the individual, and the competence and perceived competence of other group members. The examination of gender issues with reference to collaborative music composition is important because it differs considerably from the previous research by being of a creative nature and is possibly perceived by children as more "for girls" than for boys. These two factors will surely impact considerably on the group dynamics of collaborative music composition and the subsequent musical product. One may expect the females in mixed gender groups to dominate verbally and non-verbally over the boys, and the all-girl groups to be the most productive.

Therefore, on the basis of the research presented in this chapter, a number of hypotheses will be tested. On the basis of the previous research, it is expected that communication among children within the collaborating group will be related to group productivity. However, while previous research suggests that the important interaction is verbal, the present research will extend the analysis to look for the occurrence of interaction through music. It is suggested that this non-verbal form of interaction will be prevalent and will be important for group productivity.

In terms of the gender composition of the collaborating group, on the basis of previous research it could be expected that the boys in the mixed gender groups will dominate verbally and non-verbally over the girls. However, it was argued that these findings may have been due to the nature of the task. It was tentatively suggested that music may be perceived as a 'feminine' subject in contrast to the 'masculine' nature of the computer-based research, so it could be proposed that the girls may dominate in the mixed gender groups.

Gender differences across single and mixed gender groups are expected in interaction styles adopted during the collaborative working period. It is predicted that the girls will show a more co-operative approach whereas the boys will demonstrate a more individualistic working style. Furthermore, on the basis of previous research, it is predicted that single gender groups will be significantly more productive than mixed gender groups.

To test these hypotheses, three distinct types of music composition task will be examined, as it has been shown that the nature of the task is an important mediator of behaviour.

CHAPTER 5: A QUESTIONNAIRE STUDY OF PRIMARY EDUCATORS: HOW IS MUSIC TAUGHT?

5.1 Introduction

While Chapter 2 deals with the theoretical perspectives of music education, it is undoubtedly useful to find out from the teachers directly how they approach the teaching of music. More specifically, the aims of this study were to establish the extent of the use of groups in music composition classes, the typical gender composition of the groups, the types of composition tasks and musical instruments with which the children are accustomed to working, and to establish typical procedures for assessing the quality of music compositions. The aim of this questionnaire study was to provide further rationale for the subsequent empirical research, and to provide a framework within which to develop ecologically valid research practices. In sum, the questionnaire was designed to assess exactly what happens in schools.

5.2 Method

5.2.1 Participants

A sample of 60 primary school teachers (Years 3-6) was randomly selected from schools in Leicestershire, Monmouthshire and Cambridgeshire. The sample consisted of urban and rural schools, and involved teachers from middle class and inner city schools. All teachers were class teachers and taught children for every aspect of the curriculum, including music. No information was obtained as to whether they were specialist musicians.

5.2.2 The Questionnaire

The questionnaire administered to the teachers was as follows:

i) Groupings

Are the children put into groups for music composition? *(yes/no/sometimes)*

Are the children ever required to compose on their own? *(yes/no/sometimes)*

What size of group do you find most effective? *(pairs/threes/fours/fives/other)*

How are the children grouped together? *(ability/friendship/other)*

Do you keep the groups same-sex, or do you mix the sexes? *(same-sex/mixed-sex/depends on task)*

ii) Musical Instruments

Are the children taught conventional musical notation or alternatives?

What musical instruments are available to the children?
(percussion/pitched/electronic)

How are the instruments allocated? *(children choose/teacher chooses/other)*

iii) Composition Tasks

What general musical level do you expect the children to have reached by the end of Years 3, 4, 5 & 6? Please answer this question by giving an example for each year group that you teach.

iv) Assessment

How do you assess group music composition?

5.2.3 Procedure

Questionnaires were administered either personally by the researcher or through the post, with the participants given as much time as they needed to answer the questions.

5.3 Results and Discussion

5.3.1 Groupings

The beginning of the questionnaire was concerned with whether teachers group pupils for music composition, and if so, to what extent. The questions in this section related to how the children are grouped in terms of group size, gender, ability and friendship.

Questions 1-5 (below) report a summary of the quantitative data collected from the teachers.

1. Are the children put in groups for music composition?

Yes/Sometimes	No
60	0

2. Are they ever required to compose on their own?

Yes/Sometimes	No
58	2

3. What size of group do you find most efficient? *some teachers ticked more than one box, so the total here is 80 and not 60.*

Pairs	Threes	Fours	Fives
8	20	44	8

4. How are the children grouped?

Friendship	Ability	Both
10	1	49

5. Do you keep groups same - sex or do you mix sexes?

Same	Mixed	Both
0	50	10

The above information suggests that all teachers put children into groups at some point for music composition, but that solitary composition is also an important feature of music education. Only 2 teachers reported that they never require the children to compose alone. The preferred size of group was reported to be fours, and children are grouped in a combination of friendship and ability. Mixed-sex groups are the most prevalent, with 50 of the 60 teachers preferring to use only mixed groups. The remaining 10 teachers claimed to switch between single-sex and mixed-sex groups, and none reported using single gender groups only.

Empirical investigation of these methods of grouping for music composition could have extensive practical and theoretical implications. Chapter 4 (4.6) reported the gender composition of the collaborating group to be a highly salient factor in determining group productivity and patterns of interaction among the children. If children are consistently working in mixed gender groups on music composition tasks, it is vital to establish whether this is indeed the most effective grouping method. These gender issues are examined in the empirical studies (Chapters 6, 8 & 9).

5.3.2 Musical Instruments

The questions below focus on what musical instruments are available, and whether the children are taught to use conventional or alternative musical notation.

6. What instruments are available to them?

Percussion only	Percussion & pitched	Perc., pit. & electronic
3	30	27

7. Are the children taught conventional musical notation or alternatives?

Conventional	Alternatives	Both
4	20	36

Half of the teachers reported that composing is carried out on percussion and pitched musical instruments, 27 reported the use of electronic equipment in addition to percussion and pitched, and 3 reported using only percussive instruments. This information is useful for aiding in the development of research designs, as it has been reported in Chapter 2 (2.3) that if children are unfamiliar with a musical instrument, they will spend a great deal of time exploring that instrument in order to discover what it can do. This unfamiliarity with instruments influences the children's confidence levels in their ability to operate the instruments and thus complete the task. For the present research purposes it is crucial that the children have at least some degree of expertise with the instruments as unfamiliarity will interfere with the composition process, and thus the resulting musical product. On the basis of the questionnaire findings, the musical instruments to be used in the empirical studies will therefore be a xylophone, a drum, a triangle and a cabasa, and it will be further established with the children's class teachers that these are instruments with which the children are familiar.

The majority of children are required to use both conventional and alternative musical notation, a third use only alternatives and 4 use only conventional notation. Because the children in the present research will be required to compose a piece of music, it is important to consider whether they are accustomed to notating their work and if so, in what form. The fundamental factors which separate composition from improvisation are rehearsal and repetition of a piece of music, therefore the opportunity to notate throughout the working period may facilitate the composition process if the children are accustomed to doing so. In the empirical studies (Chapters 6, 8 & 9), therefore, the children will be given a pen and paper to provide them with the opportunity to write down their compositions if they want to, but this will not be compulsory.

5.3.3 Composition Tasks

The second stage of the questionnaire focused on the types of composition tasks given to the children. The question posed was; **"What level of composition ability do you expect the children to have reached by the end of Years 3, 4, 5 and 6? Please answer this question by giving an example for each year group that you teach"**. This was designed to elicit from the teachers the precise nature of the tasks and actual concrete examples of what exactly they ask the children to do. However, all of the teachers responded by giving examples of musical features they focus on with the children, and reported that they design tasks with these features in mind. None of the teachers explicitly reported the precise nature of these tasks. The features they reported as being important in learning how to compose can be summarised into 6 main areas, and this is presented below in descending order of occurrence.

Structure 28 of the teachers reported that an understanding of the structure of music is key to understanding composition. Principally, the children are taught about how to structure a piece of music in terms of providing a good beginning, a middle and an end. Children are educated in the use of patterns and are required to compose simple and more complex sequences of music using these patterns. The use of repetition and

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variation of musical ideas is encouraged, and the teachers discussed the importance of phrasing in general and melodic phrasing specifically.

Rhythm 24 of the teachers reported the importance of using rhythm in composition to maintain a steady flow of musical ideas, and within this, 12 cited the concept of tempo (speed) as an important feature of composition.

Pitch and Dynamics 16 teachers reported the use of different pitches and dynamics in composition tasks. A clear understanding of these concepts was seen as being crucial for composition.

Mood 12 teachers mentioned an understanding of the various moods of music, and suggested that by changing the pitch, rhythm and dynamics of a piece of music, one can create different moods. An example of a composition task given by one teacher is composing a piece of music to match the current mood of the individual.

External Stimuli 8 teachers reported that children are taught to appreciate that music can represent external stimuli, and are therefore encouraged to create music using pictures or stories as stimuli. For example, one teacher reported asking children to illustrate the experience of walking through a rain forest after they had studied the topic in geography class.

Experimentation 8 of the teachers reported that they encourage experimentation with ideas and instruments, the improvisation of ideas and the experimentation of how instruments move and sound. This was seen as an important part of the composition process.

On the basis of the above, it is clear that children are educated in the key ingredients of composition and are required to grapple with relatively complex musical features. When designing research procedures, it is important to be aware of the depth and breadth of the children's music education in order that composition tasks can be developed accordingly. With this in mind, the composition tasks will be based firstly

on the distinction made in Chapter 1 (1.2.2) between representational, formal and emotion-based music composition tasks, and secondly on discussions held with the children's class teachers, to ensure that the children will not face serious difficulty with the tasks.

5.3.4 Assessment

The third stage of the questionnaire was concerned with how teachers approach the assessment of children's compositions. They were asked; **"How do you evaluate the success of a particular group?"** Again, the aim of this question was to obtain explicit criteria for assessing the finished product, but the answers provided by the teachers tended to focus on factors that they considered to be important when evaluating group music compositions. Their answers are summarised below (in descending order of occurrence) under a number of recurring themes.

Children's Responses 52 of the teachers pointed to the importance of discussing the finished composition with the children who composed it, and with other members of the class. In these situations, each group typically plays its composition to the whole class, after which a discussion will take place. These discussions usually take the form of evaluating which parts worked well, which parts did not work so well and how the composition could be improved. While this is obviously an invaluable part of the development of children's musical competence, it may not be an entirely practical method for research purposes. It is therefore important to consider the other areas the teachers suggested.

Social Factors 44 of the teachers emphasised the social function of group music composition and reported that they observe the groups working on the task to look for collaboration among the children, the sharing of ideas and the involvement of the whole group. These teachers felt it was important to look not just at musical progression, but also at social progression. Unfortunately, neither of these terms was defined explicitly by any of the teachers. Within this, 16 of the teachers felt that the children's enjoyment of the task is a good indicator of the success of the group. The

influence of social factors in group music composition is a neglected research area, and in view of the fact that the present research is looking at social factors, it seems inappropriate to assess group productivity on the basis of the social interaction. This would immediately presuppose that collaboration, sharing of ideas and involvement of the whole group is important in order to produce a 'good' music composition, and this seems to be where the teacher's and researcher's points of focus differ. The present research is concerned with looking at the social factors *in relation* to group productivity and not to take the social factors to be *evidence of* group productivity. The present research must therefore take a product orientated approach to assessment, whereas the teacher may be taking a more person orientated approach. Neither approach is necessarily superior, rather this serves to highlight the different aims of research and practice.

Imagination 16 teachers look for novel ideas, that is how creative or imaginative the group has been in their composition. This is perhaps a surprisingly small number. Again, no definitions of creativity or imagination are provided. Creativity is clearly an important feature of a composition, yet it remains unclear what exactly it is and how exactly one measures it.

Task Specificity 12 of the teachers reported that they look for whether the children have done what they were expected to do. For example, if the teacher is trying to teach the child about steady rhythms, the teacher will look for the extent to which the group has incorporated this into the composition. One teacher talked about the use of tick sheets for such areas as pitch control: tick 'yes' if the child has mastered the concept, 'no' if not, and 'nearly' if they are almost there. It was argued in Chapter 3 that the assessment of a composition must be intimately related to the nature of the task, and this complements the view held by the 12 teachers. If the teacher is trying to educate the children in the concept of rhythm or pitch control, assessment procedures will focus on the degree to which the children show mastery of these concepts in their compositions. The teachers talked about looking at how well the children have done what they were asked to do. While this is feasible, it does not give explicit

information about *how* teachers assess how well the children have done what they were supposed to do.

Communication of Ideas 8 teachers reported the importance of communication during a performance of a composition among the children within the group. They look for the extent to which the children in the group are listening to each others' musical utterances, and try to fit their ideas in appropriately. This perhaps relates more to an improvised performance, where it is crucial that members of a group listen to what the others are doing and fit their musical utterances in appropriately and react to the others' musical utterances. During the performance of a composition, while listening to others is obviously crucial, it should have already been determined when to join in and when to be silent. The 'communication of ideas' approach to assessment again appears to be related to the assessment of the individuals' behaviour, rather than to the assessment of the whole group's musical product.

Selectivity 8 teachers report looking closely at the elements of the compositions to assess to what extent they are selected or whether they occur purely by chance. While this is a promising approach for the present research in that it is more product based, it is still rather ambiguous. How exactly can it be determined whether a note or a rhythm has been selected or is occurring purely by chance? Since the notes or drum beats would sound the same in either case, a great deal is left to the discretion of the assessor.

One teacher answered simply; **"By looking at the end product"**.

It is clear that the assessment of music composition is fraught with difficulties, since it remains a highly subjective issue. While the above methods are undoubtedly highly functional for the teacher, for the researcher they remain vague and ill-defined. What seems to have emerged is the task and context specificity of assessment (as discussed in Chapter 3). One has to consider exactly what one is trying to assess and for what purpose. Assessment procedures need to be flexible and reactive to the situation, as opposed to prescriptive, predetermined and predefined.

5.4 Conclusions

It has been shown that children are consistently grouped for music composition tasks. Teachers group children on the basis of friendship and ability, and tend to prefer mixed gender groups to single gender groups. The preferred size of group appears to be fours, and the children are provided with a mixture of percussion, pitched and electronic instruments. All teach some form of musical notation. Composition tasks tend to be broad-ranging, and assessment procedures vague. All of these factors will be taken into consideration when designing the peer collaboration studies.

CHAPTER 6: "A TRIP TO THE SEASIDE": TWO STUDIES OF A REPRESENTATIONAL MUSIC COMPOSITION TASK

6.1 Introduction

It was reported in Chapter 1 (1.2.2) that composition tasks can be thought of as belonging to one of three categories; representational, formal or emotional. This chapter discusses two studies of a representational composition task. The first study was exploratory by nature, and from the findings of this preliminary investigation, clearer research procedures were established for the purposes of the second study.

The aim of Study 1 was to establish the importance of verbal interaction among the children in the production of a collaborative music composition, and to assess whether musical interaction, as defined in Chapter 1 (1.3), occurred at all. If there is evidence for the communication of musical ideas through music, i.e. by playing the musical instruments, it is necessary to establish what form this takes and how it relates to verbal interaction as an important mode of communication. The children were put into mixed gender groups only, as this was found to be the most common grouping method (Chapter 5), and differences in interaction style between the genders were examined. The aims of the second study are discussed with reference to the findings of the preliminary investigation.

The principal hypothesis for Study 1 is that there will be evidence for the communication of ideas through music, and that this form of communication will have a significant relationship with group productivity. On the basis of previous peer collaboration, it could be proposed that verbal interaction will be related to group productivity (Chapter 4,4.3.1). Or it may be that there will be little need for verbal interaction as the children will be communicating their ideas musically. Furthermore, on the basis of previous peer collaboration research (Chapter 4 4.6.1), the boys will dominate over the girls in both verbal and musical interaction.

STUDY 1: "A TRIP TO THE SEASIDE"

6.2 Method (1)

6.2.1 Participants

A sample of 48 children (24 boys and 24 girls) aged 9 - 10 was taken from two primary schools in Leicestershire, both in mixed catchment areas. The children were divided into 12 groups of 4, each group consisting of 2 girls and 2 boys, by their class teachers.

6.2.2 Composition Task

The stimulus was a short story about a family's trip to the seaside and is presented in full below. This was written by the researcher and so as to be gender - neutral, with the assumption that it was a topic to which all children of this age could relate. The story was first presented orally, and each group was given only one written copy to encourage collaboration. The children were presented with four musical instruments; a glockenspiel, a cabasa, a triangle and a small drum. These instruments were reported by teachers in Chapter 5 to be most frequently used with children of this age group, and it was ensured that all children who participated had prior experience of this type of task and of these instruments. The participants were videotaped throughout the entire session.

A TRIP TO THE SEASIDE

"Mum, Dad, Ben and Sarah are all in the car, travelling to the seaside. The children are very excited about their day out and chatter all the way. Dad parks the car and Mum unloads the picnic from the boot. Ben and Sarah take off their shoes and rush through the sand into the water. The children shriek as the icy water laps up against their ankles. Dad throws a ball to Ben, who drops it. A dog snatches the ball and runs with it along the beach. Dad chases the dog, grabs the ball and throws it back to Sarah. Mum tells the others that the picnic is ready and the family tuck into sandwiches and cakes. After their lunch, the

children play in the sea once more before Dad shouts that it is time to go. Everyone is very tired and Ben and Sarah fall asleep in the back of the car. Mum yawns, and Dad switches on the radio to keep himself awake for the journey."

6.2.3 Procedure

Each group of four was studied individually. The composition task and the four musical instruments were arranged randomly on the floor, and the children were asked to sit down behind them. The story was read aloud to the children. Participants were then asked to choose an instrument each and to work together to come up with a series of sounds or music to represent or illustrate the events of the story. The importance of their collaboration was emphasised and it was also stressed that all children should agree on the finished piece.

The children were told that they would be allowed to work on the composition for 20 minutes before they would be asked to perform their finished piece for the video camera, to enable the researcher to show their class teacher their work. The researcher did not mention that they would be recorded while at work, although if they asked, they were told. While the children worked, the researcher turned away and pretended to be engaged in reading, so as not to distract the children.

After the work and the performances of the 12 groups had been collected on the video tape, the final performances were put onto a separate cassette so that they could be judged separately as the finished product.

6.2.4 Assessment of the Compositions: The Selectivity Rating Scale

It has been argued in Chapters 3 and 5 that assessment of music composition should be intimately related to the task, and given that no standardised procedure exists for assessing the quality of composition, a five-point rating scale was developed specifically for this purpose. The scale provides guidelines to assist the raters in their

marking of the compositions and is presented in full in below. The question of the validity of this scale is dealt with in Chapter 7.

The essence of this scale is the extent to which the children display selectivity or discrimination of both the actions and events within the story, and of the instruments chosen to represent these. There are many actions and events within the story which could be represented by an infinite number of musical sounds. The children must then select a variety of actions or events from the story and decide how to illustrate these with the available musical apparatus. In this way, groups of children who score well on the rating scale will be those who demonstrate a certain degree of musical thinking, apparent in this context through the selection and rejection of sounds.

This is based largely on Swanwick's (1979) three proposed criteria for attempting a definition of music, namely selection, relation and intention. Selection is apparent when not every available sound is used, many are rejected, some are repeated. Relation refers to the combination of sounds, or when sounds are made to precede or follow each other in time, and intention suggests the composer or performer intends to make music. It is assumed that the criterion of intention has been satisfied in all groups, in that the children were expected to make music, so they therefore intended to. Similarly his criterion of relation is satisfied in that the children were all producing a series of sounds which preceded or followed each other in time. Selectivity, apparent when not every available sound is used, some are repeated, others rejected, is therefore crucial to this research as it is evidence of musical thinking and task accomplishment. The importance of selectivity has also been highlighted by the questionnaire study discussed in Chapter 5, in which a number of teachers reported the importance of selecting or choosing sounds in composition rather than having them occur purely by chance. Furthermore, Delorenzo (1989) suggests that "... exploration and evaluation of sound material, manifested through production, selection and organisation of sound material, (reflects) the student's inner musical thought processes" (p.193). For Mills (1991), "Composing in groups can enhance the processes of selection and rejection inherent in problem solving" (p.25).

Rating Scale

Score 1:

All sound effects* are played, with no evidence of selection or discrimination. Sound effects are stereotyped. No evidence of decision making as to which sound should represent which event or action within the story. No apparent organisation.

Score 2:

More selective with a sense of unity. One or two instruments have been chosen to represent certain elements of the story. The sound effects tend to focus on events, rather than actions, and are still very stereotyped. Little structural control and the impression of spontaneity without development of ideas.

Score 3:

Further selection of events/actions and of instruments is apparent. Sounds become more appropriate and more inventive. Evidence of a structure to the finished piece. Compositions still rather predictable.

Score 4:

More selective still. Less narrative. Clear beginning and ending.

Score 5:

High level of selection and discrimination, of both the events/actions chosen and of the instruments. Clear beginning, middle and ending. A more abstract level than previously. Equal representation of events, actions, emotions, etc.

The use of the term 'sound effects' is for descriptive clarity only. At no time at all was it suggested to the children that they work on producing a series of sound effects. For the children, the emphasis was put on the transformation of elements within the story into a musical medium.

To establish the level of reliability of the scale, each of the twelve compositions was assessed by three independent adult raters. A highly significant correlation was obtained (Rater 1 & Rater 2: $r = .79$; $p < .001$; Rater 1 & Rater 3: $r = .81$, $p < .001$; Rater 2 & Rater 3: $r = .74$, $p < .001$), suggesting that the scale was sufficiently reliable. The final score assigned to each group was the mean given to each composition by the three raters. From here on, the mean mark awarded to each composition by the three raters will be referred to as the 'group score'.

6.2.5 Analysis of the Collaborative Working Period

The collaborative working period was assessed independently of the performance of the finished composition. Several aspects of the children's interaction during the working period were timed with a stopwatch.

Total talk for each child was sub-divided into task directed talk and time spent reading the story aloud.

Task directed talk was defined as any talk directed towards completion of the task and towards other group members. It was essentially the verbal sharing of musical ideas.

Read was simply the time spent reading the story aloud. This was included because it comprised a large part of the child's talk time, and while it was task directed by nature, it was not seen as actively sharing one's ideas with other group members.

Play, or musical interaction, was defined as the total amount of time spent playing the musical instruments during the collaborative working period. This definition is justifiably broad, given that the aim of the study was to establish whether or not the children were interacting and communicating through music, and if so, in what form this appeared.

The verbal interaction measures were broad in order to compare directly the amount of verbal and musical interaction. The importance of verbal and musical interaction was not assumed from the outset, thus the measures stem from previous peer collaboration research, but are not as specific as the types of talk discussed in Chapter 4 (4.3.2).

6.3 Results (1)

6.3.1 Verbal and Musical Interaction

A Pearson correlation was carried out on the data, and Table 6.1 shows the relationships between the process variables and the group score. It is apparent that there is no relationship between any of the process variables and the group score. The variable most closely approaching significance is that of play, which can be seen to have a negative relationship with group score.

Pearson Correlations Between the Process Variables and the Group Score

Table 6.1

	Group Score (N=12)	
	r	p
Total talk	.01	ns
Task directed talk	.06	ns
Read	-.04	ns
Play	-.26	ns

Table 6.2 shows the results of a repeated measures t-test to assess the difference in the amount of talk and play (in seconds) occurring during the collaborative working period. The figures suggest that there is more play than talk occurring among the children during the collaborative working period, but this difference does not quite

reach statistical significance. It should also be noted that the standard deviations are large, suggesting that the groups differed substantially in the amounts of talk and play in which they engaged.

Amounts of Talk and Play

	Mean (seconds)	S.D.	t	df	p
Total talk	88.35	93.86			
Total play	115.79	87.16	1.96	47	ns

6.3.2 Boys and Girls in Mixed Gender Groups

A multivariate analysis of variance was carried out to assess the differences between boys and girls in the extent to which they engaged in the task. Table 6.3 shows that there was a significant gender difference, and examination of the univariate data suggests that the girls engaged in significantly more total talk than the boys, and spent significantly more time reading the story aloud than the boys. The girls engaged in more task directed talk than the boys, but this difference did not reach statistical significance. The boys engaged in more play than the girls, but again this difference was not significant. It should be pointed out again that the standard deviations are large, suggesting a good degree of variability in the amounts of each of the process variables.

Boys' and Girls' Process Variables

Table 6.3

Pillai's Trace	Value		F	p
	.19 (df 3)		3.50	.02
Univariate **statistics**	**Means (seconds)** **(S.D.)** (df 1)		**F**	**p**
	Boys	**Girls**		
Total talk	54.38 (61.07)	122.33 (108.92)	7.11	.01
Read	17.04 (27.90)	63.17 (74.14)	8.14	.01
Task directed talk	37.33 (48.38)	59.17 (54.16)	2.17	ns
Total play	120.46 (98.38)	111.13 (76.15)	.14	ns

6.4 Discussion (1)

6.4.1 Verbal and Musical Interaction

No relationships were found between the process variables and the group score, and there could be a number of reasons for this. The working definition of 'play' was far too general in that it included all musical utterances. There was no distinction between task-directed play and simply 'messing around' with or exploring the instruments. This might explain the negative (but not quite statistically significant) relationship between play and group score - those groups where play was prevalent may simply have been either messing about or exploring the instrument, and not working on the task at all. Thus in these cases, scores would be likely to be lower.

more overtly confident and therefore dominating in mixed gender groups (see section 4.6.1).

An explanation for the findings comes from Lee's (1993) status theory (4.6.2), which claims that if a subject is perceived as being appropriate for one gender rather than the other, that gender will dominate. Perhaps the girls see themselves, and are seen by boys, to be the more competent gender musically, so they take verbal control of the task. Or it could simply be that it is this type of task at which girls see themselves as, and are seen by boys to be, more competent. This raises the question as to whether groups of girls are more successful in music composition than groups of boys, and further highlights the need to study not just mixed gender groups, but also single gender groups. No significant difference was found between the two genders for the amount of time spent playing the instruments. This suggests that both boys and girls were equally involved on a musical level (in the extent to which they played the instruments during the collaborative working period), although it has been pointed out that there may be different styles of play which need to be more closely examined.

Inadequate definitions of the process variables and the limitations of studying only mixed gender groups render conclusions rather limited in generality. The aim of the second study is to rectify these issues. The total talk occurring between the children will be separated into task directed talk, read, off task talk and interaction with the researcher. Total play will consist of task directed play and exploratory play. The second study will look at all-boy, all-girl and mixed gender groups.

STUDY 2: "RETURN TO THE SEASIDE"

6.5 Introduction

In addition to examining more clearly defined process measures and observing groups of different gender composition, the children in this study were asked a series of questions about their participation in, and enjoyment of, school music lessons and extra-curricular musical activities. It was hoped that this information may help shed light on any possible gender differences in interaction patterns and in productivity.

The principal hypothesis in this study is that there will be a significant relationship between the amount of musical interaction occurring among the children during the collaborative working period and group productivity. Verbal interaction will not be related to productivity. In line with the findings of Study 1, it is predicted that the girls in the mixed gender groups will dominate verbally and non verbally over the boys, and that the two genders will show differences in communicative style, determined by the extent to which they engage in specific activities during the collaborative working period. Furthermore, it is predicted that the single gender groups will be significantly more productive than the mixed gender groups. This study differs from Study 1 in that it is examining single gender and mixed gender groups, whereas Study 1 looked only at mixed gender groups.

6.6 Method (2)

6.6.1 Participants

A sample of 88 children was taken from a primary school in Monmouthshire from a mixed catchment area, consisting of 46 girls and 42 boys, aged 9 - 11 years. The children were randomly divided into 22 groups of 4 by their class teachers; 7 groups of 4 girls, 6 groups of 4 boys and 9 groups of mixed gender fours consisting of 2 boys and 2 girls.

6.6.2 Composition Task

The composition task was the same as in Study 1.

6.6.3 Process Variables

For this study, the process variables were more specific than in Study 1, and as in Study 1 several features of the children's interactions during the collaborative working period were timed with a stopwatch. The total talk occurring among the children during the collaborative working period was divided into four categories: task directed talk, time spent reading the story aloud, off - task talk and interaction with the researcher.

Task directed talk was defined as any talk directed towards the successful completion of the task. This type of talk included the presentation of ideas and suggestions to other group members, the discussion of alternatives and the justifications of accepted and rejected solutions. Task directed talk was therefore assumed to be indicative of attempts to share the social reality of the problem-solving situation.

Reading the story aloud was defined as in Study 1.

Off task talk was defined as any talk not directed towards completion of the task, suggesting time out from actively working to complete the task.

Interaction with the researcher was any time spent talking to the researcher, including questions of help.

Similarly, there were two sub-variables of total time playing the instruments: task directed play and exploratory play.

Task directed play was defined as play directed towards completion of the task and towards other members of the group. This definition included the presentation of ideas directly on the instruments, and was viewed as an alternative means of sharing the social reality.

Exploratory play refers to the exploration of the sound materials, and was seen as being directed towards the individual, or 'playing for oneself'. This type of play was not seen as contributing to a mutual understanding of the task, and did not move the group closer towards establishing shared understanding or towards the completion of the task.

To assess the possible effects of the **gender** composition of the collaborating group in terms of verbal and musical interaction and subsequent group performance, the type of group in which the children were placed was coded as consisting of all boys, all girls or mixed gender.

6.6.4 Children's Questionnaires

In this study, the children were required to complete a series of questions measuring their enjoyment of school music lessons, the extent of their musical experience outside the classroom, whether they perceived school music to be more appropriate for one gender than the other, which of the four musical instruments in front of them they would most like to play, whether or not they enjoyed working in groups, and with which gender they preferred to work. This was designed to reveal any potential gender differences which may help shed light on differences in interaction patterns and group productivity, and is presented in full below.

1. Do you like school class music lessons?
2. Do you have any extra curricular musical activities?
3. Do you think music is more for boys, more for girls or do you think it is for both?

4. From the instruments in front of you, which one would you most like to play?

5. Do you like working in groups?

6. Do you prefer working with boys or girls or both?

6.6.5 Procedure

On entering the room, the children were asked to complete a questionnaire individually. They were informed that there was no right or wrong answer for any of the questions, and that none of their teachers would be shown what they had written. Each question was read aloud and any problems clarified, to ensure a complete understanding. The remaining procedure was as for Study 1.

6.6.6 Assessment of the Compositions

The assessment took the same form as in Study 1. Again, three raters were asked to score the 22 compositions using the rating scale, and a highly significant correlation was obtained (Rater 1 & Rater 2: $r = .79$; $p < .001$; Rater 1 & Rater 3: $r = .81$; $p < .001$; Rater 2 & Rater 3: $r = .74$; $p < .001$), suggesting adequate reliability of the scores. The group score was the mean mark awarded to each of the compositions by the three raters.

6.7 Results (2)

6.7.1 Verbal and Musical Interaction

Pearson correlations were carried out between the process variables and the group score, and the results of these are presented in Table 6.4. It can be seen that there are significant relationships between the amount of task directed talk and task directed play occurring during the collaborative working period and the group score. No relationship was found between exploratory play, off task talk, interaction with the researcher, the time spent reading the story aloud and the group score.

Pearson Correlations Between the Process Variables and the Group Score

Table 6.4

Process variables	Group score (N=22)	
	r	p
Task directed talk	.47	.01
Task directed play	.44	.02
Exploratory play	-.29	ns
Off task talk	-.23	ns
Interaction with researcher	-.16	ns
Reading story	.22	ns

Table 6.5 shows the result of a repeated measures t-test to assess potential differences in the total amount of talk and play occurring among the children during the collaborative working period. The figures suggest that there was significantly more talk than play. The standard deviations are large, indicating a high degree of variability among the groups.

Talk and Play

Table 6.5

	Mean (seconds)	S.D.	t	df	p
Total talk	155.58	131.28			
Total play	116.81	70.60	2.30	87	.02

6.7.2 Gender Composition of the Groups

A multivariate analysis of variance (MANOVA) was carried out to assess possible differences among the three types of group in the amount and type of verbal and musical interaction. Table 6.6 presents the results of this.

Verbal and Musical Interaction by Group Type

Table 6.6

Pillai's Trace	Value			F	p
	.214 (df 12)			1.62	.09
Univariate statistics	**Means (seconds) (S.D.) (df 1)**			**F**	**p**
	Boys	**Girls**	**Mixed**		
Exploratory play	51.71 (43.52)	40.04 (50.97)	18.56 (39.69)	4.32	.02
Researcher interaction	9.29 (20.33)	.1.43 (1.83)	3.64 (5.89)	3.31	.04
Task directed talk	103.42 (90.45)	74.32 (66.92)	74.06 (68.93)	1.34	ns
Reading story	64.04 (76.33)	73.25 (68.16)	62.86 (99.09)	.13	ns
Off task talk	4.75 (12.86)	0.54 (1.97)	3.17 (9.75)	1.41	ns
Task directed play	75.96 (57.16)	95.61 (57.92)	76.58 (48.52)	1.22	ns

From Table 6.6, it can be seen that the overall differences among the three types of group are not statistically significant. However the univariate statistics suggest that there was a significant difference in the amount of exploratory play and in the amount of interaction with the researcher among the three types of group. Given that the overall difference among the three groups was not statistically significant, these univariate findings should be interpreted with caution. Furthermore, the amounts of interaction with the researcher are very low with large standard deviations. The significant differences in this instance may be due to one outlying data point.

A one way analysis of variance was carried out to assess the extent to which the three types of group differ in terms of group score, and this is presented in Table 6.7. The means show that the all-girl groups were awarded higher marks than the mixed gender groups, who in turn were awarded higher marks than the all-boy groups, although this difference does not reach statistical significance.

Group Score by Group Type

Table 6.7

	Mean (seconds) (S.D.)			F	p
	Boys	Girls	Mixed	df(2,19)	
Group score*	3.14 (.80)	3.60 (.74)	3.29 (.76)	2.46	.09

maximum score = 5

6.7.3 Boys and Girls in Mixed Gender Groups

To examine the interaction patterns in the mixed gender groups, a multivariate analysis of variance was carried out. Table 6.8 presents a summary of the findings.

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Boys and Girls in Mixed Gender Groups

Table 6.8

Pillai's Trace	Value		F	p
	.20 (df 8)		.85	.57
Univariate statistics	**Means (seconds) (S.D.) (df 1)**		**F**	**p**
	Boys	**Girls**		
Total talk	99.11 (109.19)	187.67 (150.11)	4.10	.05
Read	34.83 (91.90)	90.89 (100.54)	3.05	ns
Task directed talk	56.44 (53.42)	91.67 (79.20)	2.45	ns
Off task talk	4.00 (10.87)	2.33 (8.73)	.26	ns
Interaction with researcher	3.94 (6.73)	3.33 (5.09)	.10	ns
Total play	99.50 (69.85)	90.33 (60.87)	.18	ns
Task directed play	71.78 (47.53)	81.39 (50.40)	.35	ns
Exploratory play	27.72 (52.68)	9.39 (17.03)	1.97	ns

Table 6.8 indicates that, within the mixed gender groups, there was no significant

difference between the genders on the process measures taken as a whole.

Examination of the univariate statistics suggests that the girls engaged in significantly

more total talk than the boys, however this should be interpreted with caution. The

means suggest that the girls engaged in more task directed talk and spent more time reading the story aloud than the boys, but these differences do not reach statistical significance. On the other hand, the boys engaged in more exploratory play than the girls, however again, this difference is not statistically significant.

6.7.4 Children's Questionnaires

Table 6.9 below provides a summary of the information obtained from the children's responses to the questionnaires.

Children's Responses

Table 6.9

	GIRLS (46)				BOYS (42)			
1. Do you like music lessons?	Y	N . OK			Y	N	OK	
	42	2	2		19	16	7	
2. Any other musical interests?	Y	N			Y	N		
	39	7			23	19		
3. Is music for boys, girls or both?	B	G	Bo		B	G	Bo	
	0	0	46		0	0	42	
4. Which would you most like to play? *	X	D	C	T	X	D	C	T
	40	4	0	2	8	32	1	1
5. Do you like working in groups? **	Y	N	S		Y	N	S	
	26	3	17		34	2	6	
6. Do you prefer groups with boys, girls or both?	B	G	Bo		B	G	Bo	
	1	21	24		24	0	18	

* X refers to the xylophone, D the drum, C the cabasa and T the triangle.

** S stands for 'sometimes'.

Table 6.9 suggests that more girls than boys reported that they enjoy their school music lessons, and more boys than girls stated that they did not enjoy their music lessons. A chi-square reveals these differences to be significant (chi-square = 21.9, df

= 1, p < .001) (the categories 'No' and 'OK' were collapsed because more than 20% of the cells had expected frequencies of less than 5).

Significantly more girls than boys have musical interests outside of the classroom (chi-square = 9.51, df = 1, p < .05 respectively), although it should be noted that more than half of the boys reported having extra-curricular musical activities. Both boys and girls explicitly stated that school music was not perceived as being more appropriate for one particular gender - all children felt it was appropriate for boys and girls.

When asked which of the instruments they would most like to play, the majority of the girls chose the xylophone whereas the majority of the boys chose the drum. A chi-square suggests that these differences in instrument choice are highly significant (chi-square = 40.80, df = 1, p < .01) (drum, cabasa and triangle categories were collapsed because more than 20% of the cells had expected frequencies of less than 5).

Both boys and girls reported that they like working in groups, and both genders reported preferring to work with either their own gender or a combination of both. Significant differences were again observed in both of these questions (chi-square = 4.90, df = 1, p < .05, with categories 'No' and 'Sometimes' collapsed; and chi-square = 31.40, df = 1, p < .01, with categories 'Girls' and 'Both' collapsed, respectively).

6.8 Discussion (2)

6.8.1 Verbal and Musical Interaction

Evidence is provided for the occurrence of interaction through music, and it seems that this form of interaction is important for the productivity of the group. However, in this particular study, communication through music did not replace verbal interaction: both were important for group productivity. Furthermore, there was more total talk than total play during the collaborative period. These findings may be due to the nature of the task. The compositions were direct representations of external

events and the stimulus was highly verbal. It could be that in these types of representational tasks, the child's musical ideas are adequately expressed verbally. Manipulation of the task is therefore necessary and is examined further in Chapters 8 and 9.

6.8.2 Gender Composition of the Groups

It was suggested that there may be differences in the amount and type of verbal and musical interaction among the three types of group. The all-boy groups were found to engage in significantly more exploratory play than the mixed groups, with the all-girl groups lying between the two. Given girls' preference for co-operation in group situations and boys' more individualistic working style (Thompson, 1995), it would perhaps have been expected that the all-girl groups would engage in the least amount of exploratory play, given that to engage in high levels of exploratory play is by its definition (6.6.3) to adopt an individualistic working style. The findings of the present study suggest that boys demonstrated an individual working style when grouped with other boys, but not so much as when in a group with girls. Similarly, girls explored the instruments (to a lesser degree than boys) when in all girl groups, but did so far less when grouped with boys.

The all-boy groups were found to interact with the researcher significantly more than the all-girl groups, with the mixed gender groups falling between the two. Interaction with the researcher represented questions of help and this, combined with the higher levels of exploratory play in all-boy groups suggests that the boys were more unsure of how to tackle the task than the girls. The boys in the mixed gender groups showed higher levels of exploratory play than the girls. Although this difference did not reach significance, it is again perhaps indicative of boys' uncertainty over how to approach the task. A change of task would shed further light on this (this issue is looked at in Chapters 8 and 9).

Attention was also paid to the dynamics within mixed gender groups and it was questioned whether one gender would consistently take control of the task. Total

verbal activity was significantly greater for girls than boys. The girls also spent more time reading the story aloud and on task directed talk than the boys, but these differences did not reach significance. These findings are in line with the findings of female verbal domination in the mixed gender groups in Study 1.

It was further suggested that the gender composition of the group may affect the quality of the musical product, as assessed by the rating scale. No significant differences were found among the groups, although the means suggest that the all-girl groups achieved the highest marks, followed by the mixed gender groups then the all-boy groups. This ties in again with the idea that girls may be more able to productively work on this type of task, or at music in general, although any conclusions drawn from this should be done so with caution.

6.8.3 Children's Questionnaires

It was suggested that the children's responses to a series of questions about their level of interest in music would help clarify such issues as gender stereotyping and perceived musical ability. In this study, none of the children reported that they believed music to be more appropriate for one particular gender: all children stated that music was for everyone. Taking this in isolation would shed no light on possible explanations for the observed gender differences in interaction patterns and in productivity discussed above. However, while the children gave no explicit gender stereotyping, their behaviour (as previously discussed) and responses to the other questions suggested otherwise. Significantly more girls than boys reported that they enjoy their school music lessons, and significantly more girls than boys participate in extra curricular musical activities. Their choices of the instruments they would most like to play from the four presented to them also showed an effect of gender. The majority of the girls said they would choose the xylophone, whereas the majority of the boys said they would choose the drum. The gender difference in their choice of instruments was significant, and supports previous research into the gender stereotyping of musical instruments (e.g. O'Neill & Boulton, 1996).

The fact that a gender effect was found in these key areas suggests that there is gender stereotyping at a level that is perhaps not so explicit as stating that music is more for boys or for girls. A possible explanation for this difference could be simply that the children did not want to report that they believed music was more appropriate for one gender over another. Alternatively, participation in extra curricular musical activities in children as young as those in the study may depend more on the influence of the child's parents than on the actual child. Therefore, the fact that more girls have extra curricular music may be more a function of parental encouragement than of any gender stereotyping on the part of the actual child. Parental influence may explain this particular finding, but it remains unclear why the girls would prefer to play the xylophone, the boys the drum.

With respect to the gender composition of the collaborating group, the children's responses suggest that they prefer to either work solely with their own gender or with a combination of their own and the other. They do not, however, prefer to work with members of the opposite gender. The fact that they chose their own gender over the other is not particularly surprising, as at this age, same gender friendships are more common than are cross gender friendships (see Hartup, 1983; Thorne, 1986; and Erwin, 1993). However, the finding that they seem to like working in a mixed group is positive, given that the questionnaire study with primary teachers (Chapter 5) showed how teachers tend to put children in mixed gender groups. Given this, it remains possible that the children's answers were merely responses to the demand characteristics of the situation: perhaps the children who were in a mixed group at the time of filling in the questionnaire felt obliged to say that they liked working in mixed gender groups. Or they may have felt that because they were in mixed groups for much of the time at school, that was how they should be grouped and they therefore should like it.

It is difficult to know from these questionnaires exactly how much is due to actual opinions or beliefs and how much relates to how the children feel they should answer. Either way, it provides an interesting insight into children's music education.

6.9 Conclusions

To summarise, Study 2 supports the claim that communication is important for group productivity. However, while verbal communication was related to productivity, there was evidence also for the occurrence of communication through music and for its importance for the successful completion of the task. Communication through music did not replace verbal communication as a method of sharing ideas, however it as been suggested that this may be due to the verbal nature of the task. The findings of Studies 1 and 2 have highlighted some important gender differences, such as the verbal domination of females in mixed gender groups. Overall the results suggest that the girls were more able to engage successfully in the task than the boys and it is therefore important to establish whether this is because they are or are believed to be more competent than boys at music in general, or just at this particular task. A change to the task administered to the children will help to clarify firstly the role of communication through music in the production of a group music composition, and secondly the gender issues raised in the use of a structured, representational music task.

It is important to remind the reader that the findings of both Studies 1 and 2 are discussed in relation to the scores yielded by the specially devised rating scale. It has been noted in Chapters 3 and 5 that assessment in music cannot be objective, and at best one can hope for intersubjective ratings. That is, by providing guidelines of criteria, one can aim to achieve similar ratings of each composition from a number of assessors. A different set of criteria may give rise to a different set of results. The highly significant correlations between the three raters in each of the studies suggest that the rating scale was sufficiently reliable for the research purposes. However the question of its validity remains, and this is the focus of the following chapter.

CHAPTER 7: PRIMARY TEACHERS' ASSESSMENTS OF MUSIC COMPOSITION: THE SELECTIVITY RATING SCALE AND INTUITIVE RATINGS

7.1 Introduction

Chapter 6 presented the findings of two studies involving a representational music composition task, and the process variables were discussed in relation to evaluations of the finished music composition. It was argued that the assessment of composition should be intimately related to the task, and so the finished products were assessed by means of a rating scale devised specifically for the two studies. As discussed in Chapter 6 (6.2.4), the essence of the rating scale is the extent to which the children displayed selectivity of both the actions and events from the story and of the instruments chosen to represent these. While adequate reliability of the scale was established, questions were raised about its validity, and it is therefore important to establish whether it represents a valid means of assessing the music compositions in these studies.

There are many ways of establishing the validity of a test. Concurrent validity is assessed by correlating the test with other tests that are known to be valid measures of the criterion. If a comparable method of assessing music composition can be found, the selectivity rating scale could be measured against this. There have been a number of approaches to the assessment of creativity which can be summarised into three main research areas: psychometric research, which uses both intellectual and personality traits as a basis for the design of measurement tools; cognitive research, which centres on identifying mental processes and underlying mental structures; and environmental research, which focuses on the interaction of the creator with the setting in which the creative work occurs (see Webster, 1992, for a discussion of this). None of these measures are appropriate for assessing the quality of the compositions produced by the children in Studies 1 and 2, as they are not direct

measures of the quality of a composition. Thus there is no comparable rating scale against which to assess the concurrent validity of the selectivity rating scale.

Predictive validity is established by obtaining correlations between the test given on one occasion and some later criterion, for example correlating scores obtained on an intelligence test at age 11 with performance at age 16 at GCSE examination. This is not a practical approach to take here, given the limitations of the time scale of the present research. The present research requires an immediate valid assessment of the compositions.

An assessment of content validity is mainly applicable to attainment scores. If the items of a test can be shown to reflect all aspects of the subject being tested then it is valid given that the instructions are clear. For example, if in a mathematics test of the ability to subtract, one of the items is 6-2 = ?, it is hard to argue that the item is not valid. This approach is only useful for tests where, as in mathematics, the subject matter is clear, and it is inappropriate to apply this approach to the assessment of music composition where the subject matter is far from clear.

A test is said to have construct validity if the results of using the test fit hypotheses concerning the nature of the test variable, that is theoretically-derived hypotheses. The better the fit, the higher the construct validity. The theories discussed in Chapter 2 suggest what can be expected of children at ages 9 and 10. The compositions could be studied with reference to these theories to see whether the children are working at a level that is expected of them. However, this approach would appear to assess the elements of the composition, and how well the children have mastered the use of these elements, rather than the experience of the composition as a whole. It does not provide an indication of the quality of the composition.

With the above methods in mind, one possible test of the validity of the rating scale is primary music teachers' assessments of the compositions based upon their intuitive ratings. The teachers' intuitive ratings refers to the marks the teachers would award each of the compositions after having been told exactly what the children were asked

to do in the composition task. In this instance the teachers would not be given a set of pre-determined criteria. Rather they would be using their own judgements which would have developed from their training and classroom experience. If a match is found between the scores each teacher gives using the rating scale and those given using their own methods, then adequate validity can be inferred.

Furthermore, it is of interest to examine the level of agreement between the teachers when they are using the selectivity rating scale as compared with their intuitive ratings. If the selectivity rating scale proves to be a more reliable method than teachers intuitive ratings, further justification of the selectivity scale's use for the assessment of the children's compositions would be provided.

Thus the aim of this study is to compare teachers' ratings of a selection of the compositions from Study 2 using the selectivity rating scale with their intuitive ratings of the compositions. It is predicted that the two methods will be significantly related, in that the scores each teacher gives using the rating scale will be related to the scores they give using their intuitive ratings. It is further predicted that using the rating scale will prove significantly more reliable than their intuitive ratings.

7.2 Method

7.2.1 Participants

An opportunity sample of 12 primary music teachers (4 males, 8 females) was selected from three primary schools in Monmouthshire. All of the teachers were general class teachers of Years 3-6. They all taught class music lessons, but none were specialist musicians.

7.2.2 Materials

From Study 2 (Chapter 6), ten groups of children were selected. Of these ten, the scores given by the three raters in Study 2 to their finished compositions using the

selectivity scale ranged from 1-5. This ensured a range of low, medium and high scoring compositions. Four of the groups were mixed gender groups, three consisted of all girls and three consisted of all boys. The final performances of these ten groups were put onto four videotapes, each tape containing the groups in a different randomised order.

The teachers were all given a copy of the selectivity rating scale (see 6.2.4).

7.2.3 Procedure

The teachers were tested individually. Each was asked to watch the videos of the compositions of the ten groups of children, and to provide a score for each group's performance using the selectivity rating scale. The teachers were then asked to score each group using their intuitive ratings. Specifically, they were asked to give the compositions a mark out five "based on how well you think the children have done what they were asked to do". The order of this was counterbalanced and the teachers were presented with the compositions in a different order for the first and second viewings. Each of the four videotapes was used equally. While scoring the compositions using their intuitive ratings, the teachers were asked to note down the elements of composition that they believed to be important, and to give reasons why they believed the groups deserved the marks they had been awarded.

7.3 Results

7.3.1 The Selectivity Rating Scale vs. Intuitive Ratings

To assess whether the marks the teachers gave using the rating scale were related to the marks they gave using their intuitive ratings, a series of Pearson correlations was carried out for each of the ten compositions. The results are presented in Table 7.1, and suggest that there was little relationship in general between the marks the teachers gave when using the scale and those they gave using their intuitive ratings. The marks given using the two methods for compositions 1 and 2 were the exception, showing a

significant relationship. In Table 7.1, N = 12, that is 12 teachers were assessing each of ten compositions.

Relationships Between Marks Given by Teachers Using the Selectivity Rating Scale and Marks Given Using Their Intuitive Ratings

Table 7.1

Composition	Pearson correlation between selectivity rating scale and teachers' intuitive ratings (N=12)	
	r	p
1	.74	.01
2	.67	.02
3	.41	.19
4	.00	1.00
5	.09	.78
6	.17	.59
7	.45	.15
8	.46	.13
9	.13	.70
10	.12	.72

7.3.2 The Reliability of the Selectivity Rating Scale vs. Intuitive Ratings

To assess whether the marks the teachers gave using the rating scale were significantly more reliable than those when using their intuitive ratings, further Pearson correlations were carried out among each of the raters in each of the two conditions (selectivity scale and intuitive ratings). Mean Pearson correlations for each of the two methods were calculated, and are presented in Table 7.2.

Inter-Rater Reliability of the Selectivity Rating Scale vs. Teachers' Intuitive Ratings

Table 7.2

Selectivity Scale		Teachers' Intuitive ratings	
Mean r	p	Mean r	p
.75	.01	.62	.05

These results suggest that the level of agreement among the raters was greater when they were using the rating scale to assess the compositions than when they were using their intuitive ratings. To establish whether this difference between the two methods was significant, Fisher's zr transformation was carried out on the two mean Pearson correlations. This is presented below.

$$z = \frac{zr_1 - zr_2}{\sqrt{1/(N_1 - 3) + 1/(N_2 - 3)}}$$

$$z = .53$$

For this to be significant at the 5% level, a value of 1.57 is required, thus in this instance, the z value of .53 suggests that the two mean Pearson correlations do not differ significantly from each other.

7.3.3 The Teachers' Intuitive Ratings

While making assessments of each of the ten compositions based on their intuitive ratings, the teachers were asked to note down why they believed the compositions deserved the marks they were given, and also to note general criteria they used in their assessments.

7.3.3.1 Comments on each of the compositions

A summary of the teachers' comments on each of the ten compositions is as follows:

Composition 1:   Seemed musically unorganised and rather random.

Showed some togetherness as a group.

The children shared responsibility of the task. Each child took a

turn at reading the story and playing the instruments.

Composition 2:   An exciting and engaging composition.

Very expressive.

The children appeared to be enjoying themselves.

The musical elements appeared to be selected rather than

occurring purely by chance.

This has obviously been rehearsed well and is more than an

improvisation of ideas.

Composition 3:   A sense of unity and togetherness as a group.

The children seemed to have collaborated and enjoyed the work.

A good structure to the composition.

The children listened well to each other.

Composition 4:   Seemed improvised rather than composed.

Little togetherness as a group.

No organisation.

All children in the group played instruments all of the time,

especially the drummer.

Little thought about which elements from the story should be

represented by which instruments.

Composition 5:   Evidence of collaboration among group members.

These children worked well as a group.

An original piece of work.

The children attempted to fit their instruments in with the others.

All of the children tried to represent everything from the story.

Composition 6: Far too narrative with little musical activity.

Some originality when the children played their instruments, but

this did not happen often enough.

Too much talking.

Composition 7: Appeared under-rehearsed.

The children needed to give each other cues when to come in

which disrupted the flow of the piece.

Some original ideas.

Composition 8: This group were co-ordinated and very together.

Obvious collaboration among the children.

They have put a great deal of thought into the piece.

Composition 9: These children were not listening to each other.

Each child appeared to be trying to do their own representations of

the story, rather than trying to fit in with the other group members.

They had obviously enjoyed what they were doing.

Composition 10: Musically, this was very disorganised and random.

Some originality which made the piece more interesting.

As a group, they worked very well together.

7.3.3.2 General criteria for assessing music composition

The teachers in the study were asked how they evaluate group compositions on a daily

basis, and this information is summarised below.

Teacher 1: The children present their compositions to the rest of the class, either live or recorded on tape. The group themselves, and the whole class, then discuss the composition. This discussion is guided by the teacher.

Teacher 2: The most important factor is how well the children work in the group. Does each child contribute ideas? How innovative are these ideas? Is there enjoyment of the composition process?

Teacher 3: How well the children work together as a group. Do they all offer suggestions, collaborate and present original ideas?
The key to working in a group on a music composition is how well the children listen to each other, rather than simply doing their own thing. Their ideas must fit in with the others'.

Teacher 4: It depends on the nature of the task. How well have the children done what they were asked to do?
Have the children learned from what they have been taught in class and applied these ideas to their compositions?

Teacher 5: Social as well as musical progression.
Sometimes the composition is related to other areas of the Curriculum: for example, the children make be asked to make up a dance to their composition to see how well they have understood the concept of rhythm, tempo, beats and so on.

Teacher 6: Is there a high level of collaboration? Do all children share their ideas and contribute to the group composition?
How well do they communicate with each other during the performance?

Ask the children themselves what they think of their composition, then ask the whole class to discuss it.

Teacher 7:   Look for evidence of collaboration among the children.

How well does the group work together?

Listen to the elements within the composition - how organised are they, are they spontaneous or are they well-developed ideas?

How well do the ideas fit together?

Teacher 8:   Look for whether the children have been able to work collaboratively to produce a thoughtful piece of music which has been discussed and evaluated by all of them.

Pupils' self and other assessments.

Teacher 9:   Whether the whole group is involved and the extent of their collaboration and sharing of ideas.

How much the children have enjoyed the work.

How well has the group done what they were supposed to do.

Teacher 10:   How well the children collaborated, listened to each other and shared ideas and task responsibility.

How original are the ideas?

Ask the children themselves what they think of their compositions.

Teacher 11:   How structured the musical ideas are.

How well the children have mastered the objectives of the lesson.

It depends on the nature of the task.

Teacher 12:   Ask the children how they feel about their work.

Have a class discussion about each of the compositions.

How well the group has worked and whether there was collaboration and sharing of ideas.

7.4 Discussion

7.4.1 The Selectivity Rating Scale vs. Intuitive Ratings

For validity of the selectivity rating scale to be established, the marks teachers assigned to the children's compositions using this scale were compared with the marks they gave based on their own set of criteria. It was predicted that the marks given using the two methods would be significantly related to each other. Relationships between the two methods were found only for compositions one and two and no relationships were found for the remaining eight compositions. This suggests that the selectivity rating scale had little in common with the marking scheme the teachers were using.

To understand this a little more, the teachers were asked to provide comments on each of the compositions and also to state features they believed to be important when assessing music composition on a regular basis. The teachers' comments are provided in detail in the Results section and are summarised here in four main points:

Musical organisation: a number of the teachers mention the necessity of a good structure to the piece, and the importance of the organisation of musical ideas. Within this, the musical ideas should be well-developed as opposed to spontaneous, and the piece should appear rehearsed.

A sense of unity: related to the above point, the group should display 'togetherness' and the children within the group should listen to what the other members are doing. Each child's playing should relate to, and fit in with, the activity of the others.

Task responsibility: it is seen as important that each child within the group takes a turn at playing, and that each child contributes equally. A number of the teachers look for whether one child is dominating the playing, or whether play is shared among the group. This is seen as evidence of collaboration.

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Musicality: a good composition should be exciting, engaging and expressive. Ideas should be original, but within the constraints of the nature of the task. The enjoyment of performing the piece is important.

On the surface, the criteria the teachers present do not seem to differ substantially from those of the selectivity scale. The main focus is different in that the selectivity scale concentrates one's thinking on the extent to which ideas are selected, whereas the teachers tended to take a more holistic approach. They talk about enjoyment of the task, which is not something the selectivity scale considers, and this is perhaps evidence that the teachers are taking a more child-based approach rather than the product-centred orientation of the research. This is not all that surprising, given that a teacher needs to be concerned with the child's understanding and enjoyment, and ways of improving these. The selectivity scale was devised in order to study the performance of the composition in relation to the activity of the children within the group during the collaborative working period. The teachers' approach is to take the two together.

This relates to the issue of whether the composition process and the resulting musical product can or should be separated. The present research has essentially separated process from product, so perhaps teachers' ratings are not the best way of establishing validity given that the focus of research and teaching has been shown to differ. That is, in Chapter 3 (3.2) and Chapter 5 (5.3.4) it was suggested that the teacher is concerned far more with the development of each child over a long period of time, whereas the present research was concerned with assessing a product (the finished composition) independently of any learning or development that may have occurred. The two approaches are fundamentally different in the sense that the teacher and the researcher are working from different starting points. And, if assessment is seen as a means to an end, the two ends are different also. The teacher's objective is the progression of the child, seeing how the child improves and develops over the years spent at the school. The researcher's objective is to establish a set of valid scores for the compositions which can then be related to each group's collaborative working

period. Looked at in this way, it is perhaps not surprising that the teachers' intuitive ratings are largely unrelated to the ratings they gave using the selectivity rating scale.

7.4.2 Reliability of the Selectivity Rating Scale vs. Intuitive Ratings

It was predicted that the marks the teachers gave to the compositions when using the rating scale would be significantly more reliable than when they were using their intuitive ratings. The data suggests that the rating scale was a more reliable method, but that the reliability of the two methods did not differ significantly. This could be explained by the fact that the twelve teachers gave very similar thoughts on what factors they considered to be important for scoring the compositions, and they were generally looking out for similar features. That is to say that their training and classroom experience has led them to form similar judgements on what constitutes a good composition, and that using this method is as reliable as assessing compositions with a set of pre-defined criteria, in this instance the selectivity rating scale.

7.4.3 Conclusions

The assessment of music composition is fraught with difficulties. This point was highlighted by a review of the relevant literature (Chapter 3) and the questionnaire data (Chapter 5) and has been reiterated here. The main difficulty in this study is the discrepancy between the child-centred approach of the teacher and the product-based approach of the present research. Anecdotally, nine of the twelve teachers expressed discomfort at scoring the compositions either with the rating scale or using their intuitive ratings. They stated that this is not normally how they approach assessment, preferring instead to look at the composition process as well as the product. For teaching purposes, a separation of process and product moves away somewhat from the aim of a rounded generalist music education. The criteria the teachers suggest to be important are vague and ill-defined, again suggesting that the teacher does not assess simply the group product.

Given the high degree of reliability of the selectivity rating scale found both here and among the three raters in Studies 1 and 2, it seems sensible to conclude that for the present research purposes, the rating scale is adequate. It is task specific and assesses aspects of composition that have been shown to be important, such as the selection and rejection of sounds, the structuring of ideas, group organisation, a sense of unity and so on. The discrepancy between the rating scale and the teachers' intuitive ratings serves to further highlight the problematic nature of assessing music composition.

CHAPTER 8: "COMPOSE A PIECE OF MUSIC WITH A BEGINNING, A MIDDLE AND AN END": A FORMAL MUSIC COMPOSITION TASK

8.1 Introduction

The music composition task in Chapter 6 involved the direct representation of external events, and the stimulus was highly verbal (a story about a family's trip to the seaside). It was suggested that, with this type of task, the children's ideas may be adequately expressed verbally, as a relationship was found between both verbal and musical interaction and group productivity. It is necessary to examine an alternative task to test this hypothesis. The formal music composition task to be used in the present study requires the children to compose a piece of music "with a beginning, a middle and an end". It is proposed that with a task of this kind, which requires the children to work directly with musical form and structure rather than representations, communication of ideas through music will have a significant relationship with group productivity and that verbal interaction will be both less prevalent and less important.

On the basis of the previous findings of female domination in mixed gender groups (Chapter 6), it is important to examine whether these findings were also due to the nature of the task. Three key gender issues are examined here: whether one gender consistently takes control of the task verbally and non-verbally in the mixed gender groups; possible differences in communicative style between the genders; and the relative productivity of single and mixed gender groups.

8.2 Method

8.2.1 Participants

A sample of 72 children was taken from a second primary school in Monmouthshire from a mixed catchment area, consisting of 36 girls and 36 boys, aged 9 - 11 years.

The children were randomly divided into 18 groups of 4 by their class teachers; 6 groups of 4 girls, 6 groups of 4 boys and 6 groups of mixed gender fours consisting of 2 boys and 2 girls.

8.2.2 Composition Task

The children were asked to compose a piece of music "that has a beginning, a middle and an end". This was a formal music composition task which contained elements of structure and form, but was not directly representational like that in the previous study (Chapter 6). The children were given the same musical instruments as for Study 1.

8.2.3 Assessment of the Compositions

For the purposes of this study, a validated series of rating scales was used to assess the compositions. Hargreaves, Galton & Robinson (1996) devised a series of 14 bipolar constructs on the basis of teachers' comparative judgements of children's creative work. This study is described in detail in Chapter 3 (3.6). The 10 evaluative scales were used in the present study and are presented below. This method of assessment was chosen because Hargreaves et al's rating scales are directed towards capturing the essence of a continuous piece of music. The selectivity rating scale discussed in Chapters 6 and 7 was inappropriate here because it focussed specifically on one key element (the selection of sounds). A continuous piece of music is about much more than this one element, and Hargreaves et al's scales provide a much broader and more relevant assessment of the compositions in this instance. This is in line with the idea of task specificity discussed in Chapters 3 and 5 (5.3.4).

Each of the 18 compositions was rated by three independent raters. Highly significant correlations were obtained (Rater 1 & Rater 2: $r = .97$, $p < .01$; Rater 1 & Rater 3: $r = .82$, $p < .01$; Rater 2 & Rater 3: $r = .76$, $p < .01$), suggesting adequate reliability of the scores.

UNEVOCATIVE	1 2 3 4 5 6 7	EVOCATIVE
DULL	1 2 3 4 5 6 7	LIVELY
UNVARIED (repetitive, limited)	1 2 3 4 5 6 7	VARIED (wide ranging)
UNORIGINAL (safe, conventional)	1 2 3 4 5 6 7	ORIGINAL (imaginative, innovative)
INEFFECTIVE	1 2 3 4 5 6 7	EFFECTIVE
UNINTERESTING	1 2 3 4 5 6 7	INTERESTING
UNAMBITIOUS	1 2 3 4 5 6 7	AMBITIOUS (adventurous)
DISJOINTED	1 2 3 4 5 6 7	FLOWING (articulate)
AESTHETICALLY UNAPPEALING	1 2 3 4 5 6 7	AESTHETICALLY APPEALING
TECHNICALLY UNSKILFUL	1 2 3 4 5 6 7	TECHNICALLY SKILFUL

A factor analysis was carried out on the scales to assess whether the set of constructs was measuring just one underlying factor, as Hargreaves et al. discovered. The final statistics suggest that there is indeed just one factor, with an Eigenvalue of 7.67, therefore 76.7% of the variance in the scores is explained by this factor. The factor matrix is presented below.

	Factor 1
Aesthetically appealing-unappealing	.90
Ambitious-unambitious	.87
Effective-ineffective	.95
Evocative-unevocative	.73
Flowing-disjointed	.70
Interesting-uninteresting	.94
Lively-dull	.90
Original-unoriginal	.93
Technically skilful-technically unskilful	.90
Varied-unvaried	.91

As Hargreaves et al. suggest, this factor could be measuring the 'goodness', or overall effectiveness, of the compositions. In light of this, factor scores were awarded to each of the compositions. Thus the 'group score' refers to the factor score awarded to the composition and can be thought of in terms of how effective the composition was.

8.2.4 Children's Questionnaires

The children were given the same set of questions as reported in Study 2 to assess their participation in, and enjoyment of, school music lessons and extra-curricular musical activities.

8.2.5 Procedure

The general procedure was as for Study 1. In terms of the composition task, the children were asked to work together to compose a piece of music that has a beginning, a middle and an end. Again it was established beforehand that this was a task with which the children were familiar.

8.2.6 Analysis of the collaborative work

The process measures discussed in Chapter 6 (6.6.1) were observed here, except of course the variable 'read' was not applicable. In this instance, the process variables were task directed talk, off task talk, interaction with researcher, task directed play and exploratory play.

8.3 Results

8.3.1 Verbal and Musical Interaction

Table 8.1 shows the Pearson correlations between the process variables and the group score. From this table, it can be seen that there is a significant relationship between

task directed play and the group score. No relationship was found between the amount of task directed talk and the group score.

Pearson Correlations Between the Process Variables and the Group Score

	Group Score (N=18)	
Process Variables	**r**	**p**
Task directed play	.47	.05
Task directed talk	.33	ns
Exploratory play	-.18	ns
Off task talk	-.17	ns
Interaction with researcher	-.05	ns

Table 8.2 reports a repeated measures t test to examine the difference between the total amounts of talk and play occurring among the children during the collaborative working period. The results of the t test suggest that there is significantly more play than talk.

Talk and Play

Table 8.2

	Mean (seconds)	**S.D.**	**t**	**df**	**p**
Total talk	74.63	71.99			
Total play	241.76	100.19	10.71	71	<.01

8.3.2 *Gender Composition of the Groups*

A multivariate analysis of variance was carried out to assess possible differences among the three types of group in the amount of verbal and musical interaction. Table 8.3 presents a summary of these findings.

Verbal and Musical Interaction by Group Type

Table 8.3

Pillai's Trace	Value			F	p
	.301 (df 10)			2.33	.01
Univariate statistics	Means (seconds) (S.D.) (df 2)			F	p
	Boys	**Girls**	**Mixed**		
Task directed play	202.13 (96.09)	249.88 (86.26)	147.00 (88.30)	7.80	.01
Exploratory play	48.50 (50.82)	14.13 (22.18)	63.67 (84.56)	4.54	.01
Task directed talk	50.83 (47.72)	91.04 (80.91)	73.54 (67.03)	2.20	ns
Off task talk	.500 (2.45)	.000 (.000)	1.13 (4.14)	.99	ns
Researcher interaction	.458 (1.38)	4.54 (12.43)	1.83 (4.32)	1.78	ns

Table 8.3 suggests that there was an overall significant difference among the three types of group. Examination of the univariate data suggests that the three groups differed in the amount of task directed play and exploratory play. The all-girl groups

engaged in the most amount of task directed play, followed by the all-boy groups and the mixed gender groups. The mixed gender groups engaged in the highest level of exploratory play, followed by the all-boy groups and the all-girl groups.

A one way analysis of variance also looked at the extent to which the three types of group differed in terms of their group (factor) score, and this is presented in Table 8.4. The means suggest that the all girl-groups obtained the highest score, followed by the all-boy groups and lastly the mixed gender groups. The F and p values reveal that this difference does not reach statistical significance.

Group Score by Group Type

Table 8.4

	Mean (seconds) (S.D.)			F	p
	Boys	Girls	Mixed	df (2,15)	
Group score	-.276 (1.280)	.652 (.415)	-.373 (.912)	2.18	ns

8.3.3 Boys and Girls in Mixed Gender Groups

To examine the interaction patterns in the mixed gender groups, a multivariate analysis of variance was carried out. This is presented in Table 8.5. The means suggest that the girls spent more time on the task directed process variables than the boys, however the MANOVA suggests that none of the differences reached statistical significance.

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Table 8.5

Pillai's Trace	Value		F	p
	.10 (df 5)		.40	.84
Univariate statistics	Means (seconds) (S.D.) (df 1)		F	p
	Boys	**Girls**		
Task directed play	141.17 (68.49)	152.83 (107.40)	.10	ns
Exploratory play	68.08 (90.68)	59.25 (81.76)	.06	ns
Task directed talk	66.67 (73.58)	80.42 (62.26)	.24	ns
Off task talk	2.25 (5.75)	0.00 (0.00)	1.84	ns
Interaction with researcher	2.33 (5.52)	1.33 (2.84)	.31	ns

8.3.4 Children's Questionnaires

Table 8.6 below provides a summary of the information obtained from the children in the small questionnaire.

Children's Responses

Table 8.6

	GIRLS (36)				BOYS (36)			
1. Do you like music lessons?	Y	N	OK		Y	N	OK	
	26	1	9		19	6	11	
2. Any other musical	Y	N			Y	N		
interests?	21	15			22	14		
3. Is music for boys, girls or	B	G	Bo		B	G	Bo	
both?	0	0	36		0	0	36	
4. Which would you most like	X	D	C	T	X	D	C	T
to play? *	15	13	5	3	8	23	0	5
5. Do you like working in	Y	N	S		Y	N	S	
groups? **	30	0	6		20	5	11	
6. Do you prefer groups with	B	G	Bo		B	G	Bo	
boys, girls or both?	0	10	26		13	2	21	

* X refers to the xylophone, D the drum, C the cabasa and T the triangle.

** S stands for 'sometimes'.

Table 8.6 suggests that more girls than boys reported that they like their school music lessons, although half of the boys from the sample reported an enjoyment of school music. A chi-square reveals that the differences between the genders are not significant for this question (chi-square = 2.9, df = 1, p = .088).

More than half of the children reported that they participate in extra curricular musical activities, and there is equal participation of boys and girls (chi-square = .058, df = 1, p = .81). All participants reported that music is a subject for both boys and girls.

From the instruments placed in front of them, the girls said they would most like to play the xylophone or the drum, whereas the boys expressed a stronger preference for the drum. The categories drum, cabasa and triangle were collapsed because more than 20% of the cells had expected frequencies less than 5. The chi-square suggests no

significant difference between the genders in instrument choice (chi-square = 3.1, df = 1, p = .79).

The majority of the children appeared to like working in groups, and prefer to work with either their own gender or a mixture of the two genders. Again, the chi-square reveals the differences between the genders to be significant (chi-square = 6.51, df = 1, p < .05, with the categories 'No' and 'Sometimes' collapsed because more than 20% of the cells had expected frequencies less than 5; and chi-square = 15.90, df = 1, p < .01, with categories 'Girls' and 'Both' collapsed because more than 20% of the cells had expected frequencies less than 5, respectively).

8.4 Discussion

8.4.1 Verbal and Musical Interaction

The results support the hypothesis that with a formal music composition task, there should be a significant relationship between the amount of task directed play during the collaborative working period and group productivity. Also as predicted (8.1), no relationship was found between the amount of task directed talk and the group score. This suggests that while group productivity was dependent on the communication of ideas among the children, this communication was non-verbal, or specifically was communication through the musical instruments. Ideas were presented musically rather than verbally. This is further apparent in the finding of significantly less total talk than total play among the children during the collaborative working period.

8.4.2 Gender Composition of the Groups

It was questioned whether there were any gender differences in interaction styles and group productivity. It was also examined whether one gender consistently took control of the task in the mixed gender groups, as in the representational task of Studies 1 and 2 the girls were found to dominate verbally over the boys.

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Firstly, the all-girl groups engaged in significantly more task directed play than the mixed gender groups. The all-boy groups lay between the two. It would perhaps have been expected that, given the presence of girls in mixed gender groups, the all-boy groups would have engaged in the lowest levels of this activity, although the results could be explained by the claim that interaction in mixed gender groups can be problematic (see section 4.6). This is further supported by the finding that the mixed gender groups engaged in significantly more exploratory play than the all-girl groups, again with the all-boy groups lying between the two. The all-girl groups obtained the highest marks for their compositions, followed by the all-boy groups and lastly the mixed gender groups, although, as in Study 2, these differences did not reach statistical significance.

8.4.3 Mixed Gender Groups

This time, in the mixed gender groups, neither gender consistently took control of the task. The boys and girls may have felt on a more equal footing in this study than in Study 2 in terms of their ability to tackle the task. Perhaps this type of task was one to which the boys were better able to relate and may be more akin to the sort of music they enjoy. Or perhaps it was a type of task to which the girls were less able to relate. This requires further investigation.

These results show that neither gender appeared to benefit from being placed in a mixed gender group, and indeed that it was detrimental to the amount of co-operative, productive musical behaviour during the collaborative working period and also to the quality of the musical product. This was especially true for the girls, whose levels of co-operative play diminished dramatically when working in a mixed gender group as compared with an all-girl group. Their levels of exploratory, individualistic play, however, were far greater when in a mixed gender group.

8.4.4 Children's Questionnaires

As in Study 2 (Chapter 6), none of the children reported that they believed music to be more suitable for one particular gender. In contrast to Study 2, the children's responses to the other questions and their performance in the composition task seem to support this claim. More girls than boys reported that they like their school music lessons, although half of the boys from the sample also reported an enjoyment of school music. The difference between the genders was not significant in this instance. More than half of the children reported that they participate in extra curricular musical activities, and there is equal participation of boys and girls. These findings are in line with the conclusion that the boys and girls in this study may have felt on a more equal footing in terms of their ability to complete the task.

From the instruments placed in front of them, the girls said they would most like to play the xylophone or the drum, whereas the boys expressed a stronger preference for the drum. These differences, however, did not reach statistical significance. The majority of the children appeared to like working in groups, and preferred to work with either their own gender or a mixture of the two genders. These findings are in line with those of Study 2.

The finding that neither gender consistently dominated in the mixed gender groups was explained in terms of the nature of the composition task, and it was suggested that this was a task in which the boys were more able to successfully engage (as compared with that of Study 2). However, examination of the responses to the questionnaires suggests that the children in this study held weaker gender stereotypical ideas than the children in Study 2. Therefore, the results could simply be a function of the children themselves. As there was equal participation in extra curricular musical activities across the genders, and both boys and girls reported enjoying their class music lessons, it could be that no gender stereotypes existed within this sample of children. That is, the children perceived themselves, and were perceived by the other group members, to be equally competent at working on music composition tasks regardless of their gender.

8.5 Conclusions

To summarise, as in Study 2 (Chapter 6), this study shows the occurrence and importance of communication through music in the production of a group music composition. However, in contrast to Study 2, verbal interaction was not related to group productivity and was significantly less prevalent than interaction through music during the collaborative working period. In terms of the gender composition of the collaborating group, mixed gender groups did not function as well as the single gender groups, in both the composition process and the subsequent musical product. The all-girl groups engaged in more co-operative play, but only significantly more than the mixed gender groups, not the all-boy groups. It was suggested that these findings were due to the nature of the task. To add further weight to these claims, it is important to examine a further alternative task and this is the goal of Study 4. Study 4 will require the children to work on an emotion-based composition task, specifically they will be asked to "compose a piece of music that will make me happy". This task differs from the representational and formal composition tasks studied in Chapters 6 and 8 respectively in that it concentrates the children on the expression of emotions (see 1.2.2 for a discussion on the three distinct types of composition task).

CHAPTER 9: "COMPOSE A PIECE OF MUSIC THAT WILL MAKE ME HAPPY": AN EMOTION-BASED COMPOSITION TASK

9.1 Introduction

Chapters 6 and 8 have looked at children working on a representational and formal music composition task respectively. The present chapter presents the findings of children's collaborative work on an emotion-based composition task. In a study of a representational music composition task (Chapter 6), where the stimulus was highly verbal, both verbal and musical interaction were related to productivity. With a formal music composition task (Chapter 8), while musical interaction was related to productivity, verbal interaction was not. It was suggested that these differences were due to the nature of the task. It is therefore important to examine a further type of task in order to support these claims. On the basis of the findings reported in Chapters 6 and 8, it is suggested that with an emotion-based music composition task, musical interaction will have a significant relationship with group productivity and that verbal interaction will be both less prevalent and less important.

The three key gender issues are again examined here: whether one gender consistently takes control of the task verbally and non-verbally in the mixed gender groups; possible differences in communicative style between the genders; and the relative productivity of single and mixed gender groups. On the basis of the findings of the previous studies, it is expected that the girls will feel more able to engage in appropriate behaviour to complete the task than the boys, and this will be manifest by higher levels of task directed activities by the girls than the boys, and higher evaluations for the finished compositions for the girls than the boys.

9.2 Method

9.2.1 Participants

A sample of 72 children was taken from a third primary school in Monmouthshire. Further details are as for Study 3, Chapter 8 (8.2).

9.2.2 Composition task

The children were asked to compose a piece of music "that will make me happy". This composition task has no elements of structure and form and requires pure representation of emotion. The children were given the same musical instruments as for Study 1 (6.2.1).

9.2.3 Assessment of the compositions

As in Study 3, Hargreaves, Galton & Robinson's (1996) bipolar constructs were used to assess the finished compositions (see Chapter 8, 8.2.2). Each of the 18 compositions was rated by three independent raters. Highly significant correlations were obtained (Rater 1 & Rater 2: $r = .91$, $p < .01$; Rater 1 & Rater 3: $r = .89$, $p < .01$: Rater 2 & Rater 3: $r = .78$, $p = .01$), suggesting adequate reliability of the scores.

As for Study 3, a factor analysis was carried out on the scales and again, this revealed that there was one underlying factor, this time with an Eigenvalue of 5.80 and 82.9% of the variance in the score explained by the factor. The factor matrix is presented below.

	Factor 1
Aesthetically appealing-unappealing	.90
Ambitious-unambitious	.92
Effective-ineffective	.92
Evocative-unevocative	.84

Flowing-disjointed	.71
Interesting-uninteresting	.96
Lively-dull	.88
Original-unoriginal	.95
Technically skilful-technically unskilful	.89
Varied-unvaried	.85

As Hargreaves et al. suggest, and in line with the findings of Study 2 (8.2.2), this factor could be measuring the overall effectiveness of the compositions. In light of this, factor scores were awarded to each of the compositions. Thus the 'group score' refers to the factor score awarded to the composition and can be thought of in terms of how effective the composition was.

9.2.4 Children's Questionnaires

The questionnaires took the same format as in Study 2 (6.6.4).

9.2.5 Procedure

The children were asked to compose a piece of music that will make me happy. The remaining procedure was as for Study 1.

9.2.6 Analysis of the collaborative work

The process measures discussed in Chapter 6 (6.6.3) were employed here.

9.3 Results

9.3.1 Verbal and Musical Interaction

Table 9.1 shows the Pearson correlations between the process variables and the group (factor) score. The results suggest that there is a significant relationship between the

amount of task directed play occurring among the children during the collaborative working period and the group score. No significant relationship was found between the amount of task directed talk and the group score.

Pearson Correlations Between The Process Variables and the Group Score

Table 9.1

	Group Score (N=18)	
Process variables	**r**	**p**
Task directed play	.55	.02
Task directed talk	.14	ns
Exploratory play	-.40	ns
Off task talk	-.07	ns
Interaction with researcher	-.40	ns

Table 9.2 presents the results of a repeated measures t test to see whether there was more total play than total talk occurring among the children during the collaborative working period. The results suggest that there was significantly more play than talk.

Talk and Play

Table 9.2

	Mean (seconds)	**S.D.**	**t**	**df**	**p**
Total talk	76.53	72.81			
Total play	394.35	163.70	17.96	71	.00

9.3.2 Gender Composition of the Groups

Table 9.3 presents a multivariate analysis of variance to examine possible differences between the three types of group in the amount and type of interaction occurring

during the collaborative working period. The results suggest that there are no differences between the groups for any of the process variables.

Verbal and Musical Interaction by Group Type

Table 9.3

Pillai's Trace	Value			F	p
	.21 (df 10)			1.53	.14
Univariate statistics	Means (seconds) (S.D.) (df 2)			F	p
	Boys	Girls	Mixed		
Task directed play	352.21 (198.94)	327.54 (166.68)	314.21 (129.34)	.32	ns
Exploratory play	73.08 (80.62)	61.17 (60.00)	49.58 (55.99)	.75	ns
Task directed talk	66.54 (63.22)	81.92 (83.65)	65.75 (69.48)	.38	ns
Off task talk	2.04 (4.84)	.000 (.000)	.875 (3.14)	2.27	ns
Researcher interaction	3.88 (5.27)	7.13 (12.68)	1.46 (2.81)	2.96	ns

A one way analysis of variance also looked for differences in the group score, and this is presented in Table 9.4. The results suggest that there is a significant difference between the three types of group, and subsequent analysis with Tukey's HSD reveals that the all-boy groups achieved significantly higher group scores than the mixed gender groups. The all-girl groups lie between the two.

Score by Group Type

Table 9.4

Variable	Mean (seconds) (S.D.)			F	p
	Boys	Girls	Mixed	df (2,15)	
Group score	.73 (.56)	.09 (1.20)	-.82 (.44)	5.58	.02

9.3.3 Mixed Gender Groups

To examine the interaction patterns in the mixed gender groups, a multivariate analysis of variance was carried out. This is presented in Table 9.5. The univariate results suggest that there was a significant difference between the groups in the amount of interaction with the researcher, however there was no overall significant difference between the boys and girls.

Boys Vs. Girls in Mixed Gender Groups

Table 9.5

Pillai's Trace	Value		F	p
	.24 (df 5)		1.14	.38
Univariate statistics	Means (seconds) (S.D.) (df 1)		F	p
	Boys	Girls		
Task directed play	311.58 (134.18)	316.83 (130.23)	.01	ns
Exploratory play	49.67 (49.50)	49.50 (70.75)	.00	ns
Task directed talk	57.67	73.83 (92.06)	.32	ns
	(38.41)			
Off task talk	1.17 (4.04)	.583 (2.02)	.20	ns
Interaction with researcher	.250 (.866)	2.67 (3.55)	5.25	.03

9.3.4 Children's Questionnaires

The children's responses to the questionnaires are summarised in Table 9.6

Children's Responses

Table 9.6

	GIRLS (36)				BOYS (36)			
1. Do you like music lessons?	Y	N	OK		Y	N	OK	
	25	3	8		18	5	13	
2. Any other musical interests?	Y	N			Y	N		
	23	13			15	21		
3. Is music for boys, girls or both?	B	G	Bo		B	G	Bo	
	1	1	34		0	3	33	
4. Which would you most like to play? *	X	D	C	T	X	D	C	T
	12	14	7	3	12	18	1	5
5. Do you like working in groups? **	Y	N	S		Y	N	S	
	25	3	8		21	4	11	
6. Do you prefer groups with boys, girls or both?	B	G	Bo		B	G	Bo	
	2	6	28		14	0	22	

* X refers to the xylophone, D the drum, C the cabasa and T the triangle.

** S stands for 'sometimes'.

Table 9.6 suggests that more girls than boys reported an enjoyment of school music lessons, although nearly half of the boys stated that they too like school music. More girls than boys engage in extra curricular musical activities. A chi-square reveals that the differences between the genders in questions 1 and 2 are not significant (chi-square = 2.83, df = 1, p = .243, with categories 'No' and 'Okay' collapsed as more than 20% of the cells had expected frequencies of less than 5; and chi-square = 3.57, df = 1, p = .060 respectively).

A substantial majority of both the boys and the girls reported that they believed music was suitable for both genders, although one girl reported that it was more suitable for boys, one felt it was more suitable for girls and three boys believed music to be more for girls. No significant differences between the genders were found here (chi - square = 2.01, df = 1, p = .365 with categories 'Boys' and 'Girls' collapsed because more than 20% of the cells had expected frequencies less than 5). The most popular instrument of the four presented to them was the drum (for both genders), followed by the xylophone. The differences between the genders were not significant here (chi-square = 1.5, df = 1, p = .462, with categories 'Cabasa' and 'Triangle' collapsed because more than 20% of the cells had expected frequencies less than 5).

Both boys and girls stated that they like working in groups, and there were no significant differences between the genders (chi-square = .964, df = 1, p = .617, with categories 'No' and 'Sometimes' collapsed because more than 20% of the cells had expected frequencies less than 5). The girls prefer to work in a mixed gender group and the majority of the boys agreed, although 14 (out of 36) reported a preference for working with members of their own gender only. These differences are significant (chi-square = 11.6, df = 1, p < .001, with categories 'Girls' and 'Both' collapsed because more than 20% of the cells had expected frequencies less than 5).

9.4 Discussion

9.4.1 Verbal and Musical Interaction

The results support the hypothesis that with an emotion-based music composition task, there should be a significant relationship between the amount of task directed play during the collaborative working period and group productivity. Also as predicted, no relationship was found between the amount of task directed talk and the group score. This suggests that while group productivity was dependent on the

communication of ideas among the children, this communication was non-verbal, or specifically was communication through the musical instruments. Ideas were presented musically rather than verbally. This is further apparent in the finding of significantly less total talk than total play among the children during the collaborative working period. These findings are in line with those of the previous study (Chapter 8).

9.4.2 Gender Composition of the Groups

No significant differences were found for any of the process variables among the three types of group, suggesting that for this task, all groups were able to appropriately engage in task directed activities to complete the task. In line with this, in the mixed gender groups neither gender consistently took control of the task, suggesting that both the boys and the girls felt able to tackle the task and did so in a similar fashion. However, the all - boy groups were found to obtain significantly higher marks for their compositions than the mixed gender groups, with the all - girl groups lying between the two. The all - boy groups did not engage in more task directed behaviour than the other groups, therefore it is unclear as to why they were found to be more productive. The analysis of the interaction patterns is very broad and perhaps does not explain in sufficient detail exactly what is going on during the working period. A more detailed analysis is required, with more categories of behaviour to isolate the important factors. What does seem to have emerged again is that the mixed gender groups were the least effective, achieving the lowest marks on average.

9.4.3 Children's Questionnaires

A substantial majority of both the boys and the girls reported that they believed music was suitable for both genders, although one girl reported that it was more suitable for boys, one felt it was more suitable for girls and three boys believed music to be more for girls.

More girls than boys reported an enjoyment of school music lessons, although nearly half of the boys stated that they too like school music. More girls than boys engage in extra curricular musical activities. For both of these questions, the differences between the genders did not reach statistical significance. The most popular instrument of the four presented to them was the drum (for both genders), followed by the xylophone. Again, these differences were not significant between the two genders. Both boys and girls stated that they like working in groups. The girls prefer to work in a mixed gender group and the majority of the boys agreed, although 14 (out of 36) reported a preference for working with members of their own gender only.

It was suggested in Chapter 8 (8.4.4) that while the observed gender differences could be explained by the nature of the task, an alternative explanation for the results existed, namely the nature of the children's attitudes to music. As reported in Chapter 8, there was equal participation of both genders in extra-curricular musical activities and both boys and girls reported enjoying their school music lessons. Thus it could be said that there was little, if any, gender stereotyping of music within these children, and there was some concern that simply enjoyment of and participation in music could explain the findings.

This theory is called into question in the present study. On the basis of the children's answers to the questionnaire, there is little to distinguish the genders in their enjoyment of and participation in music, yet the all-boy groups achieved a significantly higher mark for their compositions than the mixed gender groups, with the all-girl groups lying between the two. Thus, enjoyment of and participation in music alone is not sufficient to explain the findings.

9.5 Conclusions

To summarise, evidence is again provided for the occurrence and importance of communication through music for productivity. In line with Study 3 (Chapter 8), and in contrast with Study 2 (Chapter 6), verbal interaction was not related to productivity. It was suggested that these findings were due to the nature of the task.

In terms of the gender composition of the group, no differences were found among the three types of group in terms of their engagement in the task during the collaborative working period. However, in this instance the all-boy groups achieved significantly higher marks for their finished compositions than the mixed gender groups, with the all-girl groups lying between the two. This finding differs from those of Studies 2 and 3 in which the all-girl groups achieved the highest marks (in Studies 2 and 3, the differences in marks awarded were not significant). In line with Study 3, and in contrast with Study 2, neither gender consistently took control of the task in the mixed gender groups.

CHAPTER 10

CONCLUSIONS

10.1 Introduction

The present research has looked at peer collaboration and children's music composition, and the aim of this chapter is to review its contributions and limitations. The issues covered in the research are to be discussed in the following order:

- Verbal and musical interaction
- The gender composition of the collaborating group
- The assessment of music composition
- The implications of the research for
     i) education
     ii) developmental psychology
- Further research

10.2 Verbal and Musical Interaction

This section is sub-divided into the two types of musical behaviour analysed in the present research, namely task directed play and exploratory play.

10.2.1 Task directed play

The four studies of collaborative music composition provide support for those who claim that communication among children in collaborating groups is crucial for group

productivity (e.g. Damon & Killen, 1982; Glachan & Light, 1982; Wegerif, Mercer & Dawes, in press). However, the present research suggests that this communication need not always be verbal but can also be non-verbal, or can specifically be communication through music. This is in line with several computer - based studies (e.g. Pheasey & Underwood, 1995), in which pairs of children were found to be less likely to talk to each other about their ideas, preferring instead to try them out directly on the computer. This is an important finding, as the extent to which the children communicated their ideas through the musical instruments was found to be dependent on the nature of the task.

In a directly representational musical task (Study 2, Chapter 6), it was found to be important that the children talked to each other during the collaborative working period in addition to playing the instruments. There were significantly higher levels of talk than play, but both were important to the productivity of the group. In a formal music composition task (Study 3, Chapter 8), in which the children were asked to produce a continuous piece of music as distinct from a series of sounds, the most important element of the task activity was found to be task directed play, that is the presentation of ideas through music rather than words. Verbal interaction did not have a significant relationship with group productivity and there was significantly more play than talk during the collaborative working period. To assess this further, a third type of task, an emotion-based task, was used (Study 4, Chapter 9), in which the children were asked to compose a piece of music that "will make me happy". Again, communication of ideas through the musical instruments was both apparent and important, and verbal interaction showed no clear relationship with group productivity. There were very low levels of verbal interaction and high levels of musical interaction.

While it is suggested here that these differences are due to the nature of the task, it needs to be kept in mind that each of the studies was carried out in different schools with different approaches to music education. More research is needed to establish which of the findings are due to the nature of the task, and which are due to the differences among the schools.

In addition to differences among the schools, there are also differences among the children. Put simply, different children collaborate in different ways. The ways in which they collaborate with other group members may be affected by such factors as the extent to which they are used to working in that particular group, friendships within the group and their own individual working styles. If children are used to working with particular other children, they may feel more at ease, or more inhibited, in the presence of those others. There may be unspoken status rules, whereby one child is seen as being more knowledgeable and to whom the others must listen.

If the group consists of friends, it is possible that the children may communicate more responsively, both verbally and musically, as given the essential reciprocity of a friendship, they would be accustomed to doing this in their everyday lives. On the other hand, non-friends or relative strangers may struggle to achieve any form of shared social reality as the absence of a relationship may prevent them from doing so.

Each child's working style will be different. Some may prefer to think over ideas before presenting them to the group and may take a more individualistic approach; others may prefer to 'think aloud' and bounce ideas with the other group members. Furthermore, a child placed in a certain group may not participate fully if the others are more confident and appear to have plenty of ideas. However, the same child placed with children who are quieter and perhaps struggling with the task may see an opportunity to take control of the situation and become more confident of their own ideas.

While this thesis suggests that the differences in interaction patterns in the studies were due to the nature of the task, to establish this fully it would be necessary to examine the same children working on a variety of composition tasks to make clear which of the differences were due to the task and which were due to individual differences among the children.

While it has been established that interaction through music does occur and is important for group productivity, many questions are raised. This form of interaction appears to act as a replacement for language but it is unclear whether it acts *like* a language. That is, if the purpose of verbal interaction in collaborating groups is to present ideas and discuss their alternatives, how is this happening in music? To what extent are ideas presented musically and subsequently modified musically? Verbal interaction essentially involves reciprocity; to what extent does this occur in musical interaction? Does one person in the group dominate in their instrumental playing as sometimes occurs in verbal interaction? These issues require further investigation.

Much research into the relationship between talk and group productivity looks at types of talk, such as transactive (Kruger, 1993), disputational, cumulative and exploratory (Dawes et al, 1992; Fisher, 1993; Mercer, 1994). Transactive talk is defined as "a dialectical process in which one's own reasoning confronts the other's antithetical reasoning in an ongoing dialogic dynamic" (Berkowitz, 1980a, p.16), or more simply, reasoning about one's partner's reasoning. Disputational talk is effectively unproductive disagreement characterised by an initiation followed by a challenge. Such challenges lack clear resolution or else result in resolution which is not supported by agreement. Cumulative talk simply adds uncritically to what has gone before. Initiations are accepted either without discussion or with only superficial amendments. In contrast, exploratory talk demonstrates the active joint engagement of the children with one another's ideas. Whilst initiations may be challenged and counter-challenged, appropriate justifications are articulated and alternative hypotheses offered. The alternative accounts are developments of the initiation, and progress therefore emerges from the joint acceptance of suggestions. Dawes et al. conclude that exploratory talk offers a potential for learning over and above that offered by the other categories, therefore in accordance with their analysis, collaborative activities should be designed to foster children's use of exploratory talk.

The present research took a far broader approach and looked only at task-directed and off-task talk. Similarly, the category 'play' was divided only into task directed play and exploratory play. It would undoubtedly be useful to examine whether musical interaction, or task-directed play, can be transactive, or disputational, cumulative and exploratory in the same way as the above authors apply their definitions to the use of language. This was rather beyond the scope of the present research, as the research question was somewhat different. The present research was concerned with whether any form of interaction through music occurred and whether it outweighed the amount of verbal interaction among the children in both amount and importance. It has been shown that communication through music does occur and its importance depends on the nature of the task. Now is the time to begin examining in more detail the exact nature of this musical interaction and to attempt to answer the above questions.

10.2.2 Exploratory play

The exact nature and function of what was called exploratory play is still rather unclear. This was defined as an individualistic form of play, as opposed to play directed towards the group or towards completion of the task. It was essentially the exploration of the musical instruments. While this element of play is considered individualistic, rather than co-operative, it did not have a negative relationship with group productivity as would be expected. Rather it showed no relationship with group productivity. It is therefore dangerous to assume that exploratory play is somehow detrimental, it may in fact be a vital part of task accomplishment, or may have some other role that the present analysis has not tapped into. It may be an important precursor to task directed play, where the child may be trying out ideas for him/herself before feeling ready or able to share those ideas with the rest of the group. What begins its life as an exploration of ideas at the individual level may somehow make the transition to task directed play at the group level. 'Group score' may not be the most effective means of assessing its importance.

A fundamental difficulty with the definition of exploratory play was that it did not distinguish between individualistic playing involving trying out ideas, and simply 'messing around' with the instruments. On a behavioural level, this distinction is problematic to make as it involves inferences of intention on the part of the child. While exploratory play did not show a clear relationship with group productivity, high levels of this behaviour were observed in all four studies, and so it would seem feasible to suggest that it must have some function. Is it improvisation, exploration of ideas, exploration of the instruments or simply a time wasting activity to avoid working on the task? It is important to study the elements which make up the category of exploratory play as it may consist of all of these.

10.3 Gender Composition of the Collaborating Group

The studies concentrated on three main gender issues; firstly the findings of previous research which suggest that boys in mixed gender groups dominate verbally and non - verbally over girls; secondly, the suggestion that mixed gender groups tend to be less productive than single gender groups; and thirdly, possible differences between the genders in communicative style. It should be pointed out that in each of the studies, the children were grouped by their class teachers. No information was obtained relating to the extent to which the children were used to working with each other, whether they were friends or whether they normally sat together in class. This should be kept in mind when interpreting the results.

In Studies 2, 3 and 4, the children were asked a series of questions relating to their enjoyment of and participation in music lessons and extra curricular musical activities. It was thought that this may help shed light on any observed gender differences in behaviour during the collaborative working period and in subsequent group productivity. These findings are discussed after the three key gender issues have been considered.

10.3.1 Mixed Gender Groups

Studies 1 and 2 showed the most surprising results in that it was the girls in the mixed gender groups who dominated verbally over the boys (neither gender dominated musically). This is in stark contrast with previous research, which suggests that in mixed gender groups, it is the boys who occupy the most 'verbal space' (Swann, 1992). This could be explained by the theory that if a subject is perceived as being within the domain of expertise of one gender, that gender will take control of the task (Lee, 1993). Music in school has been rated as being 'towards the feminine' (Archer, 1992), and so one would expect the females to dominate. However, Studies 3 and 4 found the genders to be on an equal footing in that neither boys nor girls consistently took control of the task. Perhaps it is not the simple case of music being seen as 'feminine', rather the task within that. It is important also to determine whether it is the boys who felt more competent in the second two tasks than they did in the first one, or whether the girls felt less able to tackle the second two than the first one.

10.3.2 The Relative Productivity of Single and Mixed Gender Groups

Previous research suggests that mixed gender groups perform less effectively than single gender groups (e.g. Fitzpatrick & Hardman, 1994). Study 4 was the only one to show a significant difference in group productivity as measured by the rating scales, with the all - boy groups attaining significantly higher marks for their compositions than the mixed gender groups. Study 3 showed the mixed gender groups to be the least productive, but this difference was not significant. In Study 2, the all - girl groups achieved the highest marks, followed by the mixed gender groups then the all - boy groups, although this difference did not reach significance. The results of the studies point towards the suggestion that mixed gender groups are less effective than single gender groups, although as the differences in productivity only reached significance in one of the studies, any conclusions based on this should be

made with caution. These findings are important as the questionnaire study (Chapter 5) revealed that teachers prefer children to work in mixed gender groups for music composition, and this may in fact not be the most effective method in terms of group productivity.

10.3.3 Gender and Communicative Style

Differences in 'communicative styles' between the genders have been previously observed (Garton & Renshaw, 1988). In Study 3, the all girl groups were found to engage in significantly more task directed (co-operative) play than the mixed gender groups, the latter engaging in significantly more exploratory (individualistic) play than the former, suggesting that the all - girls groups engaged in more group directed, mutual playing than the mixed gender groups. Study 2 supports the finding that boys tend to show a more individualistic working style (e.g. Thompson, 1995) in that they engaged in significantly more exploratory play than the girls. However, Study 4 reports no gender differences for any of the process variables. It could be suggested that the nature of the task is responsible for the different findings, and this is examined in the following section.

10.3.4 Gender and the Nature of the Task

The three tasks are very different and seem to elicit different behaviours. The nature of the task appears to determine what is important during the collaborative working period for productivity, and in the extent to which the boys and girls engage in these behaviours. Any conclusions should be attempted with caution. The fact that there is not one consistent finding relating to gender throughout the three studies suggests that more research of this kind is needed to determine how much of the observed differences are due to the nature of the task. It could tentatively be concluded that the girls engaged in more task directed behaviours when working on the representational task (Studies 1 and 2), whereas the boys seemed unable to engage themselves

appropriately. This was apparent by female verbal domination in mixed gender groups, all - girl groups' achievement of the highest marks and boys' high levels of exploratory play. In the other two types of task (formal and emotion-based), the boys and girls were on a more equal footing in terms of task directed behaviours, although the all - boy groups in Study 4 obtained significantly higher evaluations for their compositions than the mixed gender groups. While the nature of the task appears to explain the different findings related to gender, examination of the questionnaires the children completed prior to working on the composition task raises further issues, and this is the focus of the following section.

10.3.5 Children's Questionnaires

In Study 2, significantly more girls than boys reported liking their school music lessons and significantly more girls than boys participated in extra curricular musical activities. Thus, female verbal domination in this study may be explained simply in terms of enjoyment, that is the girls enjoyed the task more than the boys did. The boys may have been quite happy for the girls to take control of the task because the boys were not enjoying what they were doing. In Study 3, where it was suggested that the boys and girls may have felt on a more equal footing, no significant gender differences were found in reported enjoyment of school music lessons or in extra curricular musical activities. Thus in addition to 'enjoyment' to explain the results, there may be an ability or experience factor. Those who participate in extra curricular musical activities not only enjoy music but also are subsequently more 'educated' in music and feel more able to tackle music composition tasks. Where both genders report enjoyment of and participation in musical activities, one would expect both genders to suitably engage in music composition tasks, and this is what was found in Study 3.

In Study 4, where equal engagement of both genders was observed, both boys and girls reported enjoying their school music lessons, but significantly more girls than

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boys participated in extra curricular musical activities. The above argument still holds for this study despite more girls reporting engaging in extra curricular musical activities; this may simply reflect parental encouragement. Perhaps the girls are given more opportunities or are encouraged to participate in music outside of the school more than the boys. The key question appears to be the extent to which there is enjoyment of class music lessons. A more pertinent question may have been the extent to which the children would have liked to have participated in extra curricular musical activities.

The issues raised here need studying in much greater detail. If the key to equal participation of both genders is enjoyment of the task, then it is important to ask the children what they enjoy, what they do not enjoy and how tasks can be altered to create enjoyment. Furthermore, given that the studies were carried out in different schools, it would be useful to find out what the children's teachers were doing with them in their class music lessons in those schools where enjoyment was reported and enjoyment was not reported. Also to obtain a fuller picture, discussions with the children's parents may help with why more girls than boys seem to participate in extra curricular musical activities. It certainly cannot be concluded that music is something that only girls can enjoy, as it has been shown that the boys can enjoy it too, and any differences in participation of musical activities may be a result of opportunities provided on the basis of what others think is more suitable for a particular gender.

10.4 The Assessment of Music Composition

One of the most important issues to arise over the course of this research is the inadequacy of current assessment procedures for determining the quality of music composition. Given the National Curriculum's emphasis on Attainment Targets, the establishment of valid and reliable procedures is of key importance. It was shown in Chapter 3 (3.2) and Chapter 5 that the teachers themselves do more than simply assess the finished product and take into account the personal, expressive and

collective, instructional objectives. They view the product from a number of perspectives and observe the pupils at work. They look at how the children perform the task, how they interact with others, how they interact with the artistic medium and so on. These methods rely heavily on a subjective approach to assessment which does not fit well with research practice. One approach to assessment is to use rating scales of pre-defined criteria, however this is not without its problems. It was argued in Chapter 3 that to enter a situation with a set of criteria, or to travel from the general to the specific, is the wrong approach and does not allow for creative deviations. Criteria to assess the 'goodness' of a piece of work need to be developed in response to the nature of the task. This brings us full circle to a subjective assessment procedure.

Perhaps the most promising research into assessment has been that of Hargreaves et al. (Chapter 3, 3.6) who developed rating scales based on criteria that had emerged from a number of composition tasks. More research of this kind is needed to establish to what extent these scales can be applied to a full range of composition tasks, and whether music educators feel these scales reduce, or adequately capture, the experience of hearing a music composition.

10.5 The Implications of the Research

The aim of this section is to summarise the important contributions of the research in terms of its implications for education and developmental psychology.

10.5.1 Implications for Education

The questionnaire study of primary music teachers reported in Chapter 5 revealed that children are consistently grouped for music composition tasks. Chapter 1 (1.2), in a review of the literature, reported that children tend to compose together either as a

whole class activity, or in small groups, firstly for practical reasons and secondly because "group composition offers more opportunity for learning" (Mills, 1991, p.25). Furthermore, music is seen as a social activity and composing in groups is an important aspect of many composers' lives. It is therefore important to consider whether in fact group music composition does 'offer more opportunity for learning', and if so to establish the factors which promote this (the present research has been concerned with group productivity rather than learning).

The questionnaire study revealed that teachers prefer mixed over single gender groups. This is important because the present research did not find that mixed gender groups functioned too well, both in terms of the extent to which they engaged in so-called co-operative behaviours during the collaborative working period, and in terms of their productivity. It may be reasonable to suggest that the teacher puts children in mixed gender groups for social benefits rather than benefits as determined by the productivity of the group. It has already been discussed above (10.6) and in Chapter 3 (3.2) that the focus of the teacher may differ from that of the researcher, in that teachers are not necessarily interested in clinically separating the process from the product, and are consequently more interested in encouraging the development of the whole child. They may believe that children need to interact with members of their own and the other gender in order to develop socially.

Similarly, one of the aims of music education as discussed in Chapter 1 (1.2.1) is to enable children to develop a wide range of skills, including the transmission of the cultural heritage, fostering of creativity, social education, provision of worthy recreation, improvement of physical and mental health, the development of intellectual capacities and so on. This suggests that music education ought to contribute to intellectual, emotional, sensory motor and social development. Participation in music is believed to enhance the development of transferable skills, including a sense of individual and collective achievement; aesthetic appreciation and discrimination; listening skills and sensitivity to sounds; imagination and

inventiveness; intellectual and artistic skills; the ability to analyse and solve problems; study skills, including attention to detail, accuracy, memorising and the interpretation of sounds and symbols; verbal and non-verbal communication skills; social skills such as co-operation, resourcefulness, perseverance, tolerance and self-confidence; self motivation, self-discipline, self analysis and self-evaluation; and awareness of a wide range of cultural traditions (National Curriculum Music Working Group, 1991).

Thus the opportunity to engage in music composition tasks with others who differ in terms of gender, ability or friendship levels can only serve to enhance the learning process. However, if this is the reason for grouping children in this way, care must be taken to ensure that these groups are functioning effectively. The measures of group productivity in the present research do not look favourably on mixed gender groups, but perhaps a more important implication for the teacher is that the levels of co-operative behaviour are lowest, and individualistic behaviours are highest, in the mixed gender groups as compared with the single gender groups. This suggests that, while the teacher may believe that the children are gaining social benefits from being grouped with members of the opposite gender, they are not really interacting with the opposite gender. The extent of social benefit is therefore questionable.

The research also has implications for politicians who doubt the inclusion of music in a compulsory curriculum. The children were required to work on three distinct types of task, and all did so with relative ease, enjoyment and a wealth of creativity. In what other area of the curriculum can they voice this creativity in this way? Furthermore, the children are learning the potency of music, and its ability to act as a communicator of feelings, thoughts and ideas. They are learning to work in situations where there are infinite solutions to problems. They are encouraged to communicate through media other than language, to listen to and fit in with others, and to adopt a hands-on approach to something which was, until very recently, believed to be a subject only for those who were 'naturally talented'. The present

research has shown that children as young as 9 and 10 years are able to grapple with quite complex musical forms, and to engage themselves appropriately in music composition tasks.

10.5.2 Implications for Developmental Psychology

The present research has contributed to an increasing body of peer collaboration research, which to date has neglected its role in creativity. It is important to look at peer collaboration in all areas of the curriculum, as it may be that the factors responsible for productivity in science-based tasks do not adequately account for productivity in creative tasks. It was pointed out in Chapter 3 (3.3) that science is governed by sets of rules which provide consistency of results, so assessment of a pupil's ability can be made objectively in relation to the application of those rules. The arts are not concerned with working towards particular solutions to problems but with finding varieties of solution as well as differences in ways of reaching them. This particular quality of arts education, its non-rule-governed nature and the expectation of diversified responses, is a main justification for its inclusion in the curriculum, as it provides opportunities for the development of thought patterns as well as particular expressive skills and abilities which are not much in evidence elsewhere in the curriculum (Allison, 1986). It is important to look at how peer collaboration may enhance the development of these particular thought patterns and expressive skills and abilities.

Perhaps the most important contribution of the present research is the evidence to suggest that children interact with each other through music rather than words when working on a music composition task. It was argued that, through what was called task directed play, the children were establishing a shared social reality, and the groups who achieved this were the most productive. The extent of the importance of musical interaction was dependent on the task; in a representational task, involving the direct representation of external events, it was important that the children

communicated their ideas verbally and musically. In formal and emotion-based composition tasks, verbal interaction was not related to productivity and musical interaction was.

The present research therefore provides support for those who claim that the communication of ideas, or the establishment of a shared social reality, is the most important factor in group productivity (see Chapter 4, 4.3.1). However, the findings take this one step further to suggest that where a more enlightening medium exists for the effective communication of ideas, the children will make use of it, and in this instance this other medium was the music itself. What remains to be seen is the exact nature of this interaction through music, as discussed above (10.2).

Given Allison's (1986) argument (above) that problem solving in the arts requires the use of thought patterns different from those in science, it may have been expected that the children would work in a way that was different from the way they might approach a science-based task. However, as noted in Chapter 1 (1.2), composition is seen as a form of problem solving, where a problem is set up, decisions are taken to solve the problem which results in the satisfaction of having answered them (Salaman, 1988). While it is accepted that there may be infinite solutions to this problem, the results of the present research suggest that the work needed to complete the task may involve similar processes to those observed in science-based tasks. That is, behaviourally, the same factors found to be responsible for productivity in science-based tasks account for productivity in music composition tasks, namely the communication of ideas and the establishment of a shared social reality.

While science-based tasks might motivate children to work towards the 'correct answer', it is questionable whether this is qualitatively different from children working towards a finished piece of music. If, in a science based task, there is no immediate notification that the children have reached the correct answer, that is if they hand in their finished work to the teacher or researcher and wait for a response,

they are working in such a way that they have to consider a variety of solutions and choose the one they think is correct. In this way, this is similar to a music composition task, where the children complete the work and wait for the approval of the teacher or researcher. In this respect, it is not all that surprising that the processes responsible for productivity in science based tasks are similar to those responsible for productivity in music composition tasks. This is not to equate music with science, as it is accepted that music may be concerned with the development of different skills. However, it would seem that the present research did not differ significantly from the previous science based research in terms of the thought patterns necessary to complete the task.

A further important contribution to the peer collaboration literature is the finding that in the representational task, the girls dominated verbally over the boys in the mixed gender groups. This is in stark contrast to previous research findings, where boys are usually found to take control in mixed gender groups. The issue of the gender composition of the collaborating group is discussed in detail above (10.3), and suggestions are made to explain these findings. A conclusion that can be drawn is that girls are equally able to dominate, or at least participate equally, in mixed gender groups, and the extent to which they do this may be due to the nature of the task. It is important to establish to what extent music is seen as a subject more suitable for one particular gender, and the present research attempted to establish this. It was argued that it may not be this clear-cut, and that perhaps it may be more profitable to look at the extent to which various types of music tasks are seen as gender stereotyped.

10.6 Further Research

Throughout the Discussion, questions unanswered by the present research have been noted, and these can be summarised as follows;

- **Task directed play:**
  - what are the elements which make up task directed play?
  - is it possible to identify types of task directed play?

- does it operate like a language?
- the children should perhaps be given a wider range of musical instruments from which to choose, with the assumption that if they are given instruments they enjoy playing, and with which they feel at ease, this will facilitate the communicative process.

- **Exploratory play:**
  - what is the exact nature and function of exploratory play?

- **Gender:**
  - replications of the studies are needed to establish which of the effects are due to   the nature of the task, and which are due to inherent gender differences
  - a more detailed analysis of the interaction patterns would unearth any fundamental differences between single and mixed gender groups
  - interaction patterns and group productivity in mixed gender groups needs much more attention, as children are repeatedly grouped in this way
  - far more details need to be obtained about the children involved, such as their abilities and interests. Discussions with their class teachers and parents would help understand the whole picture.

- **Assessment:**
  - there is still a need to establish valid and reliable measures for assessing music composition
  - a more ecologically valid approach may be to assess the children not simply in a working period of twenty minutes, but over a period of weeks, thus enabling the study of how the composition develops over time and how interaction patterns among the children may change as familiarity with the group increases.

10.7 Conclusions

In sum, the present research has been concerned with children's collaborative music composition, with the principal aim of establishing which factors within groups of children are important for group productivity. Previous peer collaboration research has suggested that the most important element of task activity in groups is the dialogue among group members. The present research has shown that this 'dialogue' can occur musically, that is through the music itself rather than through words. The importance of this communication through music was found to be dependent on the nature of the task.

Three distinct types of music composition task were studied, namely representational, formal and emotion-based. In a representational task, involving the direct representation of external events, group productivity was related to both verbal and musical interaction. However, in the formal and emotion-based composition tasks, requiring the children to work with musical form and structure, group productivity was related only to musical interaction. In these two tasks, verbal interaction showed no clear relationship with productivity.

The effects of the gender composition of the collaborating group were also examined. In the representational task, the girls dominated over the boys in the mixed gender groups. This finding is in contrast to previous peer collaboration research, in which it is the boys who are found to dominate. In both the formal and the emotion-based tasks, neither gender consistently dominated. Furthermore, the mixed gender groups did not fare as well as the single gender groups in all the composition tasks in terms of both the extent of their co-operative behaviour during the collaborative working period and in the marks awarded to the finished composition.

This research represents an important contribution to the existing peer collaboration literature, and the scope for further research of this kind is vast. Perhaps the most thought-provoking conclusion is that talking about music composition is not always productive, and there is no substitute for the experience of the music itself.

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