

A TEST OF SELECTED ASPECTS OF PETER WEBSTER'S
CONCEPTUAL MODEL OF CREATIVE THINKING IN MUSIC

by

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ABSTRACT

The purpose of this study was to test selected aspects of Peter Webster's "conceptual model of creative thinking in music." The investigation proceeded in three parts. The first part tested for relationships within the central or *thinking process* section of Webster's model. The second part tested the hypothesis that creativity moves from divergent to convergent thinking, and the third part tested, through an experimental study, the relationship of the *thinking process* section of Webster's model to a creativity project carried out in the classroom.

In general the study supports Webster's model of creative thinking in music. The central premise of the model, that there is movement from divergent to convergent activity, and the relationships within the model appear to be well founded. The relationship of the model to a creative task assigned in the classroom, however, could not be addressed due to a lack of consensus by the judges used in the study.

Specifically, Part I of this study found support for selected relationships within the Webster model. Five relationships that had been previously reported by Swanner (1985) were also found to exist in the present study. With the duplication of these results in the present study, it seems probable that the inclusion of the various enabling skills and conditions is solidly founded. Further research is still needed, however, to refine which specific enabling skills and conditions should be included in findings from the model. Part II suggested that the central premise of the model, (i.e., the movement from divergent to convergent activity), appears to be well founded. This study confirmed results (Kratus, 1985) that students, when given a creative task, begin with exploration as the most prevalent activity and finish with repetition as the most prevalent activity. The aspect of this study that could not be fully assessed was part III, the relationship of the model to an creative task assigned in the classroom.

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TABLE OF CONTENTS

CERTIFICATE OF EXAMINATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	ix
CHAPTER ONE	1
Introduction	2
Background	3
Purpose of the Study	21
Methodology	22
The Subjects	22
Collection of the data	22
Analysis of the data	24
Importance of the Study	25
CHAPTER TWO	26
Review of the Literature	26
Introduction	26
Theoretical Basis for Webster's Model	26
Summary	29
Musical Components of Webster's Model	30
The Creative Process	30
The Creative Product	35
Psychometric Studies	37
Summary	40
Extra-Musical Components of Webster's Model	41
Summary	44
Chapter Summary	45
CHAPTER THREE	46
Methodology	46
Purpose and Hypotheses	46
Subjects	46
Collection of the data	48
Selection of Variables	50
Test Instruments	52
Analysis of the Data	61
Summary	62

CHAPTER FOUR	64
Results	64
Introduction	64
Descriptive Statistics	64
Musical Measures	64
Non-Musical Measures	68
Part I	70
Part I - Summary	72
Part II	73
Part II - Summary	78
Part III	79
Part III - Summary	82
Tests of Hypotheses	83
CHAPTER FIVE	84
Summary, Conclusions, and Recommendations	84
Introduction	84
Summary of the Study	84
Purpose of the Study	84
The Subjects	85
Collection of the data	85
Selection of Variables	85
Test Instruments	86
Analysis of the Data	88
Summary of Results	89
Descriptive Statistics	88
Part I	88
Part II	89
Part III	89
Discussion and Conclusions	90
Discussion	90
Importance for Music Education	95
Conclusions	96
Suggestions for Further Research	97
APPENDIX A	99
Letters of Permission	99
Letter to John Lewis, principal L. B. Pearson School for the Arts	100
Letter to parents for permission for students to participate in the study	101
APPENDIX B	103
"Jabberwocky" by Lewis Carroll	104
BIBLIOGRAPHY	105
VITA	115

LIST OF TABLES

Table 1.	
MAP descriptive statistics	64
Table 2.	
MCTM descriptive statistics	66
Table 3.	
<i>Parent Evaluation of Child's Behaviour</i> descriptive statistics.	69
Table 4.	
<i>Teacher Evaluation of Student Behaviour</i> descriptive statistics.	69
Table 5.	
Relationship of musical creativity with personality/motivation. .	70
Table 6.	
Stepwise multiple regression analysis using personality variables as independent variables.	72
Table 7.	
Mean composite number of 15 second time intervals per period.	74
Table 8.	
Composition task time usage for all students.	75
Table 9.	
Analysis of Variance of time-use between work periods for the three categories of exploration, development, repetition.	79
Table 10.	
Judge group reliability correlation matrix.	78
Table 11.	
Simple correlations between judges scores and enabling skills.	80

Table 12	
Simple correlations between judges scores and enabling conditions.	81
Table 13.	
Stepwise multiple regression analysis using enabling skills and conditions as independent variables.	82

LIST OF FIGURES

Figure 1. Structure of the intellect model. (Guilford. 1967)	10
Figure 2. The locus of creativity. (Csikszentmihalyi. 1988)	14
Figure 3. Components of Creative Performance. (Amabile. 1990)	15
Figure 4. Componential Model of Individual Creativity. (Amabile. 1990)	15
Figure 5. Conceptual model for creative thinking in music. (Webster. 1987)	18
Figure 6. Perception of music: content, processes, and products (Greenhoe. 1972)	26
Figure 7. Time analysis of the composition period of students receiving successful and non-successful replication ratings. (Kratz, 1989)	33
Figure 8. Composition festival judging form.	60
Figure 9. Histogram of the raw scores for tonal imagery.	65
Figure 10. Histogram of the raw scores for rhythmic imagery.	65
Figure 11. Histogram of the scores for musical extensiveness.	66
Figure 12. Histogram of the scores for musical flexibility.	67
Figure 13. Histogram of the scores for musical originality.	67
Figure 14. Histogram of the scores for musical syntax.	68
Figure 15. Time use for each work period on the creative task.	76

CHAPTER ONE

Introduction

The gift of creativity belongs to every man (sic). Whether it appears as a faint spark or a glowing flame, it is a human quality that requires frequent and regular nurturing to develop. One place where creativity should flourish is the music class: opportunities for musical creativity abound at every stage of learning. (*Music: Intermediate Division*, 1972, p. 8)

Over the next two decades, and particularly with the introduction of *Ontario Schools: Intermediate Senior* (OS:IS), the status of creativity as a teachable behaviour in music education changed. By 1990 the guideline stated more strongly that “All music programs from grade 7 through 12 shall include the three components of listening, performing, and creating” (*Curriculum Guideline: Music, Intermediate and Senior Divisions*, 1990, p. 20). Creativity was now introduced as follows:

Creating music--that is, exploring sound, improvising, arranging accompaniments, and composing for voices, instruments, and electronic or other sound sources--is a process through which all students can attain a greater appreciation and understanding of music. Such understanding is possible even for the most inexperienced and tentative creators. Teachers, therefore, should ensure that all students, regardless of their background or propensity, are provided with experiences that yield both challenge and success in this area. (*Curriculum Guideline: Music, Intermediate and Senior Divisions*, 1990, p. 25)

By 1990 the Ministry of Education mandated that each student must have an opportunity to create as a part of the music program. Although any of the

three components in the program could receive as little as 15% of the instructional time. musical creativity was now considered a regular part of the curriculum.

In 1993 the Ministry introduced a new policy governing the delivery of programs for grades 1 to 9: *The Common Curriculum*. This policy stresses designated “outcomes” as structural guides for the delivery of programs. Within the Arts, outcomes are grouped under four broad topics: Understanding Form in the Arts; Exploring Meaning in the Arts; Understanding the Function of the Arts; and, Experiencing the Creative Process in the Arts. The last area states:

Students should create works of their own so that they may learn how and why works of art are produced. By using the materials and techniques appropriate to the different arts, students learn to connect theory and practice, and they develop a deeper understanding of their own achievements and the achievements of artists whose works they are studying. (*The Common Curriculum: Policies and Outcomes Grades 1-9*, 1995, p. 45)

Since creativity became a major focus of the music curriculum music educators have had to develop strategies for its implementation. In doing so, they have had to confront fundamental questions regarding creativity itself: What is musical creativity? How do we teach creativity? How do we assess creativity? Although these questions are philosophical in nature, they are also practical questions in need of answers for the effective delivery of a systematic, comprehensive program in music.

Background

One of the fundamental problems of researching “creativity” is establishing exactly what is meant by that term. No two people seem to have the same conception about what constitutes creativity. The word itself is in everyday use and is applied in many different ways. Perhaps one may

be considered to be creative if he or she invents a new revolutionizing product. Yet, the term is also sometimes applied to reorganizing one's living room furniture in a novel way. Although both actions may be considered creative, the end products are quite different. In the field of research there are seemingly as many definitions as there are researchers. Writings about creativity inevitably begin with a discussion of how the term applies to present circumstances.

The difficulty is that creativity cannot be pinned down to a single concept, but rather creativity appears to be a complex interaction of many processes both internal and external to the creative individual. Single, simplified definitions are not sufficient to cover the breadth of constructs which are now believed to be a part of the creative process. Feldhusen and Goh (1995) state that:

By considering creativity to be such a broad, interacting system of constructs, it is possible that the entire complex comes to be better understood. However, those who search for the essence of creativity in current theory and research are apt to be overwhelmed by both the current breadth of conceptions of the field as well as the relative uncertainty of its fundamental components. (p. 232)

Getzels (1975) maintains that there is no agreement on a universal definition of creativity. Treffinger (1987) agrees, adding that assessment of creativity is accordingly difficult.

A second difficulty with defining creativity is that creativity is found in all areas of knowledge. As a result, many different points of view have been taken to explain how the creative process occurs. Wehner, Csikszentmihalyi, and Magyari-Beck (1991) have found that the focus for the type of creativity research carried out will be different, depending of the area of research (i.e., education, business, history, etc.). Researchers in education tend to focus on studies concerning either the individual traits or individual processes of

creativity. Research in creativity on business tends to focus on organization processes, whereas historical studies of creativity focus on cultural processes. Each of these avenues of research may lead to different definitions of creativity (Wehner et al., 1991, p. 268).

Creativity has been speculated upon for millennia. Becker (1995) points out that "Plato attributed inspiration to the gods and argued that poets were not themselves during the act of creation" (p. 227). Aristotle, however, was a bit closer to the modern conception of the term, seeing creativity "as a natural process where pre-existing material is used to create something new" (p. 227). However, it is only in the last century, and particularly since 1950, that creativity as a separate field of research has been studied. It was not until J. P. Guilford's 1950 presidential address to the American Psychological Association, where he called upon researchers to consider this long neglected area, that extensive creativity research began. Prior to 1950 most studies that touched on creativity pertained to investigations of either genius or intelligence. Ribot (1900), while studying genius, was one of the first to define creativity in modern terms. He believed that there were two categories of creativity:

aesthetic and *practical*, the latter defined as everything not art. Creativity was composed of three factors: intellectual, emotional, and the unconscious. The intellectual factor used the ability to dissociate, or to analyse into parts, and then evaluate. The emotional factor was the ability to associate, or form new combinations. The third factor was the unconscious, or inspiration (Becker, 1995, p. 222).

Ribot was one of the first to include the "unconscious" in his definition. Rather than the Platonian view that creativity was divinely inspired, Ribot postulated that, through a period of incubation, the unconscious worked on the creative endeavour, and then often the solution would suddenly be presented to the conscious mind. Freud also offered a view of the creative

process which incorporated the unconscious. "Creative production was seen as the result of unconscious conflicts of drives and needs sublimated through the ego's effort into outcomes useful to both the creator and society" (Taylor, 1975, p. 5).

It was Wallas (1926) though who presented a model that defined some of the basic concepts of the creative process which have lasted to the present day. This model has four stages: preparation, incubation, illumination, and verification. Wallas describes these stages using the work diaries of German Physicist Helmholtz as an example of the process.

Helmholtz here gives us three stages in the formation of a new thought. The first I shall call Preparation, the stage during which the problem was 'investigated. . . in all directions'; the second is the stage during which he was not consciously thinking about the problem, which I call Incubation; the third, consisting of the appearance of the 'happy idea' together with the psychological events which immediately preceded and accompanied that appearance, I shall call Illumination.

And I shall add a fourth stage, of Verification, which Helmholtz does not here mention. . . . in which both the validity of the idea was tested, and the idea itself was reduced to exact form. (1926, p. 81)

Wallas believed that these four stages ran in succession. When working on a particular problem though that may involve many facets each facet may proceed at a different pace.

In the daily stream of thought these four different stages constantly overlap each other as we explore different problems. . . . Even in exploring the same problem, the mind may be unconsciously incubating one aspect of it, while it is consciously employed in preparing for or verifying another aspect. (1926, pp. 81-82)

This four-stage model was one of the first comprehensive definitions which

attempted to explain the workings of the creative process.

With Guilford's challenge to researchers in 1950 the study of creativity began in earnest. Irving Taylor (1975) stated that in the 25 years following Guilford's address, the field organized itself into five systematic approaches to the study of creativity and seven different areas of research. He cautioned, however, that there was much overlap within these approaches. The five approaches were identified as: psychoanalytic, humanistic, trait-factoral, holistic, and associationistic. Each of these different approaches was defined by the work of an individual or group of researchers.

The psychoanalytic approach, which carries on from Freud, studied the unconscious as the focus in the creative process. The humanistic approach stemmed from the psychoanalytic but focussed on *self-actualization* as a major component of the creative act. Abraham Maslow and Carl Rogers were major advocates of this point of view. Rogers, however, preferred the term *fully functioning person*. The third systematic approach is trait-factoral. The leading proponent of this area of investigation was Guilford (1967, 1968) who, through the study of intelligence, developed a model called the *Structure of the Intellect* (SI). The fourth approach to the study of general creativity is holistic. Schachtel was the key figure in this approach, and his book *Metamorphosis* (1959) presented his ideas on creativity. The fifth and last approach that Taylor (1975) cites is associationistic. This approach has its roots in the work of Ribot.

Within these different approaches Taylor (1975) identifies the following seven research areas: the creative personality, creative problem formation, the creative process, creative products, creative climates, creativity and mental health, and creativity and intelligence.

Research on the creative personality has identified a number of traits that seem to be demonstrated most often among creative individuals. For

example, "highly creative persons stress their inventiveness, independence, individuality, enthusiasm, determination, and industry, while the less creative stress virtue, good character, rationality, and concern for others" (Taylor, 1975, p. 13). Additional traits, such as ego strength, dominance, self-sufficiency, sensitivity, introversion, and radicalism were identified by Cattell (1955) and preference for cognitive complexity was demonstrated by Barron (1953).

The area of creative problem formation is not as thoroughly researched as the other areas. However, Getzels (1964) maintains that the actual act of identifying a problem is very important to the eventual solution of that problem. He realized this by looking at how problems were discovered rather than how problems which had already been presented were solved.

One of the early models of the creative process was that of Wallas (1926) mentioned earlier. Osborn (1953) coined the term "brainstorming" when referring to the interaction of two people working together on a creative endeavour. Parnes (1962a) developed brainstorming as a part of a program of study at the Creative Problem-Solving Institute. The course taught at the institute included fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. Another program based on the creative process was called Synectics, developed by Gordon (1961). The program was pragmatic and involved both analogy and metaphor to solve problems.

Research in creative products has focussed on criteria such as *correctness* or *relevancy*, and *goodness* or *hedonics*, as well as *transformation* and *condensation*. *Correctness* and *relevancy* refer to how well the product is already satisfied in a field. *Goodness* or *hedonics* is a measure of the value placed on the product by others. *Transformation* is the degree to which a product reforms its field, and *condensation* is how much

information is expressed by the product. Jackson and Messick (1965) have been leading researchers in this area. Taylor himself is also involved in this particular area. Taylor developed the Creative Product Inventory (Taylor and Sandler, 1972) which uses the following criteria to profile a product: generative power, transformation power, degree of originality, relevancy, hedonics, complexity, and condensation.

Torrance (1967) has been active in researching how creative climate affects creativity in educational settings. He found five factors that can affect a person's creative productivity: "respect unusual questions, respect unusual ideas, show that ideas have value, provide opportunities and credit for self-initiated learning, and allow performance to occur without constant threat of evaluation" (Taylor, 1975, p. 19).

The relationship between mental health and creativity stems mostly from the differing opinions of the psychoanalytic researchers and the humanistic researchers. Both focus on the unconscious mind as the source of a person's creative capacity, but psychologists believe that creativity occurs as a result of conflict and neurotic tendencies, whereas humanists maintain that creativity comes from the healthier side of a person's unconscious.

The last research area is the relationship between creativity and intelligence. Torrance (1967), and Guilford (1967, 1968) both obtained results that show there is a distinction between creativity and the traditional concept of "intelligence" (i.e., as measured by IQ test). They caution that these results do not indicate that there is no link between the two, only that there is enough evidence to suggest that these two areas may be treated as separate facets of human capabilities. MacKinnon (1962a) sums up the situation quite nicely stating: "if a person has the minimum of intelligence required for mastery of a field of knowledge, whether he performs creatively or banally in that field will be crucially determined by nonintellective factors"

(Taylor, 1975, p. 22).

Taylor's (1975) review of general creativity research shows that the problem is very complex. Interpreting the processes involved is made even more difficult as definitional boundaries of creativity constantly change. Facets of the creative process are continuously being identified. Two of the most widely quoted definitions of creativity are given by Torrance and by MacKinnon. Torrance, as cited in Richardson (1983) defines creativity as: the process of sensing gaps or disturbing, missing elements; forming ideas or hypotheses concerning them; testing these hypotheses; and communicating the results, possibly modifying and restating the hypothesis. (Richardson, 1983, p. 6)

MacKinnon's definition, as cited in Feldhusen and Goh (1995), is similar but more comprehensive.

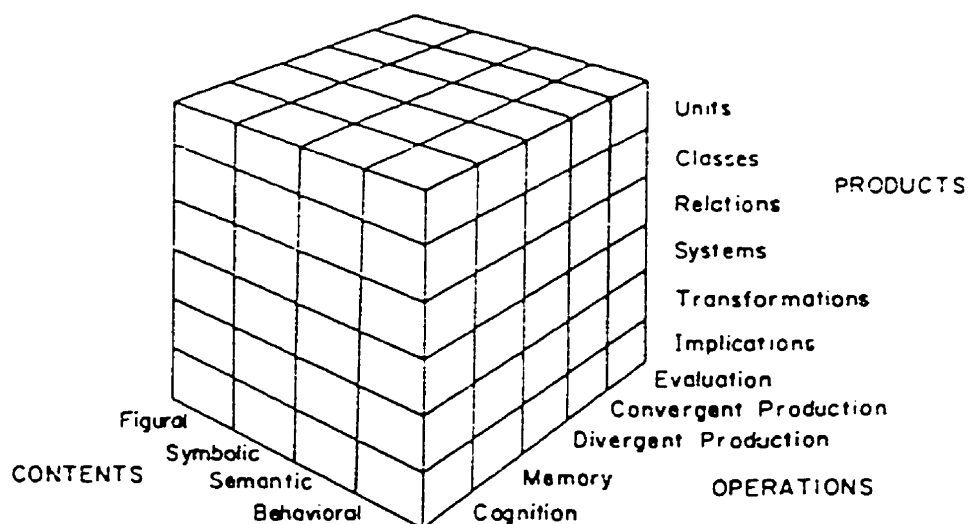
It [creativity] involves a response or idea that is novel or at the very least statistically infrequent. But novelty or originality of thought or action, while a necessary aspect of creativity, is not sufficient. If a response is to lay claim to being part of the creative process, it must to some extent be adaptive to, or of, reality. It must serve to solve a problem, fit a situation, or accomplish some recognizable goal. And thirdly, true creativeness involves sustaining of the original insight, an evaluation and elaboration of it, a developing of it to the full. Creativity, from this point of view, is a process extended in time and characterized by originality, adaptiveness, and realization. (Feldhusen and Goh, p. 233)

Even this fairly comprehensive definition does not encompass all of the areas of creativity. Most researchers seem to agree, though, that any definition of creativity should involve a person, a process, and a product.

One of the approaches that has had a major impact on the field of music education is the trait-factorial work of J. P. Guilford. By using factor

analytic techniques Guilford identified 120 theoretical factors of intellectual ability. Guilford's model has become one of the focal points for research into musical creativity. Guilford hypothesized that there were many different types of intelligence, grouped according to three categories: operations, products, and content. Guilford arranged the categories into a cube model. See Figure 1.

Figure 1. Structure of the intellect model (Guilford, 1967)



Guilford explains how this cross-classification of abilities in the model works:

It classifies the abilities in three different ways, and the categories of one way intersect with those of the other ways of classification. . . . one way of classification is in terms of the kind of mental *operation* involved in the abilities. Each ability involves simple cognition (knowing), memory (or learning "that sticks"), divergent production (generation of logical alternatives), convergent production (generation of logic-tight conclusions), and evaluation (judging goodness of what is known or produced). Each operation category of the model is

shown as including 24 different abilities, parallel to those in every other operations category.

The second way of classification is in terms of content, or areas of information within which the operations are performed – figural (concrete, perceived), symbolic (signs, code elements such as numbers or letters), semantic (thoughts, conceptions, or constructs), and behavioural (psychological). . . . Each set of abilities distinguished as to content includes 30 abilities that are parallel to those in every other content category.

Whereas we may say that the content categories describe the basic substantive kinds of information from the psychological point of view, the *product* categories describe the formal kinds of information. Information takes the form of units (segregated chunks), classes (common properties within sets), relations (meaningful connections), systems (organized patterns), transformations (changes, transitions), and implications (information suggested by other information). Within any area of information it takes different abilities to process information in the form of various products. Within each product category there is a set of 20 abilities, which are parallel with those in each of the five other product categories. (1971, p. 18)

Two components of the SI model were hypothesized to affect creativity - divergent thinking, and transformations. Guilford defined divergent thinking as the 'generating of logical alternatives', and transformations as changes or transitions. From these two components, Guilford hypothesized eight creative abilities: sensitivity to problems, fluency, flexibility, originality, analysis, synthesis, redefinition, and penetration. Four of these original eight abilities were demonstrated as being strong indicators of creativity. These four were fluency, flexibility, originality, and elaboration.

Fluency was defined as giving multiple answers to the same

question. Three abilities were found in this area: word fluency, or divergent production of symbolic units; associational fluency or, divergent production of semantic relations; and ideational fluency or, divergent production of semantic units. Flexibility had three different meanings. The first concerned adaptability to changing instructions. The second focussed on “freedom from inertia of thought” or the readiness to shift meaning. The third meaning was described as “spontaneous shift of thought”, moving between various categories easily to provide answers. Guilford identified two flexibility factors: spontaneous flexibility, or divergent production of semantic classes; and adaptive flexibility, or divergent production of figural transformations. Originality had three hypothesized meanings. The first was an act that was rare in the population to which the individual belonged. The second was the remoteness of associations between things and ideas which were produced by the individual. The third meaning was what Guilford termed the “cleverness of responses”. One factor was found in this area which represented all three hypothesized meanings: divergent production of semantic transformations.

Fluency, flexibility, and originality were tested through Guilford's analysis of creative thinking; elaboration, was tested in his analysis of abilities in planning. Three hypothesized definitions for elaboration were proposed: (a) specification: giving essential details; (b) production of alternative methods: finding different arrangements for an adequate situation; and (c) symbolization: producing adequate representations for ideas. Two factors were found for these three definitions: semantic elaboration, or divergent production of semantic implications; and figural elaboration, or divergent production of figural implications.

Guilford's model, and in particular these four abilities, had a profound effect on subsequent research in musical creativity (Vaughan, 1971; Vaughan and Myers, 1971; Webster, 1979; Gorder, 1980; Kratus, 1990).

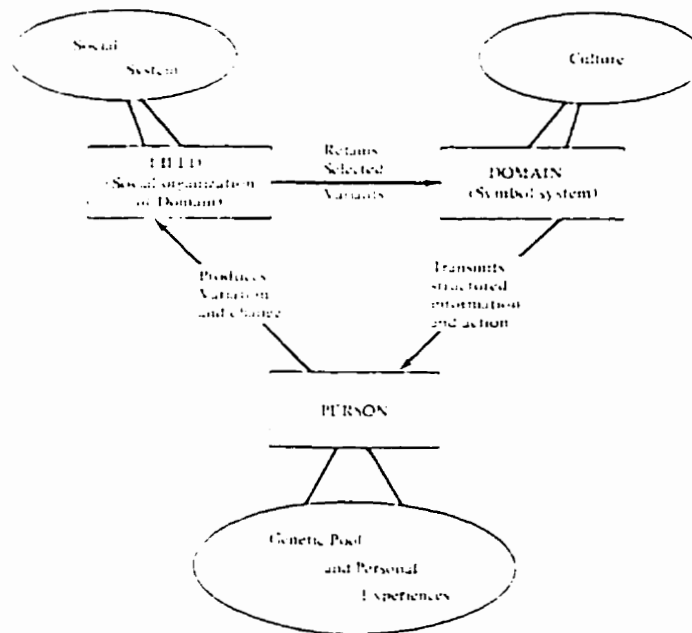
These researchers hypothesized that through the development of a measure of musical creativity a method for the systematic instruction of creativity could be developed.

Recent research by Csikszentmihalyi however has shifted the focus of creativity research in an entirely new direction. Csikszentmihalyi (1990) has recently proposed that society plays the key role in the creative process. His research does not centre on the traditional areas of person, process, or product, but instead looks at the social aspect of creativity. Csikszentmihalyi states:

We cannot study creativity by isolating individuals and their works from the social and historical milieu in which their actions are carried out. This is because what we call creative is never the result of individual action alone; it is the product of three main shaping forces: a set of social institutions, or *field*, that selects from the variations produced by individuals those that are worth preserving; a stable cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generations; and finally the *individual*, who brings about some change in the domain, a change that the field will consider to be creative. (Csikszentmihalyi, 1988, p. 325)

Csikszentmihalyi considers each of the 'three main shaping forces' as separate systems which interact in the locus of creativity. The following model shows the relationship of the three systems.

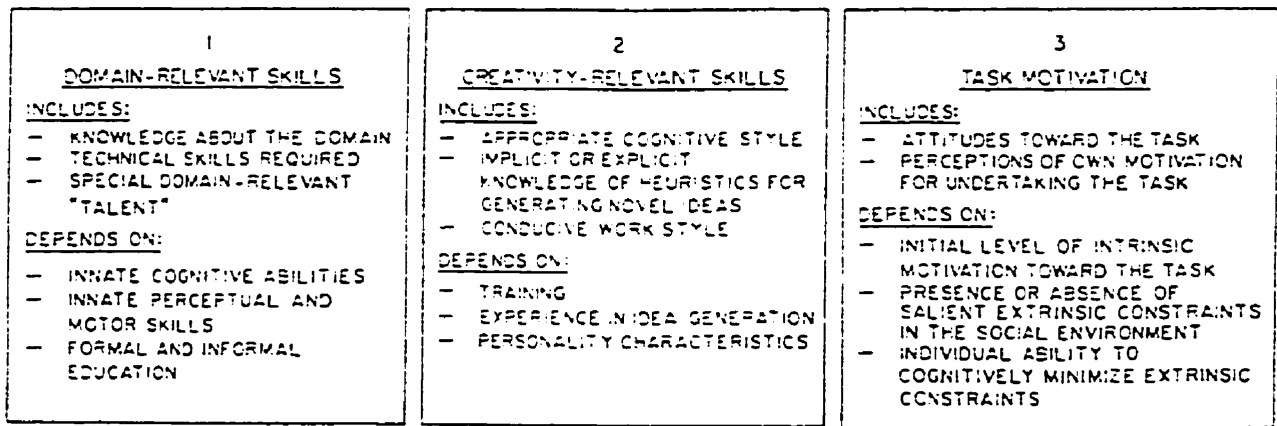
Figure 2. The locus of creativity. (Csikszentmihalyi, 1988, p. 329)



Other researchers credit the role that people other than the creator play in the creative process. As stated earlier, Irving Taylor introduced the concept of *hedonics* to refer to the acceptance of the creative product by others. Even as early as the 1960's Rhodes (1961) proposed that creativity consists of a person, a process, a product, and a situation, indicating that creativity may not be confined to the individual (Feldhusen and Goh, 1995). Csikszentmihalyi moves further than these researchers finding equal partnership between all three systems.

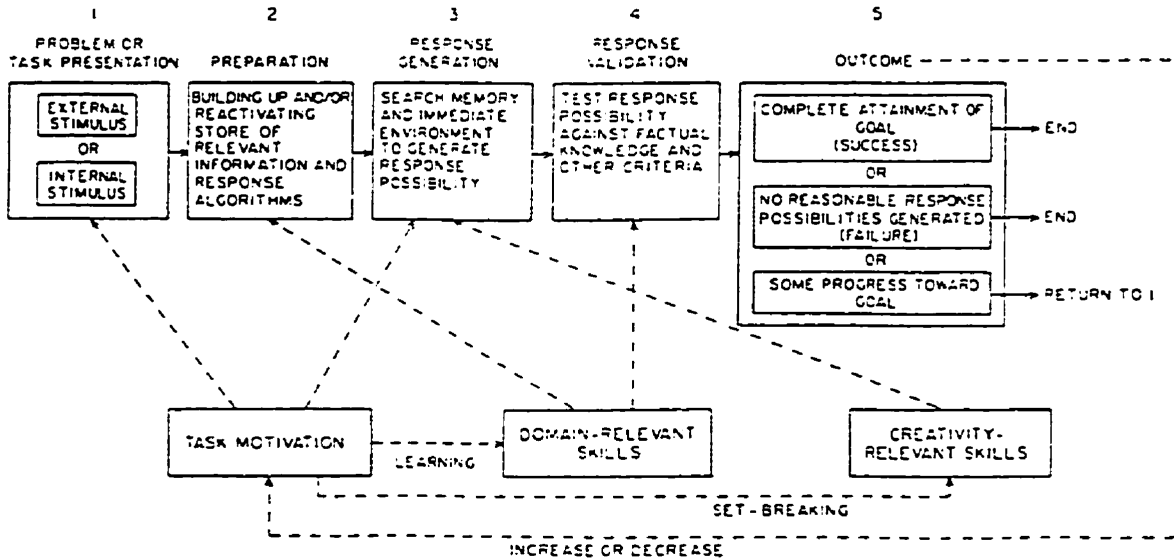
Amabile (1983) refers to the social psychology of creativity. She agrees with Csikszentmihalyi that the individual is only a part of the overall process of creation, but she places more emphasis on individual intrinsic motivation. Amabile divides this into three areas, as shown in Figure 3.

Figure 3. Components of Creative Performance (Amabile, 1990, p. 77)



These components interact in a five stage model of the creative process, as illustrated in Figure 4.

Figure 4. Componential Model of Individual Creativity (Amabile, 1990, p. 81)



Feldhusen and Goh (1995) provide a summary of the model:

[The model] conceptualizes the external input as an incoming

stimulus but also sees the initial impetus as coming from within the individual. Stage 2 in the model, preparation, acknowledges the role of information or knowledge input. Creative processing then involves memory and environmental search, response generation (Stage 3), and response evaluation (Stage 4). The culmination in Stage 5 is success, failure, or partial success. Influencing the whole creative process are task motivation, domain-relevant skills, and creativity-relevant or processing skills. (p. 233)

It is important to note that, once the product or response is produced, it is up to appropriate observers to judge the results of the individual's effort. Amabile (1990) states: "A product or response is creative to the extent that appropriate observers independently agree that it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated" (p. 65). She goes on to further define the product or response: "A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic" (Amabile, 1990, pp. 65-66). Amabile uses McGraw's 1978 terms of algorithmic – tasks with a straight forward path to solution – and heuristic – tasks with no clear path which require exploration – for her definition.

To deal with the difficulties involved in finding a satisfying definition of creativity some researchers, like Amabile, have tried to build models based on aspects of the overall process. In this way creativity may be better understood and an acceptable definition may be found.

David Elliott (1989) proposes a model of musical creativity that is based on four concepts. Creativity involves a doer, a doing, something done, and the context in which it is done. The key aspect of creativity, though, lies not with the individual creator, but rather "the necessary conditions for

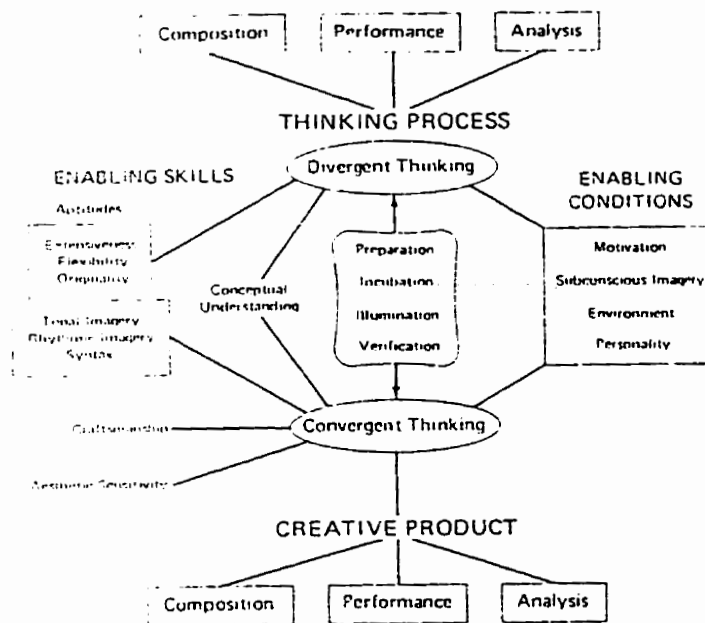
awarding the merit “creative” include the originality and significance of the achievement judged in the context of a specific tradition of human practice” (p. 23). Individuals, just because they have produced something deemed “creative”, are not necessarily creative individuals. In Elliott’s view, these individuals carry no special mental traits that would single them out as creative.

The creative person, then, combines many abilities that both enable and promote creative production. Creativity as personality cannot be limited to the possession of potencies like general intelligence, or musical intelligence, or ideational fluency and flexibility (a person’s ability to quickly generate relevant ideas) . . . specific knowledge and know-how – in a word expertise – is the foundation for creative achievement in a field. (pp. 31-32)

For Elliott, then, the key to determining musical creativity is not within the individual. An individual must have expertise for a product to be termed creative, but the determination comes from the people involved with the specific tradition to which the individual is a part.

Webster (1987) proposed a model of creative thinking that differs from Elliott’s view, centring on the processes and conditions surrounding the individual creator. Webster contends that there are specific enabling skills and enabling conditions that affect an individual’s creative potential. Further, Webster believes that this potential is measurable. Webster’s model, as presented in Figure 5, is the focus of the present study.

Figure 5. Conceptual model for creative thinking in music (Webster, 1987).



There are three main divisions in the model: *product intention*, *thinking process*, and *creative product*. Both the product intention and the creative product stages use the same categories. Webster argues that the intention to produce a certain product forms the goal for the creator. The three categories within the product intention and creative product sections are: composition, performance/improvisation, and analysis. Although the model only shows performance as the middle category, Webster includes both performance and improvisation in his definitions. He defines these categories as follows:

Composition – the conception and recording of sound structures for presentation at a latter time.

Performance/Improvisation – the transmission of sound structures that are either composed previously or actually conceived by the performer at the time of performance.

Analysis – the process of understanding and explaining sound

structures in written, verbal, or (in the case of active listening) mental form. (Webster, 1987, p. 162)

Between the product intention and the creative product is the thinking process stage of the model. In this stage, cognitive activity takes place along with all of the support structures for that activity. The central part of the thinking process stage is movement from divergent thinking to convergent thinking. Similar to Guilford's model, Webster's model proposes that the individual engaged in a creative task generates a number of solutions to that task and then eventually settles on one particular solution which seems to best solve the problem posed by the task. This process occurs in four stages: Preparation, Incubation, Illumination, and Verification. The stages, however, may not always proceed in a linear fashion. Movement back and forth between stages may occur. While this process is taking place, there are certain enabling skills and enabling conditions that contribute to the individual's ability to successfully complete the creative task. Webster asserts that these are "a set of skills that allow for the thinking process to occur" (p. 163). Enabling Skills are divided into four groups:

1. Musical Aptitudes – individual skills that are likely to be subject to great influence by the environment during the early years of development and possibly into early adult life. They include skills of tonal and rhythmic imagery (Gordon, 1979), musical syntax (sensitivity to musical whole), musical extensiveness, flexibility, and originality (Webster, in press-a).
2. Conceptual understanding – single cognitive facts that comprise the substance of musical understanding.
3. Craftsmanship – the ability to apply factual knowledge in the service of a complex musical task.
4. Aesthetic sensitivity – the shaping of sound structures to capture the deepest levels of feelingful response; achieved over the full

length of a musical work (Webster, 1987, p. 163).

Enabling Skills are considered to be specific *musical* skills needed to complete a *musically* creative task. Non-musical variables that also have an effect on the completion of a creative task are grouped under the term Enabling Conditions. These conditions are:

1. Motivation – those drives (both external and internal) that help keep the creator on task.
2. Subconscious imagery – mental activity that occurs quite apart from the conscious mind and that may help to inform the creative process during times when the creator is occupied consciously with other concerns.
3. Environment – the host of characteristics of the creator's working conditions that contribute to the creative process, including financial support, family conditions, musical instruments, acoustics, media, societal expectations, and many others.
4. Personality – factors such as risk taking, spontaneity, openness, perspicacity, sense of humour, and preference for complexity that seem to exist in many creative persons and that may hold some significance for enabling the creative process. (Webster, 1987, p. 164).

Purpose of the Study

Webster has proposed a theoretical model that describes the process of creative thinking. But, does this model portray what students actually do when engaged in musical creativity? Does the model represent what happens when a creative project is undertaken in the music classroom? If this model does in fact describe the creative process, then its application to the development of music curricula should enhance the teaching of creativity in the music program.

The purpose of this study was to test selected aspects of Webster's

Conceptual Model of Creative Thinking in Music (Webster, 1987). The investigation proceeded in three parts: each part sought to answer a different question. The first part tested for relationships within the central or *thinking process* section of the model itself. The second part tested the hypothesis that creativity moves from divergent to convergent thinking, and the third part tested, through an experimental study, the relationship of the *thinking process* section of Webster's model to a creativity project carried out in the classroom. The following questions were addressed:

1) Are there statistically significant relationships between selected enabling conditions and the enabling skills in Webster's model? Swanner (1985) studied the relationships between selected factors of personality and musically creative children aged six to nine. She found several statistically significant factors relating the personality enabling conditions to the enabling skills within Webster's model. This first part of the present study replicated certain aspects of Swanner's study.

2) Given a specific compositional task to complete, is there a statistically significant shift from divergent to convergent thinking in students' actual compositional process? The central core of Webster's model is the hypothesized shift from divergent to convergent thinking. If Webster is correct, students completing creative tasks should demonstrate this shift during the time they are working on the completion of a composition. This was tested experimentally in part II of the present study.

3) Are there statistically significant relationships between the criteria used to judge creative projects in the classroom and the enabling skills or selected enabling conditions in Webster's model? Students who make a valid attempt to solve a musical problem undergo some type of creative process to solve the problem. Regardless of what that process is, the end product is evidence that some process has occurred. Students in the classroom are confronted with musical challenges and derive solutions.

Does the Webster model reflect this process as viewed in an educational setting? Part III of the study addressed this concern.

Methodology

The Subjects

Subjects for this study were grade 4 students, ages 9 and 10, at the Lester B. Pearson School for the Arts in London, Ontario. These students receive an expanded arts curriculum in the areas of dance, drama, visual art, vocal music, instrumental music, and piano. Students enter the program through a selection process consisting of adjudicated workshops in each of the four arts areas – dance, drama, visual art, and music. Academic testing of the students is not part of the selection process, hence there is a wide range of academic abilities among the students.

Collection of the data

Step 1 of the study involved obtaining permission from the parents, the principal, and the London Board of Education to have the students participate in the study. After permission was given at both the school and board levels a parental permission form was sent home for parents' signatures.

Data for this study were collected over a three month period beginning in April, 1996. For step 2 the *Primary Measures of Music Audiation* (Gordon, 1979) was administered. Test administration took place over two class periods, the first period for the rhythmic imagery test, and the second for the tonal imagery test. When analysing the results of this test, it was found that the majority of students achieved perfect or close to perfect scores. As a result, the *Gordon Music Aptitude Profile* was administered the following September to achieve a more useful distribution of scores.

Step 3 involved the administration of the *Measures of Creative thinking in Music* (Webster, 1994). This test is designed for children ages 6 to 10 and consists of 10 scored tasks. Three sets of instruments are used

for this test. These instruments are: "(1) a round "sponge" ball of about 6 inches in diameter that is used to play tone clusters on a piano. (2) a microphone that is suspended in front of the piano and is attached to an amplifier and speaker, and (3) a set of five wooden resonator blocks" (Webster, 1991, p. 272). Through the use of these instruments, the subject manipulates the parameters of high/low, fast/slow, and loud/soft. Depending on the task, one or more of the parameters are used to score each of four factor areas. These include:

- (1) musical extensiveness -- the amount of clock time involved in the creative tasks.
 - (2) musical flexibility -- the extent to which the musical parameters of high/low (pitch), fast/slow (tempo), and loud/soft (dynamics) are manipulated.
 - (3) musical originality -- the extent to which the response is unusual or unique in musical terms and in the manner of performance.
 - (4) musical syntax -- the extent to which the response is inherently logical and makes musical sense.
- (Webster, 1991, p. 272)

Each child was tested individually and video taped for analysis at a later time. Testing took place over a two week period during class hours. The same location was used throughout this period to control for environmental conditions and consistency for subsequent judging.

Step 4 ran concurrent with step 3. This step involved both the parents and the home room teachers filling out the *Swanner Teacher Evaluation of Student Behaviour* survey, and the *Swanner Parent Evaluation of Child Behaviour* survey. These two surveys were developed to test for personality traits and motivational factors. Based on the work of Catell (1966) and Kemp (1982, 1983) these evaluations surveyed parents and teachers for 1) student personality traits including: self-acceptance, independence, perseverance, dominance, introversion, flexibility, tolerance, internal locus of control, self-sufficiency, and non-conformity; 2) motivational needs

including: curiosity, imagination, and sensitivity of purpose; and 3) four musical constructs which correspond to the *MCTM*: musical flexibility, musical originality, musical elaboration, and musical syntax.

For step 5 students were randomly assigned by pairs within their classes and assigned a compositional task to be completed over three class periods. The students were asked to set a given poem to music for presentation at an in-school composition festival (step 7).

In step 6, three work periods for each pair of students were audio-taped so that the students' compositional process could be analysed at a later date.

Step 7 was the students' participation in the "composition festival." The festival was organized similar to a non-competitive music performance festival, but featured instead the students' compositions. Four adjudicators, two composers and two music educators, were invited to listen to the students' compositions and make general comments to the students. These adjudicators judged the compositions for the study.

Analysis of the data

Part I asks the question: are there statistically significant relationships between selected enabling conditions and the enabling skills in Webster's model? Part II asks the question: given a specific compositional task to complete, is there a statistically significant shift from divergent to convergent thinking in students' actual compositional process? And Part III asks the question: are there statistically significant relationships between the criteria used to judge creative projects and the enabling skills or selected enabling conditions in Webster's model? Correlation and multiple regression analysis were used to answer questions one and three. Question two was answered through time analysis of the work periods given to the students to develop their compositions.

Importance of the Study

This study provides a test of selected aspects of Webster's model of the creative process as observed in the classroom. Creativity has been a part of Ontario's music curriculum for 25 years and it has been an area of music education research for over thirty years. Webster (1991) states that "the most important need that faces researchers interested in [creative thinking in music] is the development of better theory" (p. 278). Webster offered his model of conceptual thinking specifically as a starting point for developing a "better" theory. If musical creativity education is to advance then music education must understand what needs to be taught, and how to apply that knowledge to everyday activities of the classroom. Webster presents a starting point for empirical testing of a theory of musical creativity. Webster states: "Working theories of creative thinking give focus to assessment efforts, bring order to the many approaches to definition and technique and aid in assessment validity. . . . These theories, and others that may follow, are vital if any lasting progress is to be made" (Webster, 1991, p. 278).

CHAPTER TWO

Review of the Literature

Introduction

The following review is primarily concerned with studies underlying the formation and foundation of Webster's model of creative thinking in music. Additional studies pertaining to various aspects of Webster's model are also cited. The chapter is divided into three sections: the Theoretical Basis of the Model, the Musical Components of the Model, and the Extra Musical Components of the Model.

Theoretical Basis for Webster's Model

Webster relied on two studies as primary sources for structuring his model: Edith Rhodes (1970), and Mary Greenhoe (1972). Rhodes (1970) compared the writings of philosophers, psychologists, and musicians concerning creativity. This qualitative study examined the nature of creativity, and the nurturing of creativity. Rhodes' "nature of creativity" applies to Webster's model. Webster (1987) suggested that creative behaviour is a normal human response and that the source of creative power is of natural origin. Also, Webster noted that "some relationship exists between creativity and cognitive intelligence, and definite groups of cognitive abilities are involved in creative thinking" (Webster, 1987, p. 159). Webster stressed four points from Rhodes' analysis of the creative process: factors guiding the creative process, the form of the final creative expression, stages of the creative process, and the kind of mental activity during creation.

Greenhoe's study (1972) was concerned with parameters of creativity in music education. Greenhoe stated: "Four parameters are required to determine an event: three to determine its position and one to determine its time. During the creative event, individual psychology (intelligence and personality), medium, and environment combine to determine position, while

the creative process itself determines time" (p. 196).

Greenhoe explored the psychological concepts of creativity based on research literature up to 1970, and related these concepts to musical experience and music education. Greenhoe defined creativity as "an activity occurring at different levels of complexity and variable in scope, resulting in the generation of an idea or object that is novel, adaptive, and communicable" (p. 6).

The first part of the definition defines creativity as "an activity occurring at different levels of complexity and variable in scope." Greenhoe adopted Calvin Taylor's (1964) framework for a classification system of creative activity. This theoretical framework involves five different levels: Expressive creativity, Productive creativity, Inventive creativity, Innovative creativity, and Emergentive creativity. Greenhoe defines these levels as follows:

1. Expressive creativity, fundamental and spontaneous, involves independent expression but does not depend upon technical skill, originality, or the quality of production.
2. Productive creativity occurs following the acquisition of skills needed to produce objects characterized by technical proficiency. Competence is an outstanding characteristic.
3. Inventive creativity is characterized by ingenuity and by flexibility in relating previously unrelated elements. Symbolic interpretation may be added to technical and expressive elements achieved at earlier, less complex levels.
4. Innovative creativity requires a thorough understanding of the medium, style, and theoretical assumptions of a discipline. At this level, elements are no longer merely combined, as in invention, but are modified, elaborated, abstracted, and newly applied. The followers of a "school", those who develop its basic premises, are

included. . . .

5. Emergentive creativity represents human creative power at its highest level. This is the exclusive and historically significant level of genius, where experience is recognized beyond the general understanding of the surrounding culture. (pp. 7-8)

These levels are cumulative, sequential, and progressively selective with fewer individuals rising to each successive level. Very few rise to the level of Emergentive creativity. Greenhoe believed that the first two levels, expressive and productive, and possibly the third level, inventive, are the levels of creative activity that may be cultivated in music education.

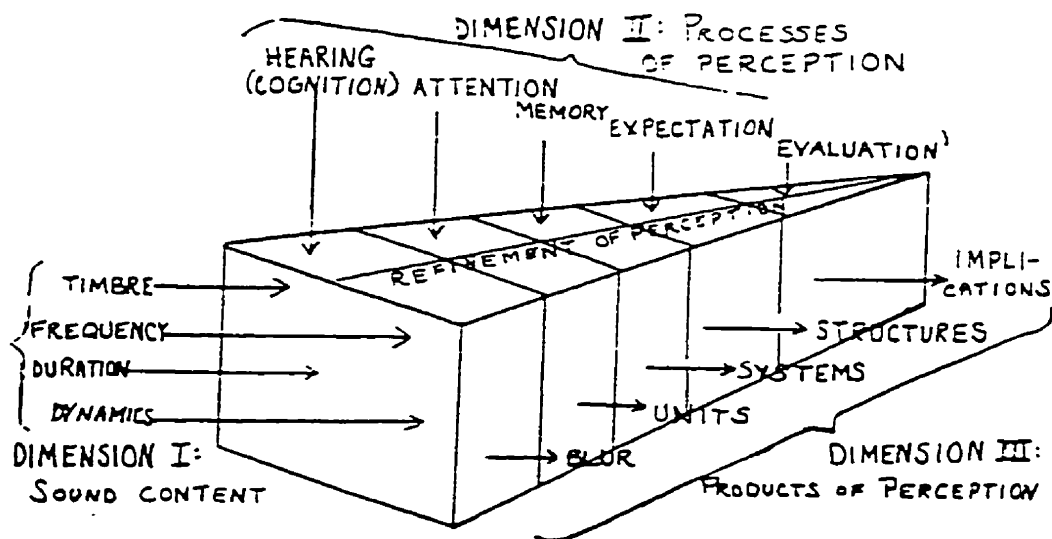
The second part of the definition is: "resulting in the generation of an idea or object." Greenhoe states that the generation of an idea occurs in a five stage process that is adapted from the four stage Wallas (1926) model (preparation, incubation, illumination, and verification). The four stages of the Wallas model remain essentially the same with the final two stages being renamed to better describe the creative process in the arts, rather than in the sciences, which Wallas was describing. The fifth stage is added at the beginning to account for the process an individual goes through to become familiar with the medium they are creating within.

The last part of the definition is "that is novel, adaptive, and communicable." Novel is used to mean unexpected or unique, and adaptive refers to the creative object's "correctness, truthfulness, relevance, or adaptiveness to reality" (p. 8).

By analysing perception in terms of its objective basis – sound content (timbre, frequency, duration, and dynamics), and in terms of its subjective basis – processes of perception (hearing, attention, memory, expectation, and evaluation) Greenhoe developed a morphological model (see Figure 6) adapted from Guilford's Structure of the Intellect. Like Guilford's model, there are three dimensions. The first is the sound content

of music. Greenhoe viewed this as the objective basis for musical creativity. The second dimension is the process of perception. This dimension is viewed as the subjective basis for creativity. There are five cumulative stages to this dimension: hearing, attention, memory, expectation, and evaluation. The third dimension, products of perception, range from initial "blurs" to "implications." Greenhoe defined this dimension as sonic relationships perceived by the listener.

Figure 6. Perception of music: content, processes, and products



Greenhoe's model was the first to take ideas developed in the field of general creativity and apply them specifically to musical creativity. This model provided a starting point for other researchers in their endeavours to understand the creativity aspect of music education.

Summary

Webster adopted constructs developed by both Rhodes and Greenhoe to form the musical foundation of his model. From Rhodes,

Webster adopts the view that creative activity is a normal behaviour having some connection with cognitive intelligence. The development of a work is directed by inspiration or by the final goal, and the creative process is a process that is governed by a series of cumulative stages. Webster's model is cognitively based, progressing through a series of stages toward one of three final goals: composition, performance, or analysis. Greenhoe's study is important as an initial attempt primarily concerned with creativity in music. The influence of Guilford's (1967, 1968) "Structure of the Intellect" model is found in Greenhoe's model. Webster is also influenced by Guilford's model. Flexibility and originality aptitudes that Guilford identifies are directly incorporated into the enabling skills section of Webster's model.

Musical Components of Webster's Model

The central premise of Webster's model is the movement from divergent to convergent activity. Enabling skills and enabling conditions provide the basis for this activity to occur. The enabling skills encompass the musical components of the model whereas the enabling conditions account for the non-musical components. This section investigates studies that have contributed to the development of the enabling skills section of the model

The Creative Process

Pond, a composer, was hired by the Pillsbury Foundation School from 1937 to 1944 to establish a school specifically for the purpose of "an in-depth study of the spontaneous music and musicality of young children" (Pond, 1980, p. 39). The children enrolled in the program were aged three to six. Each year, fifteen to twenty children participated in the program. Pond's purpose was to observe and record signs of innate musicality using what he termed a "composer's sensibility." For example, Pond found that the first activity the children engaged in was sound comparison. The children explored sound possibilities of various percussion and toned instruments in spontaneous games. Rhythmically, Pond found that the children began with

evenly spaced beats, and then experimented with accents, albeit irregular ones.

Saul Feinberg (1973) studied, qualitatively, a creative problem-solving approach to the development of perceptive music listening. To Feinberg musical content is "(1) The study of events and processes that are intrinsic to the musical work, and (2) The study of factors mainly external to the music that help to explain it or affect our experience of it" (Feinberg, 1973, p. 92). For Feinberg, intrinsic content is rhythm, melody and harmony, form, compositional structure, and tone-colour. The Contemporary Music Project (1966) also described music in terms of internal and external factors, where internal factors are "those basic musical elements common to 'all musics'". (Feinberg, pp. 92-93).

Prevel (1979) compared children's graphic scribbles in the visual arts with sound "scribbles" as a starting point for an investigation into emergent patterns in children's musical improvisations. Prevel stated that children must first learn to control psychomotor actions and subsequently move on to "alternate different colours of sound, vary the intensity of volume, and make accents, conclusions and even introductions" (p. 15). These qualitative observations are in accord with many of those found by Pond.

DeLorenzo (1989) analysed the problem-solving process of sixth-grade students within a general music class setting. She observed students in the classroom completing creative tasks that were assigned by the student's music teacher as a regular part of the music curriculum. Eight different projects from four schools in New Jersey and Connecticut were videotaped for subsequent analysis. Seven of the eight groups involved projects for small groups of students, while one project was designed for individual students. The creative problems given to the students fell into three categories: sound compositions, compositions based on a story or event, and compositions focussed around a stated musical concept. Two

cameras focussed on a particular group once the problem-solving process began and were left on that group for the entire process.

In analysing the tapes DeLorenzo states:

... four characteristics seemed to guide the musical decision-making processes of all students observed: (a) perception of the problem structure -- the openness with which the students perceived the creating task. (b) search for musical form -- the degree to which students allowed the musical events to determine the form of the music. (c) capacity to sense musical possibilities -- the depth to which students developed and shaped musical events. and (d) degree of personal investment -- the level of absorption and intensity with which students engage in the creating process. (p. 193)

Kratus (1989) used a time-analysis approach to analyse the compositional process of students aged 7, 9, and 11. Subjects were asked to make up an original song, using a small, portable keyboard. They were given ten minutes to complete this task and then asked to play the song twice for the tape-recorder. Data analysis involved dividing each ten-minute compositional period into 120 five-second intervals. Judges were asked to categorize the activity within each interval according to the following criteria:

Exploration: The music sounds unlike music played earlier. No specific references to music played earlier can be heard.

Development: The music sounds similar to, yet different from, music played earlier. Clear references to music played earlier can be heard in the melody, the rhythm, or both.

Repetition: The music sounds the same as music played earlier.

Silence: No music is heard because of subject silence, subject statement or question, or my statement.

(Kratus, 1989, p. 7)

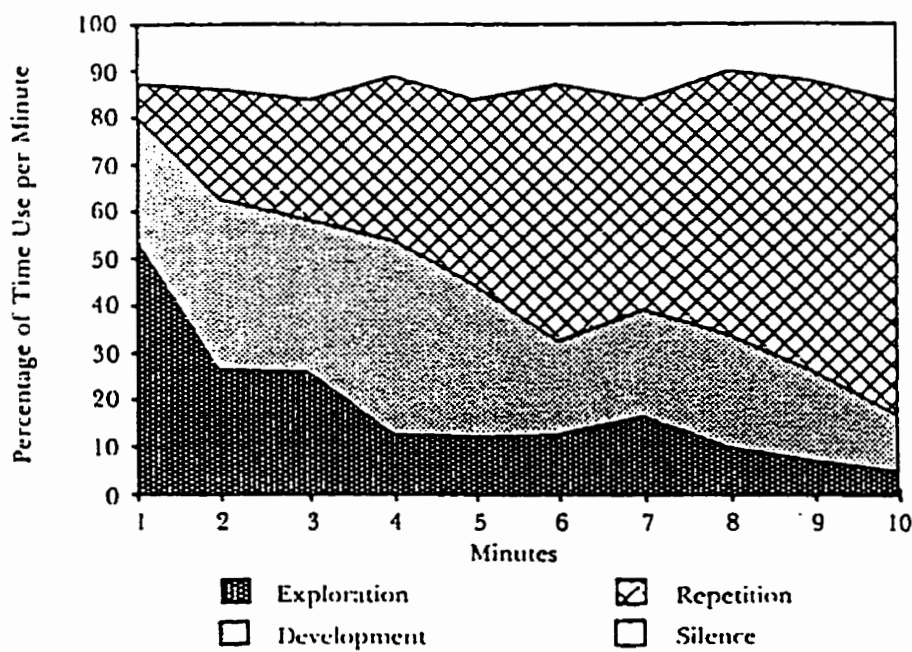
A second analysis involved a comparison between the two playings of the

final composition at the end of the ten-minute period.

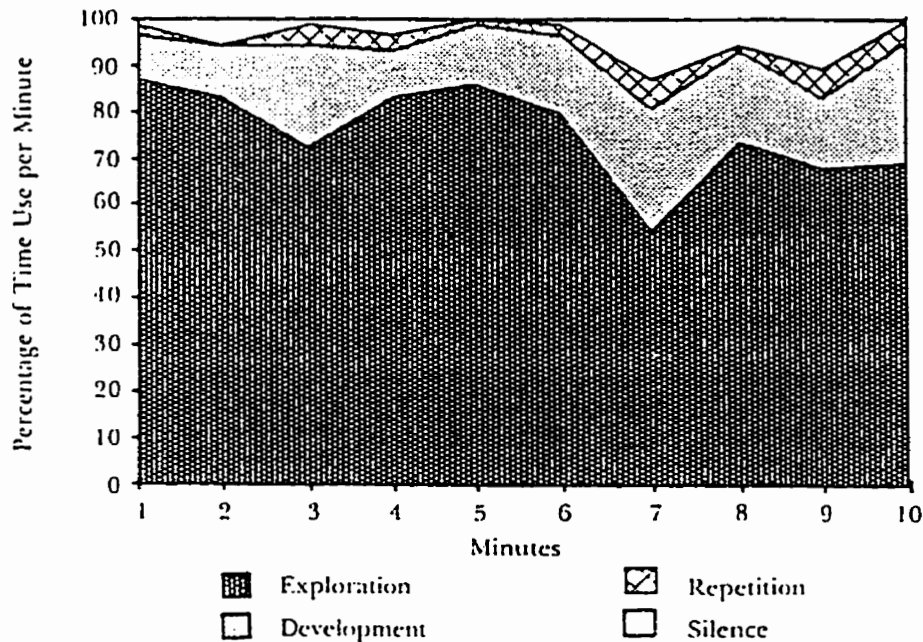
Kratus found that the 7-year-olds allotted 58% of their time to exploration, with very little time spent developing ideas. The nine and eleven-year-olds, however, showed a distinct pattern of movement from exploration through development of ideas to repetition. As age increased, this pattern became more evident. The second part of the study analysed whether or not the subjects could replicate the composition that had been created in the ten minute period. Students who were not able to replicate their compositions received a rating of 1, whereas students who were successful at replication received a rating of 3. Students who were able to replicate their composition showed an even more distinct pattern of movement from exploration to repetition. Figure 8 shows an analysis of the compositional process across the ten minute compositional period for students receiving a rating of 1 and 3 respectively.

Figure 7. Kratus (1989) - Time analysis of the composition period of students receiving successful and non-successful replication ratings.

Successful



Non Successful



Hoffman and Hedden (1990) found several limitations in Kratus' initial 1989 study.

1. The subjects in this study were from only one elementary school.
2. Composition was not part of the general music program at the school.
3. Students who had keyboard experience were excluded from the study.
4. All students had to observe the ten-minute period; they were "asked to be creative on the experimenter's schedule."
5. The students were asked to create a melody without reference to any text; they had no lyric to set to music.

(Hoffman and Hedden, 1990, p. 1)

Kratus (1991) re-analysed the data used in his 1989 study for the characterization of the compositional strategies used by the subjects to compose a melody. The songs were first sorted into "most successful" and "least successful" using a rating scale for craftsmanship and replication.

Once the successful and unsuccessful songs were determined, the compositional processes of each of the groups were analysed. Kratus found:

- 1) Low-success subjects continued exploratory stepping and skipping movement even into the last 2-minute interval, whereas most high-success subjects did not explore new musical ideas after the first 4 minutes.
- 2) Development of new musical patterns was relatively infrequent for the low-success subjects.
- 3) None of the low-success subjects demonstrated closure on a song by repeating it as they composed, but all high-success subjects did so. (p. 101)

The Creative Product

Doig (1941, 1942a, 1942b) examined compositions created by a group of students who attended the Saturday Morning Music Classes at the Cleveland Museum of Art. The purpose of the studies was to discover what elements children use before receiving systematic training in musical composition. All three studies employed the same method of composing, but each study looked at a different aspect of the composition. The compositional-instructional method used was as follows: The students were first divided into like-aged groups from six to eleven, and a single group was formed for students twelve to sixteen. Within each of these groups the instructor took suggestions from the class for the particular compositional aspect being worked on, and then wrote the suggestions on the blackboard. The class then voted for the suggestion that they liked the best to produce a final composition. The focus of each of the three studies was different. The first study examined music composed for a given text; the second study, music composed on a given subject; and the third, music composed to illustrate given musical problems.

Doig analysed the data according to structural, melodic, and rhythmic

elements. But, as Webster (1992) notes:

it is difficult to interpret these results given that the music was constructed by groups rather than individually. Doig was also the only judge of the compositions, and it is unclear exactly how she as a teacher might have influenced the final products. (p. 273)

Flohr (1979) described the behaviour of four-year-old, six-year-old, and eight-year-old children engaged in improvisatory tasks. There were 12 subjects involved in the study, four for each age group. Each subject met with the researcher for ten fifteen-minute sessions. Each session involved improvisation on a two-octave pentatonic xylophone and was divided into three phases: free exploration, in which the subject was given the opportunity to explore the xylophone for five minutes; guided exploration, through echo response and improvisatory tasks; and exploratory improvisation, where the subject was asked to play an improvised melody over a twenty-four measure bordun played by the researcher. The sessions were audio-taped. Following each session the researcher wrote descriptive notes and transcribed the exploratory improvisation for later analysis. Flohr found that the various aged groups differ with regard to applying pitch, rhythm, and form, while there were minimal differences between the groups related to dynamics and timbre.

Kratus (1985) examined original songs produced by children aged five to thirteen as a guide to understanding developmental differences in children's underlying knowledge of musical syntax. Although the primary purpose of this study was not the investigation of musical creativity, musical syntax is one of the components in Webster's model. Eighty subjects from four elementary schools in northwest Ohio participated in the study. The children were divided into groups aged five, seven, nine, eleven, and thirteen. The subjects were given ten minutes to compose and practice a song using a small hand-held keyboard, and then were asked to play their

song twice for the tape recorder. The songs were later analysed by the researcher and two independent judges for twenty-one independent variables relating to rhythm, melody, motive, and phrasing. Kratus considered the results of the study tentative due to the wide range of interjudge reliability (.00 to .87). With this in mind, the analysis showed that there were developmental differences between aged groups for the factors of tempo stability, metric strength, tonal stability, and finality. As well, Kratus noted that there was a statistically significant difference in the use of melodic motivic development and rhythmic motivic repetition. Scores for subjects aged thirteen were rated lower than the subjects aged eleven. Kratus speculated that there might be a plateau that occurs at age eleven that explains this decrease in the older subjects' ratings.

Psychometric Studies

The first attempts to produce a measure of musical creativity were developed by Margery Vaughan (1971, 1977). Vaughan investigated the relationship between mental ability, music ability, and creative thinking ability. As there was at the time no measure of musical creativity, Vaughan developed a measure based on Guilford's ideas concerning general creativity. The test was designed in a musical question-answer format where subjects responded to a musical idea presented by the examiner. Through a series of six open-ended questions using simple percussion materials, Vaughan recorded the creative rhythmic and melodic endeavours of her subjects. The responses to each of the questions were scored for fluency, rhythmic security, and ideation. By 1977 Vaughan had added synthesis as a fourth factor of her measure of musical creativity.

Gorder (1972) investigated divergent production abilities as constructs of musical creativity. The purpose of this study was "to investigate the nature of creativity in music through a study of musical divergent production" (p. 4). To do this Gorder developed a test called the *Musical*

Measure of Divergent Production (MMDP). One of the main differences between the work of Gorder and Vaughan was the “definitions of hypothesized musical creative abilities were drawn to directly parallel those of Guilford and Torrance. These definitions and the Guilford and Torrance tests were used as models to develop musical tasks involving the hypothesized abilities” (Gorder, 1972, p. 228). Gorder attempted to test for the specific aural abilities that Guilford had hypothesized, paralleling visual figural and semantic abilities. The test investigated Guilford's hypothesized aural divergent production abilities including fluency, flexibility, elaboration, and originality. Gorder also hypothesized a fifth ability called musical quality. Gorder used a sample of instrumental music students, who played either woodwind or brass instruments, at the junior or senior high school level. Four junior and four senior high schools from the Chicago area representing a variety of geographic locations, population densities; both urban and rural backgrounds were selected for use in the study. Of 542 available students, 81 were randomly selected, 41 junior high and 40 high school students. Various measures, both standardized tests and measures used in previous studies, were employed to test the validity and reliability of the MMDP. Gorder found that Musical Fluency, Musical Flexibility, Musical Elaboration, and Musical Originality paralleled the creative abilities identified by Guilford in figural and semantic areas.

Webster (1977) sought to identify relationships between creative thinking variables in music and selected musical and non-musical variables. To undertake this investigation he required a valid and reliable measure to assess potential creative thinking ability in all modes of musical ability – composition, performance through improvisation, and analysis. The development of these criteria was the primary aim of his study. Criteria measures were scored for musical fluency, musical flexibility, musical elaboration, and musical originality. Subjects for this study were 77 high

school students between the ages of 14 and 18 from three different schools in the Rochester, New York area. These students were assessed using the *Torrance Tests of Creative Thinking*, Gordon's *Music Aptitude Profile (MAP)*, and Webster's test of creative thinking developed specifically for the study. Other information including I.Q. and grade level were determined through the students' academic records. The investigation proceeded in three parts. The first part sought to establish basic correlations between the variables examined. In the second part multiple regression analysis was used to determine which factors were the best predictors of creative thinking in music. The last part used three-way analysis of variance to investigate the relationship between the nominal variable of performance medium and the criteria. Webster found that music achievement, as measured by academic records, was the most strongly related variable to creative potential and was the best single predictor of this potential. In addition, improvisation was found to be statistically significantly related to music aptitude, figural creativity, I.Q., and the sex of the subject. Compositional analysis was found to be statistically significant in relation to both verbal and figural creativity. Other than music achievement, no additional statistically significant results were found for composition.

The results of this study led Webster to develop a single measure for assessing creative thinking in music in all three modes. The *Measure of Creative Thinking in Music (MCTM)*, Webster 1994) is designed for children ages 6 to 10 and consists of 10 scored tasks divided into three parts. Three sets of instruments are used for this test. These instruments are:

- (1) a round "sponge" ball of about 6 inches in diameter that is used to play tone clusters on a piano,
- (2) a microphone that is suspended in front of the piano and is attached to an amplifier and speaker, and
- (3) a set of five wooden resonator blocks.

(Webster, 1992b, p. 272)

Four factors are scored from this test: musical extensiveness, musical flexibility, musical originality and, musical syntax. Of all of the measures discussed, the Webster MCTM is the test which has been the most widely used. Although still presently in unpublished form, Webster continues to conduct research to confirm its reliability and validity.

Summary

The studies reviewed so far focus primarily on the “conceptual understanding” or “enabling skills” components of Webster’s model. Pond (1980), Doig (1941, 1942a, 1942b), and Flohr (1979) each attempted to determine what young children conceptually know about music. Pond studied this understanding through observing children’s innate musicality, Doig by determining what elements children used to compose, and Flohr by observing the compositional behaviour of 4, 6, and 8 year olds. Prevel (1979) also studied children’s conceptual understanding of music through the emergent patterns in children’s musical improvisations. He looked at the end product rather than the process.

Both Feinberg (1973) and DeLorenzo (1989) spanned the “enabling skills” and “enabling conditions” sections of Webster’s model: Feinberg by studying events and processes that were intrinsic to, and factors external to musical creativity, and DeLorenzo by analysing characteristics that seem to guide the musical decision-making process. The characteristics that DeLorenzo found were applicable to both components of the model.

Kratus (1985 and 1989) relates to specific components of Webster’s model. The 1985 study analysed musical syntax whereas the 1989 study focussed on the shift from divergent to convergent musical behaviour. Kratus noted the distinction between studies analysing children’s songs in terms of creativity – fluency, flexibility, originality, ideation, elaboration (Vaughan, 1971, 1977; Gorder, 1972; Webster, 1977, 1983), and studies that have analysed children’s songs in terms of musical content –melody, rhythm, etc.

(Doig, 1941, 1942a, 1942b; Moorhead and Pond, 1978; Gardner, 1973; Flohr, 1979; Freundlich, 1978; Prevel, 1979:)

The psychometric studies (Vaughan, 1971, 1977; Gorder, 1972; Webster, 1977, 1983) all focus on the enabling skills component of Webster's model, attempting to determine the skills necessary for a subject to be considered musically creative.

Extra-Musical Components of Webster's Model

Lang and Ryba (1975) studied artistic (visual artists) and musical personalities in an attempt to identify some of the creative thinking parameters common to both groups. Ninety-six undergraduate students took part. The students were from various institutions in the Toronto, Ontario area and were relatively homogeneous with regard to age, formal education, sex, and cultural background. Three tests were given to all of the students: the *Torrance Tests of Creative Thinking*, the *Revised Barron-Welsh Art Scale*, and the *Mundinger Musical Perception Test – Pilot Version*. These tests yielded scores for fluency, flexibility, and originality (Torrance); stimulus complexity (Barron-Welsh); and melodic discrimination, auditory perception, aesthetic judgement, perceptual awareness, rhythmic perception, auditory memory, and rhythmic imagination (Mundinger).

Lang and Ryba found that, of all the auditory measures, only aesthetic judgement was statistically significant in relation to divergent intelligence as measured by the Torrance tests. They concluded that artistic and musical personalities have similar cognitive attributes and, that "among creative individuals, there appears to exist a shared artistic and musical sensibility for sensory phenomenon within discrete modalities" (p. 277).

A series of studies conducted by Kemp (1981a, 1981b, 1982) analysed the personality structure of the musician. The first and second studies identified traits of the performer and composer respectively. The third study looked at the significance of sex difference. In the first study three

different groups were tested using personality inventories devised by Cattell. The groups were divided by age and degree of learning. The first was 496 school musicians, aged 13 to 17, from music conservatories, youth orchestras, schools for the musically talented and secondary schools. The second group was 688 students, aged 18 to 25, from conservatories and university music departments. The last group was 202 professional musicians, aged 24 to 70. In the case of the first two groups, control groups of the same ages with no experience in music were also tested. The test instruments were the *High School Personality Questionnaire* for the secondary aged subjects, and the *16PF Questionnaire* for both of the other groups.

Kemp found that secondary school musicians showed tendencies toward introversion, pathemia, dependence, intelligence, and good upbringing. University music students showed introversion, anxiety, pathemia, intelligence, and good upbringing. Professional musicians had the characteristics of introversion, anxiety, pathemia, independence, naturalness, subjectivity, and intelligence. Kemp summed up his conclusions stating: "A stable group of primary factors for the performing musician has been shown to exist across the whole age-span and linked with introversion, pathemia, and intelligence" (1981a, p. 11).

Kemp's second study, one that focussed on traits of the composer, examined a total of 74 music subjects divided into male student and male professional populations. In this study, Kemp divided the professional musicians into male and female groupings. Again, control groups were used for both populations with no musical experience. Similarities of personality characteristics were evident, not only between the groups of composers, but also with the subjects from the first study. The male student composers showed the characteristics of introversion, pathemia, independence, naturalness, subjectivity, and poor upbringing. Professional male musicians,

showed characteristics of introversion, intelligence, and poor upbringing, whereas the females show only the two characteristics of introversion and independence. Kemp concluded that: "There would appear to be evidence here to suggest a link in temperament between those involved in the interpretation and performance of music and those who compose it in the first place" (1981b, p. 74). As well, Kemp noted: "That composers emerged with such extreme scores in comparison to other musicians, may help to account for the fact that so few musicians pursue composition" (1981b, p. 74).

The last study examined the significance of sex difference. The subjects for this study were the same subjects as the first study. No statistically significant differences were found between the sexes. Kemp concluded that "psychologically androgynous persons [people who display neither strong male or female characteristics] appear to be the best endowed with the wide range of temperaments necessary for success in music" (1982, p. 54).

Swanner (1985) investigated the relationship between musical creativity and selected extra-musical factors. The study focussed on selected factors of personality. Specifically Swanner asked: 1) What are the relationships between selected factors of personality and the musically creative child ages six through nine; and 2) What role, if any, do those variables defined as motivation, cognitive intelligence, gender, and musical aptitude play in this relationship? The subjects for this study were 69 grade 3 students (42 males and 27 females) from the Cleveland, Ohio area. To explore the relationship of the various factors, the MCTM (1983b) was administered as well as the Cattell *Early School Personality Questionnaire*, the Gordon *Primary Measures of Music Audiation*, and Swanner's own questionnaires the *Swanner Parent Evaluation of a Child's Behaviour* and the *Swanner Teacher Evaluation of a Student's Behaviour*.

The first part of this investigation examined the relationship between selected personality variables and the musically creative child. Twelve specific traits were targeted using nineteen factors from a possible list of forty-six from the Cattell and Swanner tests. These twelve traits were: excitability, aggression, independence, self-confidence, anxiety, introversion/extroversion, curiosity, sensitivity, complexity, non-conformity, and imagination. These personality factors were found to be correlated with the results of the Webster and Gordon tests. Statistically significant correlations were found between aggression, independence, self-confidence, curiosity, and imagination. Multiple regression analysis revealed that imagination, curiosity, and anxiety were all major factors. In addition, Swanner analysed common personality traits of the top 20% of creative subjects as determined by the Webster test versus the bottom 20%. She found "The highly musically creative children exhibited the following common personality traits: independence, self-confidence, sensitivity, imagination, and curiosity. Those seen as having low scores in musical creativity had only one trait in common – sensitivity" (pp. 150-151). In addition Swanner treated the four enabling skills tested by the MCTM (musical extensiveness, musical flexibility, musical originality, and musical syntax) as conditions also to determine whether or not both teachers and parents were good judges of these skills. In the second part of her study Swanner found no significant role between creativity, as determined by the MCTM, and those variables defined as motivation, cognitive intelligence, gender, and musical aptitude. Swanner concluded that certain personality traits were related to musical creativity.

Summary

The studies in this section focussed primarily on personality (Lang and Ryba, 1975; Kemp, 1981a, 1981b, 1982; Swanner, 1985) or individual motivational factors (Swanner, 1985). Each study attempted to isolate specific factors that might be attributed to what could be termed the

“musically creative individual.”

Chapter Summary

The studies reviewed in this chapter lend support to the model that has been developed by Webster. In the thinking process section of his model, “enabling skills” and “enabling conditions” are constructs that seem to be necessary components for a model of the creative thinking process. The specific enabling skills, though, that should be part of the model are still under development. Vaughan (1971, 1977) assumed the categories fluency, rhythmic security, and ideation, later adding synthesis. Gorder (1972) paralleled categories developed by Guilford (1967, 1968) for figural and semantic areas by directly relating them to music. These include musical fluency, musical flexibility, musical elaboration, and musical originality. Webster proposed the same four categories; however, he later combined the fluency and flexibility categories into a single category.

The “enabling conditions” component of the model requires more study. The majority of the research relating to music has been done only in the areas of personality and motivation. Studies analysing subconscious imagery and environment relating specifically to music are still needed. From the personality and motivation studies reviewed, introversion, anxiety, intelligence, independence, self-confidence, sensitivity, imagination, and curiosity are characteristics that seem to be prevalent.

The idea of moving through a series of stages toward a creative product is also a well founded construct in Webster’s model. Webster uses preparation, incubation, illumination, and verification categories originally developed by Wallas (1926). Kratus (1989) analysed the shift in movement between divergent and convergent behaviour, and found a statistically significant change in student’s activity. But little research has been done to support the four stages proposed by Webster for a model of musical creative thinking.

CHAPTER THREE

Methodology

Purpose and Hypotheses

The purpose of this study was to test selected aspects of Peter Webster's *Conceptual Model of Creative Thinking in Music*. This investigation proceeded in three parts, each part seeking to answer a different question. The first part tested for relationships within the central or *thinking process* section of Webster's model (see chapter one). The second part tested the hypothesis that creativity moves from divergent to convergent thinking, and the third part tested, through an experimental study, the relationship of Webster's *thinking process* component to a creativity project carried out in the classroom.

The null hypotheses tested in this study were as follows:

1) There are no statistically significant relationships between selected "enabling conditions" and the "enabling skills" in Webster's model.

2(a) Given a specific compositional task to complete, there is no statistically significant shift from divergent to convergent thinking in students' composing behaviour, (b) there is no statistically significant increase or decrease in the use of time across the three periods.

3) There are no statistically significant relationships between the criteria used to judge creative projects in the classroom and the "enabling skills" or selected "enabling conditions" in Webster's model.

Subjects

The subjects for this study were grade 4 students from Lester B. Pearson School for the Arts in London Ontario. The school has a total of 252 students from grades 4 to 8 divided into ten classes, two at each grade level. Thirty of the school's 54 grade 4 students were involved in the study.

All students at Pearson School for the Arts receive an expanded arts

curriculum.

The Lester B. Pearson School for the Arts provides specialized facilities and studio space for dance, drama, music and visual arts in order to provide opportunities for the students to:

- ▶ enrich aesthetic awareness and skill development through arts education;
- ▶ develop individual creative potential and artistic talent;
- ▶ study and perform together with students of similar artistic interests and abilities;
- ▶ develop a lifelong involvement in and appreciation for the arts.

(Lester B. Pearson School for the Arts Program Handbook, p. 6)

Students enter the program through a selection process consisting of adjudicated workshops in each of the four arts areas – dance, drama, visual art, and music. Admission to the program requires a high score in each of the four areas. Academic testing of the students is not part of the admission process.

The grade 4 students in this study were admitted in 1995. For four of the school's seven years of operation, statistical studies were conducted on the successful applicants to the program. Although no statistical study of the selection process was conducted on the students in 1995, a study was undertaken to review factors pertaining to city-wide distribution and student background for 1996. These factors include sex, socio-economic distribution, and geographic distribution. Comparison with three previous studies in 1989, 1991, and 1992 (Killip, 1989, 1992, 1993) show that the factors tested have remained fairly constant over the seven years the school has been in existence.

In the 1996 selection year 56 students were admitted to the school, 54 at the grade 4 level and two at other grade levels. For 1996 students from 33 of London's 61 elementary schools were admitted representing all

geographic regions of the city. With regard to socio-economic factors, 12% of the successful applicants were admitted from lower socio-economic areas of the city, 43% from middle socio-economic areas, and 45% from higher socio-economic areas of the city. Gender ratio has remained quite constant at or just below approximately 3 females to 1 male (Merrill, 1996, p. 10).

For the 1995 selection year, 52 grade 4 students were initially admitted and later two more students entered the program, for a total of 54 students -- 16 boys and 38 girls.

After obtaining permission from the principal to conduct the study, a letter was sent to the parents of the grade 4 students outlining the reasons for the study and how the study would be conducted. Of the 54 grade 4 permission letters that were distributed, positive responses were received from 52 families. (See appendix A for letters of permission)

Five pairs of students had to be removed from the study due to difficulties in operating the cassette tape recorder during the periods assigned for composing their song to the given poem (step 5 of the collection of the data). Two other pairs were removed from the study because one of the partners was absent at the composition festival for the presentation of the compositions they had written (step 7 of the study). Three more pairs were eliminated for incomplete data due to absenteeism. 30 students completed the study, ten were boys and twenty were girls.

Collection of the data

The collection of the data for the three parts of this study was completed in seven steps. Step 1 of the study sought permission from the parents, the principal, and the Board of Education for the City of London for the students to participate in the study. After permission was given at both the school and board level, a parental permission form was sent home for parents' signatures.

Data for this study were collected over a three month period

beginning in April of 1996. For parts I and III of the study information pertaining to students' enabling skills and enabling conditions were needed. Steps 2 to 4 collected this information. For step 2, the *Primary Measures of Musical Audiation* (Gordon, 1979) was administered to all subjects. The rhythmic imagery component of the Gordon test was administered in the first period, while the tonal imagery component was administered in the second period. In analysing the results of this test it was found that the majority of students achieved perfect, or close to perfect scores. As a result, the *Gordon Music Aptitude Profile* was administered in September to seek a more useful distribution of scores.

Step 3 involved the administration of the *Measures of Creative Thinking in Music* (Webster, 1994). Each child was tested individually and video-taped for analysis at a later time. Testing took place over a two-week period during class hours. The same location was used in administering the *MCTM* in order to control for environmental conditions and consistency for subsequent judging.

Steps 3 and 4 ran concurrently. Step 4 involved both the parents and the home room teachers completing the *Swanner Teacher Evaluation of Student Behaviour* survey, and the *Swanner Parent Evaluation of Child Behaviour* survey. These two surveys were developed to test for personality traits and motivational factors. Based on the work of Catell (1966) and Kemp (1982, 1983) these evaluations surveyed parents and teachers for (1) the student personality traits of self-acceptance, independence, perseverance, dominance, introversion, flexibility, tolerance, internal locus of control, self-sufficiency, and non-conformity; (2) the motivational needs of curiosity, imagination, and sensitivity of purpose; and (3) for the four musical constructs which correspond to the *MCTM*: musical flexibility, musical originality, musical elaboration, and musical syntax.

To complete the analysis necessary for parts II and III of the study

data pertaining to how subjects completed a given compositional task was required. Steps 5 to 7 collected this information. For step 5, students were randomly assigned to pairs within their classes and given a compositional task to be completed over three class periods. The students were asked to set a given poem to music for presentation at an in-school composition festival (step 7).

In step 6, the students were given three work periods to complete the compositional task. The three work periods for each pair of students were audio-taped so that the students' compositional process could be analysed at a later date.

Step 7 involved the students' participation in a "composition festival." The festival was organized in a way similar to a non-competitive music performance festival, but featured instead the students' compositions. Four adjudicators, two composers and two music educators, were invited to listen to the students' compositions. For the purpose of this study the four adjudicators judged the compositions according to seven categories, (craftsmanship, rhythmic interest, melodic interest, harmonic interest, dynamic interest, tone colour changes, and apparent formal structure), to determine a composite creativity ranking. From the students' point of view the adjudicators were to make general comments of encouragement about the compositions.

Selection of Variables

There were two major considerations for the selection of variables in this study. The first consideration concerned the practicality of testing all components of the model which Webster has developed. There are many components to this model, some of which have been supported by results from experimental studies and others which have not yet been tested. Due to the scope of the model a decision was made to test the central portion of the model – the *thinking process* stage. Within this section of the model only

certain areas were practical to test within the limits of a single study. Components of the model which Webster states change over a long period of time were not tested. These components include craftsmanship and aesthetic sensitivity, both of which are identified by Webster as enabling skills.

The second consideration for the selection of variables was to find a practical means of testing the various areas within the thinking process stage. Specific tests have been developed by Webster (1994) and Gordon (1965, 1979) for the six musical aptitudes in the model – extensiveness, flexibility, originality, tonal imagery, rhythmic imagery, and syntax. Methodology has been developed (Swanner, 1985) to collect data on the enabling conditions: motivation, environment, and personality. However, for the areas of conceptual understanding and subconscious imagery, a practical means of testing with acceptable validity and reliability was not found. To test the central theme of the model, that the creative process moves from divergent to convergent activities, a time-analysis procedure was used similar to that employed by Kratus (1989). In the present study, however, a composite score of seven elements was used to determine the creativity ranking. The variables tested in the study were:

Dependent Variable:

1)creativity ranking - determined through a composite score from:

- I) craftsmanship
- ii) rhythmic interest
- iii) melodic interest
- iv) harmonic interest
- v) dynamic interest
- vi) tone colour changes
- vii)apparent formal structure

Independent Variables:

- 2) *Gordon Music Aptitude Profile*
- 3) *Webster Measure of Creative Thinking in Music*
- 4) *Swanner Teacher Evaluation of Student Behaviour* survey (1985)
- 5) *Swanner Parent Evaluation of Child Behaviour* survey (1985)

Test Instruments

Each of the variables assessed in this study was measured using either a standardized test which has demonstrated acceptable levels of reliability and validity or a previously developed measure from a similar study. A description, the administration and scoring, and the rationale for all of the test instruments used is discussed below.

Music Aptitude Profile (Gordon, 1965)

The *Music Aptitude Profile* (MAP) is a test designed to yield scores for Tonal Imagery and Rhythmic Imagery, and Musical Sensitivity. There are two separate subsections for each of the first two areas, and three subsections for Musical Sensitivity. Only the Tonal Imagery and Rhythmic Imagery sections of the MAP were administered for this study. The Tonal test is divided into two parts, the first focussing on melody and the second on harmony. Subjects are asked to discriminate between pairs of tonal patterns to determine whether the contour of the second pattern is the same as or different from the first. The Rhythm test is similarly structured with the first part devoted to tempo, and the second part to meter. Again, subjects are asked to notate whether the pairs of patterns are the same or different. Unlike the *Primary Measures of Music Audiation*, subjects are also allowed to mark a “?” if they are not sure which of the two answers is correct.

Administration and Scoring. The four parts of the Tonal and Rhythmic tests were administered one week apart using the equipment and script suggested by the manual. The students completed the test within their regularly scheduled music period in their instrumental music classroom.

Each of the two classes involved in the study completed the two tests separately. Test scoring followed instructions given in the test manual.

Measure of Creative Thinking in Music (MCTM, Webster 1994)

The *Measure of Creative Thinking in Music* is designed for children ages 6 to 10 and consists of ten scored tasks. Subjects are scored for musical extensiveness, musical flexibility, musical originality, and musical syntax. The scoring for this set of tests is open-ended. If local normative tables have been developed, the tests may be compared with these tables.

Administration and Scoring. The *Measure of Creative Thinking in Music* was administered over a two-week period using the suggested equipment, setup, and administration script provided in the manual. Students were tested individually in a small workroom beside their classroom by an independent administrator. The scoring for the tests was carried out by an independent judge according to the manual instructions and using the scoring sheets provided.

Rationale. The *Music Aptitude Profile* and the *Measure of Creative Thinking in Music* were selected because of their direct applicability to the Enabling Skills component of Webster's model. Webster (1987) states that the Enabling Skills are divided into four groups. The first of these groups is musical aptitudes.

1. **Musical Aptitudes** – individual skills that are likely to be subject to great influence by the environment during the early years of development and possibly into early adult life. They include skills of tonal and rhythmic imagery (Gordon, 1979), musical syntax (sensitivity to musical whole), musical extensiveness, flexibility, and originality. (Webster, 1987, p. 163)

Swanner Teacher Evaluation of Student Behaviour survey, and the **Swanner Parent Evaluation of Child Behaviour** survey.

Swanner developed the teacher and parent surveys to test for personality traits and motivational factors. Based on the work of Catell (1966) and Kemp (1982, 1983), these evaluations survey parent and teacher opinions concerning the following: (1) student personality traits of self-acceptance, independence, perseverance, dominance, introversion, flexibility, tolerance, internal locus of control, self-sufficiency, and non-conformity; (2) student motivational needs including curiosity, imagination, and sensitivity of purpose; and (3) four musical constructs which correspond to the *MCTM*: musical flexibility, musical originality, musical elaboration, and musical syntax. A seven point Likert scale was used for each of the factors tested. Swanner defines each of the above factors as follows:

- 1) Introversion: the turning in to one's self instead of seeking the companionship of others; shown by shyness, reserved nature, and reflectiveness.
- 2) Independence: the ability to conduct activities and cope with problems without seeking help.
- 3) Curiosity: the tendency to be attracted by the novel or strange, repeatedly asking questions to gain knowledge.
- 4) Self-Confidence: the willingness and self-assurance to try new ideas.
- 5) Anxiety: apprehensiveness, dread of the unknown.
- 6) Aggression: does not get along with those around him (sic) because of bossiness, rudeness, and little concern for those around him (sic).
- 7) Sensitivity: delicacy of feelings; caring; sentimental.
- 8) Complexity: the ability to deal with many and various ideas at the same time with ease.
- 9) Non-Conformity: cannot accept the standard way of doing things.
- 10) Imagination: ability to form images that do not presently exist.

11) Cognitive Intelligence: the ability to obtain knowledge by use of perception, reason, or intuition.

12) Flexibility: responsive to change; adaptable.

13) Expressiveness: the ability to spend a great deal of time in a given situation.

14) Originality: the ability to think of new and unique ideas.

15) Syntax: the systematic arrangement of ideas.

(Swanner, 1985, pp. 190-193)

Administration of the survey. The *Swanner Teacher Evaluation of Student Behaviour* survey, and the *Swanner Parent Evaluation of Child Behaviour* survey were distributed to the home room teachers and the parents in June, 1996. Surveys were collected prior to the end of the 1995-96 school year.

Rationale. The purpose of the Swanner study was “to empirically determine the role that certain personality traits might play in a child’s musical creativity” (Swanner, 1985, p. ii). Using correlation and multiple regression analysis, Swanner found significant statistical relationships between seven of the personality traits for which the students were tested and creativity in music. The present study attempted to verify those results, and in addition used this same instrument to further test the same traits against the creative assignment completed in the classroom.

Time-Analysis of the Compositional Process

Kratus (1989) used a time-analysis method, called protocol analysis, to analyse the compositional process of students aged 7, 9, and 11. In his study subjects were asked to make up an original song. They were given ten minutes to complete this task and then asked to play the song twice for the tape-recorder. Subsequent analysis involved dividing the ten-minute period into 120 five-second intervals. For each of those intervals, judges were asked to categorize the activity of the subjects according to the following

criteria:

Exploration: The music sounds unlike music played earlier. No specific references to music played earlier can be heard.

Development: The music sounds similar to, yet different from, music played earlier. Clear references to music played earlier can be heard in the melody, the rhythm, or both.

Repetition: The music sounds the same as music played earlier.

Silence: No music is heard because of subject silence, subject statement or question, or my statement. (Kratz, 1989, p. 7)

A similar time division procedure was followed for the present study. The students were randomly assigned to paired groupings within their home room classes by the music teacher to complete the compositional task. Paired groupings were selected for three reasons: (1) students had worked in pairs or small groups for previous compositional tasks; (2) it was expected that talking between the two students would facilitate the generation of musical ideas in a classroom setting; and, (3) limitations on space, numbers of instruments, and tape-recorders within the school prohibited students working individually.

A compositional task was given to the students. This task was to use the poem *Jabberwocky* by Lewis Carroll to create a piece of music. This poem was selected because it was expected that the use of nonsense words would stir the students' imaginations. The poem appears in Appendix B.

Administration and Scoring. Prior to learning that *Jabberwocky* was to be used for their composition assignment, the students were introduced to the poem in their drama class. One drama period was devoted to exploring the language of the poem, learning what the term "nonsense word" meant, discovering which were the nonsense words, and creating a short play based on the poem. Students were given the composition assignment in the next class. They could use any of the instruments in the music room,

which included a large selection of Orff instruments, small percussion instruments, and recorders. The students had had prior experience on all of these instruments. In addition, the students could bring in any other instruments they desired.

Guidance was provided as to how to “set” the poem. The following three options were given:

- 1) students could set the poem to music to create a sung song with accompaniment;
- 2) they could create music to be played as an accompaniment to the reading of the poem; or,
- 3) they could create a piece of music inspired by the poem.

The students were told that they had the next three music periods to create their piece, and would then present their pieces at a composition festival for invited adjudicators. The students received instructions on how to operate the tape-recorders which would be used to record their three work periods. questions about the assignment were answered, and practical matters of how to facilitate twelve to fourteen pairs of students needing individual work-spaces were addressed. The creation of the compositions began with the next class. The three work periods were all forty minutes in length and occurred every other day.

Hoffman and Hedden (1990) conducted a similar study to that of Kratus (1989). In citing Kratus’ study Hoffman and Hedden listed several limitations (see chapter two). The present study addressed four of the five limitations identified by Hoffman and Hedden. The limitation concerning all subjects attending the same school was not addressed in the present study. Concerning the remaining four limitations:

- 1) composition was a regular part of the music program;
- 2) the students all had keyboard experience, as a piano lab course is one of the courses at the school;

3) rather than a ten minute time-span, the students had three forty minute periods over the course of a week which could be used, less five minutes at the beginning and end of the periods for set up and replacement of instruments; and,

4) a text was supplied with guidance as to possibilities for its use.

Scoring of the tapes was based on Kratus (1989), with modifications to suit the particulars of the present study. Because students were working in pairs in this study, the three categories of exploration, development, and repetition were each subdivided into two components to take into consideration the fact that students would be both talking about and playing their music as they moved through the creative process. The following seven categories were used to rate each fifteen-second interval for up to thirty minutes in each of the three individual work periods.

- 1) talking about a new musical idea (expl-tk)
- 2) talking about a given musical idea (devl-tk)
- 3) talking about the rehearsal of the music (rept-tk)
- 4) presenting a new musical idea (expl-pl)
- 5) expanding on a given musical idea (devl-pi)
- 6) rehearsing the music (rept-pl), and
- 7) off task. (off-task)

Judging of each fifteen-second interval was based on all the activities that occurred in each interval. If more than one category occurred within each fifteen second interval, the interval was evenly divided between those categories. The division between presenting or talking about the music was later recombined for a single score in the original three areas used by Kratus (1989) - exploration, development, and repetition. Rather than a category for silence, the category, "Off task" was added due to the students being in a situation where they were not under the immediate supervision of the teacher for the entire period.

Rationale. To determine if there is movement from divergent to convergent activity in the creative process, a time-analysis strategy was employed. This analysis involved the assessment of subject activity during each of many small units of time, thus subdividing the total time frame of the activity. Kratus (1985), in employing this method, obtained results that suggested the presence of a divergent/convergent movement. (Kratus, however, did not design his study to specifically examine this aspect of the creative process.)

Compositional Task Judging Criteria

The criteria used to rate student compositions during the three work periods combined an assessment of the elements of music (melody, rhythmic, harmony, dynamics, tone-colour, form) and the criteria that Kratus (1991) used in his study of children's compositional strategies.

Administration and Scoring. Kratus used the single category "craftsmanship" to judge the songs written by his subjects. A Likert scale ranging from 1 to 7 was used to determine the success of the song. The following information was given to the judges in the Kratus study:

7= the song forms a cohesive whole and makes interesting use of melodic and rhythmic patterns.

1= the song appears to have no structure, with seemingly random pitches and rhythmic durations. (Kratus, 1991, p. 98)

The craftsmanship category was also used in the present study. In addition, six other categories were added from the elements of music – rhythmic interest, melodic interest, harmonic interest, dynamic interest, tone-colour changes, and apparent formal structure. The seven-point Likert scale was used for all categories. Figure 8 illustrates the form used by the four judges to rate the students' compositions.

Figure 8. Composition festival judging form.

Group:			
Please check the appropriate box			
craftsmanship	unsuccessful	<input type="checkbox"/>	successful
rhythmic interest	unsuccessful	<input type="checkbox"/>	successful
melodic interest	unsuccessful	<input type="checkbox"/>	successful
harmonic interest	unsuccessful	<input type="checkbox"/>	successful
dynamic interest	unsuccessful	<input type="checkbox"/>	successful
tone colour changes	unsuccessful	<input type="checkbox"/>	successful
apparent formal structure	unsuccessful	<input type="checkbox"/>	successful

A composite score derived from the combination of the scores for all seven categories was calculated as the judgement of the most successful compositions.

Each of the pairs of students presented their composition for the judges and their parents at the Composition Festival. This festival was, from the students' point of view, a non-competitive composition festival where they had a chance to perform for the invited adjudicators. Two teachers and two composers served as judges. Both teachers were from the London, Ontario area. One is a specialist in Kodaly methodology and the other is a very successful choral director. One of the composers was also from London and the other was based in Simcoe, Ontario. These composers specialize in jazz and classical, and choral and opera works respectively. At the end of the evening each adjudicator also had the opportunity to address the students and offer thoughts on what they had heard, suggestions for further development, and in general to give words of encouragement. From the point of view of this study, the adjudicators provided the data for each of the above seven criteria.

Rationale. The seven criteria were chosen for the following reasons:

1) The “craftsmanship” category had previously been used in the Kratus study as a method of evaluating creative projects.

2) The elements of music have been a central focus for both the development of curriculum and teaching methodology used in London, Ontario schools. The elements have provided a means of analysing music, thus allowing the systematic study of the subject in other fields such as theory and composition. Music assignments and tasks are regularly assessed using the elements of music as evidence of learning and development.

3) Feinberg (1973) defined the following six elements: rhythm, melody, harmony, dynamics, tone-colour, and form. These six areas were used in the present study along with craftsmanship for the analysis of the students’ compositions. If creative musical activities are to be a part of the music curriculum, then the teaching and assessment of learning in this area should be compatible with previously accepted methodology. Creative activities need not be different in their fundamental method of teaching.

Analysis of the Data

A number of standard statistical procedures were performed by means of the Statistical Package for the Social Sciences (SPSS). These included descriptive statistics for each of the variables, multiple correlation analysis between all variables, multiple regression analysis in testing various components within the Webster model, and an analysis of variance in order to test the difference between subjects’ use of creativity time movement from divergent to convergent behaviour in carrying out the creative task.

Judge group reliability was calculated according to the following four steps.

1) Each individual judge’s composite score of the seven categories for a particular pair of students was correlated with the same score from each of the other three judges. A correlation matrix was calculated using the

Pearson product-moment correlation formula.

2) Each of the correlations were transformed to a Fisher Zr score, and a mean Zr score was calculated.

3) The mean Zr score was then reconverted into a Pearson product-moment correlation coefficient.

4) The coefficient was then used in the formula below to determine the judge group reliability.

$$\text{group reliability} = \frac{(n) (\text{homogeneity})}{1 + (n - 1) (\text{homogeneity})}$$

where. n = the number of judges, and homogeneity = Pearson product-moment correlation obtained from the mean of the Fisher Zr score.

Summary

The study was divided into three parts, each seeking to answer a different question concerning Webster's model. The first part of the study tested for relationships within the central or *thinking process* section of Webster's model. The null hypothesis for this part was: there are no statistically significant relationships between selected "enabling conditions" and the "enabling skills" in Webster's model. The test instruments used for this part of the study were: the *Music Aptitude Profile* (Gordon, 1965) and the *Measure of Creative Thinking in Music* (MCTM, Webster 1994) to collect data on the enabling skills; and the *Swanner Teacher Evaluation of Student Behaviour* survey, and the *Swanner Parent Evaluation of Child Behaviour* survey (Swanner, 1985) to collect data on the enabling conditions.

For part II of the study the hypothesis that creativity moves from divergent to convergent thinking was tested. The null hypothesis for this part was (a) given a specific compositional task to complete, there is no statistically significant shift from divergent to convergent thinking in students' composing behaviour, and (b) there is no statistically significant increase or

decrease in the use of time across the three periods. The test instrument used in this part of the study was the *Time-Analysis of the Compositional Process*.

The third part of the study tested the relationship of Webster's *thinking process* component to a creativity project carried out in the classroom. The null hypotheses was there are no statistically significant relationships between the criteria used to judge creative projects in the classroom and the "enabling skills" or selected "enabling conditions" in Webster's model. The data collected in part I of the study was used in seeking a relationship with creativity as judged by independent observers within the field of music. The test instrument used for this part of the study was the *Compositional Task Judging Criteria*.

CHAPTER FOUR

Results

Introduction

In this chapter descriptive statistics for both the musical measures and non-musical measures are presented, followed by results and discussion for each of the three parts of the study. In Part I simple correlations and multiple regression analysis results between Webster's hypothesized enabling conditions and enabling skills are presented. In Part II analysis of variance results for divergent to convergent creative behaviours are presented. Part III presents simple correlations and multiple regression analyses concerning subjects' creative activity. Judge group reliability for the four judges used in this part of the study is also presented.

Descriptive Statistics

Musical Measures

Data were collected using two musical measures, the *Music Aptitude Profile* (Gordon, 1965), and the *Measure of Creative Thinking in Music* (Webster, 1994). Table 1 presents the mean, standard deviation, and the skewness for each of the factors tested using the *Music Aptitude Profile* (Gordon, 1965).

Table 1.

MAP descriptive statistics

	Mean	Standard Deviation	Skewness
Tonal Imagery	58.67	7.761	-0.397
Rhythmic Imagery	67.23	5.655	-0.259

Although both factors of the profile were slightly negatively skewed, the distribution for the scores was considered normal. Figures 9 and 10 present histograms for each of the two factors of the MAP.

Figure 9. Histogram of the raw scores for tonal imagery.

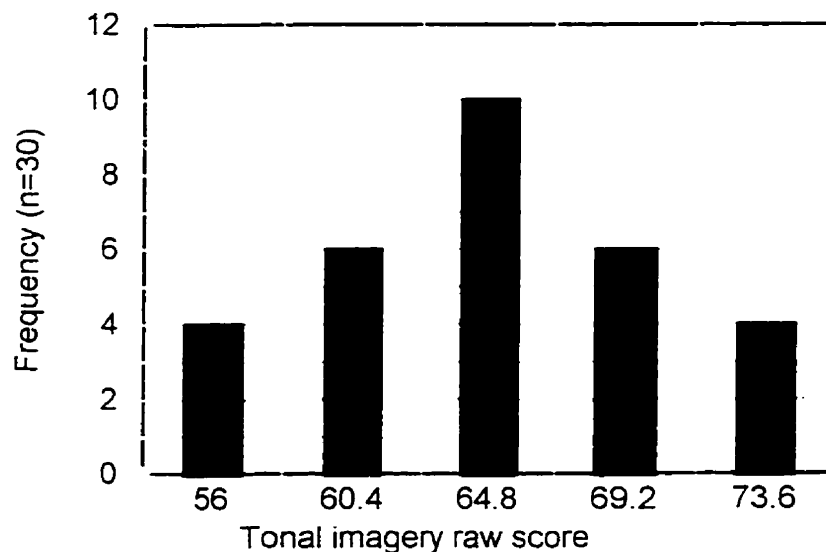
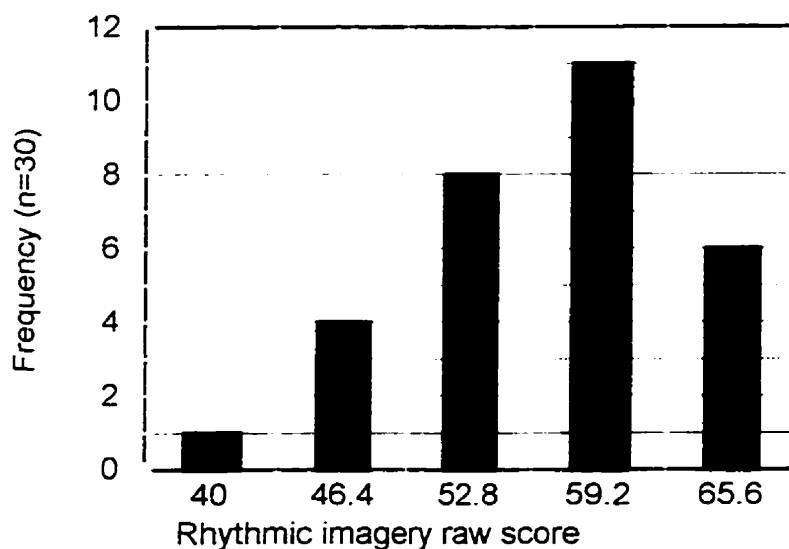


Figure 10. Histogram of the raw scores for rhythmic imagery.



Gordon reports that the mean and standard deviation norms on raw scores of musically select grade 4 to 6 students for tonal imagery are - mean 50.0, S.D. 9.57; and for rhythmic imagery are - mean 56.2, S.D. 10.82. When the scores of the subjects from the present study were converted to

percentiles to determine how their skills compared with Gordon's norms. the present studies' subjects scored quite high. The mean score for all subjects in the present study for tonal imagery was the 75th percentile, and for rhythmic imagery was the 81st percentile.

The *Webster Measure of Creative Thinking - II in Music* measures four aptitudes: musical extensiveness, musical flexibility, musical originality and, musical syntax. Table 2 presents the mean, standard deviation, and skewness for the subjects' scores on the MCTM measure.

Table 2.

MCTM descriptive statistics

	Mean	Standard Deviation	Skewness
Musical Extensiveness	384.07	171.062	2.480
Musical Flexibility	52.23	9.895	0.271
Musical Originality	8.43	3.266	-0.218
Musical Syntax	6.00	1.781	-0.196

Of the four aptitude measures, two were found to be normally distributed -- musical flexibility and musical originality. Musical syntax has somewhat convoluted distribution, and the remaining aptitude, musical extensiveness, is positively skewed. Figures 11 to 14 present the histograms for these four aptitude measures.

Figure 11. Histogram of the scores for musical extensiveness.

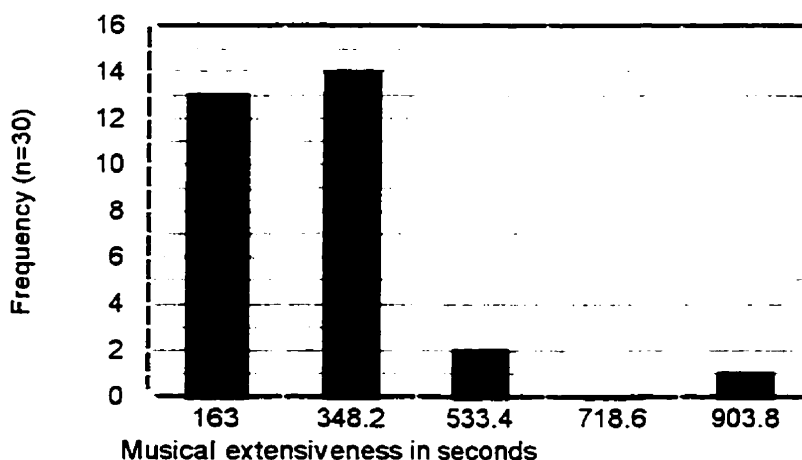


Figure 12. Histogram of the scores for musical flexibility.

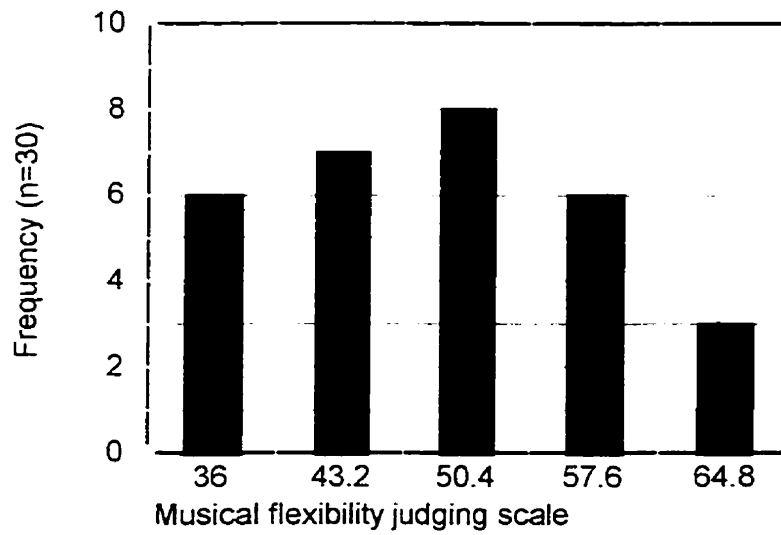


Figure 13. Histogram of the scores for musical originality.

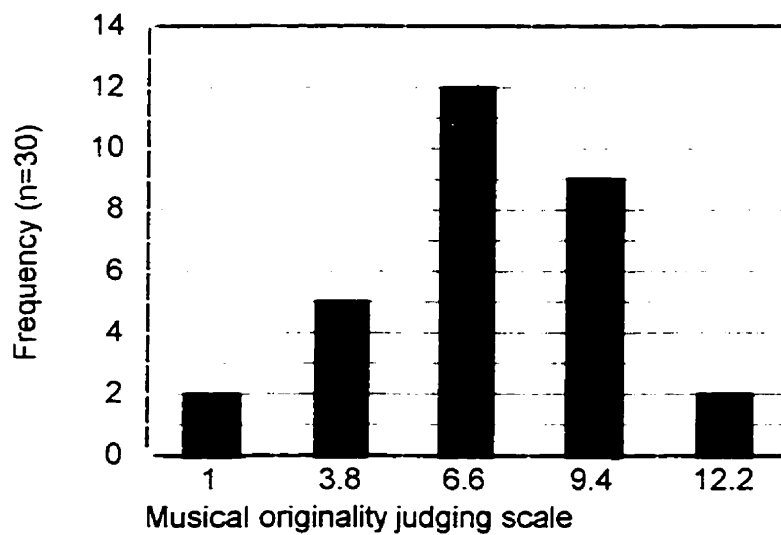
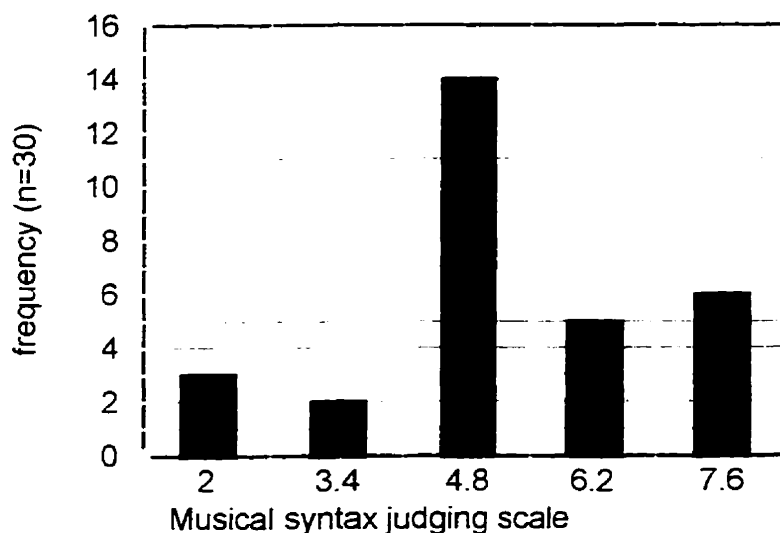


Figure 14. Histogram of the scores for musical syntax.



Non-Musical Measures

The Swanner *Parent Evaluation of Child's Behaviour*, and the Swanner *Teacher Evaluation of Student's Behaviour* each measured ten personality traits. These include: introversion, independence, curiosity, self-confidence, anxiety, aggression, sensitivity, complexity, non-conformity, and imagination. In addition to these ten, the teacher survey also reports on cognitive intelligence. Both surveys include the categories for extensiveness, flexibility, originality, and syntax to correspond with the Webster MCTM. Table 3 presents the mean, standard deviation, and skewness for the *Parent Evaluation of Child's Behaviour* and, in Table 4 the same statistics are presented for the *Teacher Evaluation of Student's Behaviour*.

Most of the data were normally distributed, with skewness falling between +1.0 and -1.0. From the parent survey six of the fourteen variables were outside of this range: introversion, +1.098; curiosity, -1.214; self-confidence, -1.052; aggression, +1.492; sensitivity, -1.921; and syntax, -1.005. From the teacher survey only one variable fell out side of the

+1.0/-1.0 range. syntax at -1.054.

Table 3.

Parent Evaluation of Child's Behaviour descriptive statistics.

	Mean	Standard Deviation	Skewness
Introversion	2.17	1.440	1.098
Independence	5.43	1.135	-0.506
Curiosity	6.10	1.155	-1.214
Self-Confidence	5.57	1.431	-1.052
Anxiety	2.32	1.263	0.555
Aggression	1.97	1.159	1.492
Sensitivity	6.10	1.125	-1.921
Complexity	4.80	1.562	-0.342
Non-Confidence	3.37	1.771	0.236
Imagination	5.97	0.928	-0.763
Expressiveness	5.53	1.224	-0.566
Flexibility	5.47	1.332	-0.299
Originality	5.17	1.206	-0.848
Syntax	5.63	1.608	-1.005

Table 4.

Teacher Evaluation of Student Behaviour descriptive statistics.

	Mean	Standard Deviation	Skewness
Introversion	3.07	2.180	0.508
Independence	4.27	2.164	-0.238
Curiosity	4.63	1.691	-0.475
Self-Confidence	4.47	1.889	-0.471
Anxiety	3.27	1.799	0.408
Aggression	2.73	1.874	0.449
Sensitivity	4.77	1.654	-0.580
Complexity	4.50	2.316	-0.428
Non-Confidence	3.00	2.017	0.459
Imagination	4.70	1.622	-0.671
Cognitive Intelligence	5.30	1.643	-0.818
Expressiveness	4.20	1.864	-0.415
Flexibility	4.77	1.832	-0.928
Originality	4.13	1.737	-0.050
Syntax	5.10	1.709	-1.054

Part I

Part I of this study sought to test selected relationships between constructs proposed by Webster's model. Relationships between selected enabling skills and selected enabling conditions were tested through correlation and multiple regression analyses. Table 5 presents two correlation matrices for the enabling conditions, including musical extensiveness (ME), musical flexibility (MF), musical originality (MO), musical syntax (MS), a composite score for all four of the Webster aptitudes (z-C), rhythmic imagery (Rhy), and tonal imagery (Ton) with the personality/motivation factors of introversion (Int), independence (Ind), curiosity (Cur), self-confidence (S-con), anxiety (Anx), aggression (Agg), sensitivity (Sen), complexity (Com), non-conformity (N-con), imagination (Img), cognitive intelligence (C.int), expressiveness (Exp), flexibility (Flx), originality (Org), and syntax (Syn). The "p" or "t" after the personality/motivation factor designates whether the variable is from the parent or teacher survey.

Table 5.

Relationship of musical creativity with personality/motivation.

	z-C	ME	MF	MO	MS	Rhy	Ton
Int-p	-0.089	-0.081	-0.017	-0.206	0.013	-0.140	-0.097
Ind-p	0.214	0.274	0.12	0.171	0.136	-0.274	-0.401 *
Cur-p	0.096	0.154	0.106	0.070	-0.017	0.065	-0.000
S-con-p	0.176	0.151	0.217	0.197	0.014	0.098	0.098
Anx-p	-0.090	0.010	-0.147	-0.227	0.069	0.067	0.358
Agg-p	0.116	0.030	0.268	0.150	-0.067	0.238	0.148
Sen-p	0.004	0.143	0.168	-0.144	-0.155	0.137	0.067
Com-p	0.108	0.039	0.159	0.058	0.099	-0.291	-0.031
N-con-p	0.206	0.143	0.221	0.091	0.219	-0.091	-0.111
Img-p	0.402 *	0.244	0.425 *	0.232	0.417 *	-0.064	-0.227
Flx-p	0.251	0.256	0.198	0.253	0.116	-0.029	-0.121
Exp-p	0.141	0.132	-0.022	0.225	0.127	-0.108	-0.057
Org-p	0.056	0.009	0.020	0.025	0.128	0.035	0.025
Syn-p	0.048	0.041	0.185	-0.034	-0.036	0.051	-0.002

* <.05 • <.01

	z-C	ME	MF	MO	MS	Rhy	Ton
Int-t	-0.156	-0.182	-0.188	-0.043	-0.098	-0.172	0.111
Ind-t	0.210	0.202	0.201	0.071	0.25	0.003	-0.163
Cur-t	0.385 *	0.291	0.496 **	0.223	0.252	-0.052	-0.194
S-con-t	0.253	0.145	0.295	0.111	0.277	-0.082	-0.351
Anx-t	-0.002	-0.031	0.062	-0.014	-0.022	-0.288	-0.139
Agg-t	0.147	0.331	-0.008	0.149	0.010	-0.095	-0.025
Sen-t	-0.151	-0.230	0.086	-0.268	-0.082	-0.101	-0.167
Com-t	0.258	0.266	0.308	0.021	0.251	-0.128	-0.278
N-con-t	0.147	0.025	0.128	0.283	0.048	0.245	-0.011
Img-t	0.109	0	0.189	-0.027	0.191	0.136	-0.014
C. int-t	0.277	0.245	0.358	0.103	0.200	-0.03	-0.059
Flx-t	-0.055	-0.078	0.028	-0.150	0.021	-0.071	-0.095
Exp-t	0.423 *	0.169	0.442 *	0.370 *	0.405 *	0.136	-0.093
Org-t	0.126	0.077	0.195	-0.004	0.145	0.200	0.101
Syn-t	0.149	0.128	0.278	0.004	0.079	-0.05	-0.031

* <.05 ** <.01

Significant correlations (<.05) were found between imagination as judged by the parent and a composite z-score of all the MCTM factors (z-C), as well as musical flexibility and musical syntax. The z-C correlated with curiosity as measured by the teacher. Significant correlations (<.01) were found between curiosity as judged by the teacher and musical flexibility. Only one statistically significant correlation was found between the variables tonal imagery and rhythmic imagery, and the personality variables. This correlation (<.05) was found between tonal imagery and independence as measured by the parent survey. It should be noted that, of the 203 correlations, only 10 were found to be statistically significant. In general though, the results of this study reflect those found by Swanner. However, one personality category strongly suggested by the present study was not found by Swanner. This relationship was expression as measured by the teacher. Four of the six aptitudes correlated significantly with this variable.

Table 6 reports the results of a multiple regression analysis testing the same variables as those in the correlation matrix. One statistically

significant factor in the stepwise analysis was found, expression as measured by the teacher survey, where z-C served as the dependant variable.

Table 6.

Stepwise multiple regression analysis using personality variables as independent variables. (p<.05, two-tailed)

Equation Number 1	Dependent Variable..	z-C
Variable(s) Entered on Step Number	1..	Exp-t
Multiple R	.42293	
R Square	.17887	
Adjusted R Square	.14955	
Standard Error	7.68992	

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	360.68787	360.68787
Residual	28	1655.77480	59.13481
F = 6.09942		Signif F = .0199	

Part I - Summary

Part 1 of this study sought to test selected relationships between constructs proposed in Webster's model by replicating the results of Swanner (1985). Swanner studied the relationship between selected enabling skills and selected enabling conditions. Aptitudes including musical extensiveness, musical flexibility, musical originality, and musical syntax as measured by the *Measure of Creative thinking in Music* (Webster, 1994), and tonal imagery and rhythmic imagery as measured by the *Primary Measures of Music Audiation* (Gordon, 1979) were used as dependent variables by Swanner in testing relationships between the personality/ motivation factors of excitability, aggression, independence, self-confidence, anxiety, introversion/extroversion, curiosity, sensitivity, complexity, non-

conformity, and imagination. The same two tests were used in the present study. However, in this study the students found the PMMA to be too easy. For the 30 subjects, mean scores of 39.68 out of 40 were found for the tonal imagery test, and 35.64 for the rhythmic imagery test. Due to the extreme skewness of these results it was decided that a more difficult test was needed to measure tonal and rhythmic imagery for these subjects. Gordon's *Music Aptitude Profile (MAP)* measures these same two aptitudes, but in both older and more musically select students. The four tests of the MAP were administered in September, 1996 when the students returned to school. The two tonal tests, melody and harmony, and the two rhythmic tests, tempo and meter, combine to produce scores for tonal imagery and rhythmic imagery. As shown, the results of these tests produced a more normally distributed score. With these new results the same six factors tested in Swanner (1985) were investigated in the present study.

In the present study ten correlations were found to be statistically significant. Of these ten, five correlations matched Swanner's (1985) findings. These are: imagination as judged by the parent with (a) the composite z-score for the MCTM, (b) musical flexibility, and (c) musical syntax ($p < .05$); and curiosity as judged by the teacher with (a) the composite z-score for the MCTM ($p < .05$), and (b) musical flexibility ($p < .01$). Those relationships found to be statistically significant in the present study that did not match Swanner's findings were independence as judged by the parent negatively correlated with tonal imagery; and expression as judged by the teacher with the composite z-score for musical creativity as measured by the MCTM, musical flexibility, musical originality and, musical syntax.

Part II

Part II involved a time analysis of the three work periods devoted by each pair of students to creating their original compositions. These compositions were based on the poem "Jabberwocky" by Lewis Carroll.

Each work period was audio taped and later assessed by the researcher according to the same criteria used by Kratus (1985). The categories for this assessment were "exploration," "development," "repetition," and "silence." In Kratus (1985), subjects were tested individually, allowing the assessment to be based solely on the musical content of the creative period. As the subjects in the present study worked with partners, a subdivision of the three categories (exploration, development, repetition) was necessary to account for discussion between the partners about the composition. Each category was subdivided into a "talking about" or "playing the music" component.

The thirty minute work periods were divided into fifteen second intervals. Each fifteen second interval was rated by the researcher according to the following criteria: (1) talking about a new musical idea (Expl-tk), (2) talking about a given musical idea (Devl-tk), (3) talking about the rehearsal of the music (Rept-tk), (4) presenting a new musical idea (Expl-pl), (5) expanding on a given musical idea (Devl-pl), (6) rehearsing the music (Rept-pl), and (7) off task (off-task). If more than one of the categories appeared within a fifteen second interval, that interval was evenly divided between the categories. Table 8 presents the mean scores for all groups of the number of fifteen second intervals devoted to each of the seven categories.

Table 7.

Mean composite number of 15 second time intervals per period.

Work period 1	Expl -tk	Devl-tk	Rept-tk	Expl-pl	Devl-pl	Rept-pl	Off Task
0'00"-4'45"	3.42	0.47	3.13	12.89	0.99	0.2	0.23
5'00"-9'45"	2.99	1.79	1.66	9.23	5.17	0.17	0.4
10'00"-14'45"	1.46	2.27	3.72	6.22	6.74	0.59	0.27
15'00"-19'45"	0.52	2.39	2.3	4.72	6.58	1.59	1.9
20'00"-24'45"	0.4	1.7	2.09	2.29	3.69	0.9	0.73
25'00"-29'45"	0	0.1	0.27	0	0.9	0.2	2.27

Work period 2	Expl -tk	Devl-tk	Rept-tk	Expl-pl	Devl-pl	Rept-pl	Off Task
0'00"-4'45"	0.3	1.53	3.1	5.2	6.33	3.87	1
5'00"-9'45"	0.3	2.46	2.6	2.09	7.52	4.7	1.67
10'00"-14'45"	0.43	1.99	2.27	2.32	7.77	4.46	2.17
15'00"-19'45"	0.2	2.26	2.22	1.63	6.32	5.27	3.43
20'00"-24'45"	0.03	0.83	1.9	1.3	5.67	5.03	5.23
25'00"-29'45"	0.13	0.07	0.9	0.93	3.3	2.9	2.03

Work period 3	Expl -tk	Devl-tk	Rept-tk	Expl-pl	Devl-pl	Rept-pl	Off Task
0'00"-4'45"	0.02	0.63	3.52	0.69	5.24	7.82	3.33
5'00"-9'45"	0.27	2.43	1.93	0.5	5.17	8.17	2.87
10'00"-14'45"	0.57	1.97	1.67	0.8	3.2	5.6	2.73
15'00"-19'45"	0	0.6	0.73	0	1.67	2.47	1.33
20'00"-24'45"	0	0	0	0	0	0	0
25'00"-29'45"	0	0	0	0	0	0	0

The three original categories of exploration, development, and repetition had been divided into "playing" and "talking" component to account for discussion between the partners about the composition. The subdivisions of the three categories were recombined, by adding together the playing and talking components for each of the three categories, to determine final time interval scores for each of exploration, development, and repetition. Table 9 presents the time-use for these three categories, as well as off task time. for all of the groups involved in the study.

Table 8.

Composition task time usage for all students.

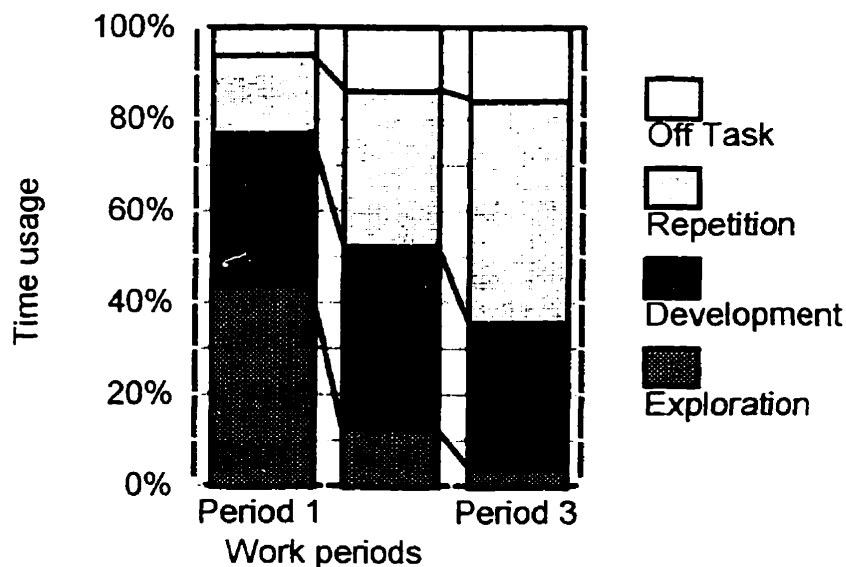
Work period 1	Exploration	Development	Repetition	Off Task
0'00"-4'45"	16.31	1.46	3.33	0.23
5'00"-9'45"	12.22	6.96	1.83	0.40
10'00"-14'45"	7.68	9.01	4.31	0.27
15'00"-19'45"	5.24	8.97	3.89	1.90
20'00"-24'45"	2.69	5.39	2.99	0.73
25'00"-29'45"	0.00	1.00	0.47	2.27

Work period 2	Exploration	Development	Repetition	Off Task
0'00"-4'45"	5.50	7.86	6.97	1.00
5'00"-9'45"	2.39	9.98	7.30	1.67
10'00"-14'45"	2.75	9.76	6.73	2.17
15'00"-19'45"	1.83	8.58	7.49	3.43
20'00"-24'45"	1.33	6.50	6.93	5.23
25'00"-29'45"	1.06	3.37	3.80	2.03

Work period 3	Exploration	Development	Repetition	Off Task
0'00"-4'45"	0.71	5.87	11.34	3.33
5'00"-9'45"	0.77	7.60	10.10	2.87
10'00"-14'45"	1.37	5.17	7.27	2.73
15'00"-19'45"	0.00	2.27	3.20	1.33
20'00"-24'45"	0.00	0.00	0.00	0.00
25'00"-29'45"	0.00	0.00	0.00	0.00

Figure 15 shows the percentage of time in each of the three work periods devoted to each of the four categories.

Figure 15. Time use for each work period on the creative task.



Kratus (1989) found that there was a shift in creative behaviour from exploration, through development, to repetition in the overall process of completing the compositional task assigned in his study. The present

study seems to support Kratus' work. Toward the end of the compositional task fewer new ideas were presented. In the first work period the students used 44% of their time in exploration activities, whereas in the third period they used only 4% of their time. For the repetition category, students spent about 17% of the first period rehearsing musical ideas, but spent about 48% of their time in period 3 on rehearsal. In the development category, time usage rose from 33% to 46% from periods 1 to 2. In period 3, development time usage fell back to 32%.

To test whether or not the time usage from periods 1 to 3 for exploration, development, and repetition varied significantly, three separate one-way analysis of variance (ANOVA) was performed, one for each of the three main effects (exploration, development, and repetition). Table 9 presents the results of this analysis.

Table 9.

Analysis of Variance of time-use between work periods for the three categories of exploration, development, repetition.

				Sum of Squares	df	Mean Square	F	Sig.
EXP	Between Groups	(Combined)		2082.948	2	1041.474	61.333	.000
		Linear Term	Contrast	1937.234	1	1937.234	114.084	.000
			Deviation	145.715	1	145.715	8.581	.004
	Within Groups			4533.863	267	16.981		
	Total			6616.812	269			
DEV	Between Groups	(Combined)		606.847	2	303.423	11.270	.000
		Linear Term	Contrast	167.987	1	167.987	6.240	.013
			Deviation	438.859	1	438.859	16.301	.000
	Within Groups			7188.184	267	26.922		
	Total			7795.031	269			
REP	Between Groups	(Combined)		551.470	2	275.735	12.529	.000
		Linear Term	Contrast	200.345	1	200.345	9.103	.003
			Deviation	351.126	1	351.126	15.955	.000
	Within Groups			5876.000	267	22.007		
	Total			6427.471	269			

The analysis indicated that there was a statistically significant change in the use of time ($<.01$) for all of three categories tested. A feature of this analysis is a linear test for trends that was found to be significant ($<.05$) for each kind of time-usage. Trend analysis tests the hypothesis that there is no statistically significant increase or decrease in, for this study, the use of time across the three periods. That hypothesis was rejected. The conclusion is that time-usage changed according to a linear function from period 1 through to period 3. Figure 15 (p. 69) shows that the students began a creative task with exploratory activities, followed by developmental activities based on the exploration done previously, and finished with repetition of the ideas they decided were the most suitable in the present situation. A movement from divergent to convergent behaviour may be seen through these three stages. Kratus (1989) found these same three stages within a ten-minute compositional period. Results of the present study confirm the transition in stages for a compositional activity that spans three work periods spread over a one week duration.

Part II - Summary

The second part of the study sought to test the central premise of Webster's model, that there is a shift from divergent to convergent thinking when a student is engaged in a creative musical task. The amount of time used by the students on the compositional task was divided into three categories: exploration, development, and repetition. A shift of time use was found. The students started in the first of the three work periods by using most of their time in exploring sounds, which is defined here as a divergent activity. The least amount of time was spent on the convergent task of repeating the sound ideas that had been worked out. By the third work period these two activities had reversed in importance. The majority of the students' time was now being spent on repetition and the least on exploration. Most of the time used in the second period was devoted to the

development category. The analysis of variance and trend analysis confirmed that the shift in use of time (shown in Figure 7) was statistically significant. The students in this study shifted behaviours from the divergent activity of exploring different sound ideas to the convergent activity of repeating developed sound ideas over the span of three work periods.

Part III

Simple correlation and multiple regression analyses used to test for relationships between Webster's enabling skills and conditions with success in the compositional process as determined by four independent judges are presented. The first step in part III was to determine the reliability of the four judges used at the composition festival. The reliability was found to be low, at 0.57. Table 10 shows the correlation matrix for the four judges.

Table 10.

Judge group reliability correlation matrix.

	Judge 1	Judge 2	Judge 3	Judge 4
Judge 1	1.00			
Judge 2	-0.17	1.00		
Judge 3	0.39	0.13	1.00	
Judge 4	0.10	0.63	0.26	1.00

Judges 1 and 2 were composers, and 3 and 4 were music teachers. There is little agreement between any of the judges other than judges 2 and 4. Other than discussing the categories used for the judging of the compositions by the students (craftsmanship, rhythmic interest, melodic interest, harmonic interest, dynamic interest, tone colour changes and, apparent formal structure) no direction was given as to how to assess the category.

The following analyses should be viewed with the understanding that the reliability between judges was low. A simple correlation analysis was carried out between the judges' mean score from the composition festival (Crtv-J) and the enabling skills as determined by the MCTM and the MAP.

A second simple correlation was carried out between the judges' mean scores and the enabling conditions as determined by the two Swanner surveys. Table 11 presents the results of the relationship between the judges' scores and the enabling skills. Table 12 presents the relationship between the judges' mean score and the enabling conditions.

Table 11.

Simple correlations between judges scores and enabling skills. ($p < .05$, two-tail)

	Crtv-J
Tonal Imagery	0
Rhythmic Imagery	0.16
Musical Extensiveness	0.04
Musical Flexibility	0.255
Musical Originality	0.192

Between the judges mean score and the enabling skills no statistically significant relationships were found to exist.

Table 12.

Simple correlations between judges scores and enabling conditions.

	Crtv-J		Crtv-J
Int-p	0.076	Int-t	-0.121
Ind-p	-0.03	Ind-t	0.141
Cur-p	0	Cur-t	0.2874
S-con-p	0.026	S-con-t	0.2187
Anx-p	-0.127	Anx-t	-0.02
Agg-p	0	Agg-t	-0.152
Sen-p	-0.01	Sen-t	0.107
Com-p	0.016	Com-t	0.101
N-con-p	-0.19	N-con-t	0.05
Img-p	0.05	Img-t	0.1152
Flx-p	0.1574	C.int-t	0.206
Exp-p	0.1252	Flx-t	0.1861
Org-p	0.055	Exp-t	0.4305 *
Syn-p	0.2967	Org-t	0.2107
* <.05		Syn-t	0.1286

Only one statistically significant relationship was found (<.05) between an enabling condition (expression as rated by the teacher) and judges mean score. This single relationship is the same personality category that was found to be significant in both the correlation matrix and multiple regression analysis between enabling skills and conditions discussed in part I of the study.

A multiple regression analysis was also performed to determine if a combination of variables would act as significant predictors of creativity as determined by the judges. The results of the multiple regression analysis are as follows:

Table 13.

Stepwise multiple regression analysis using enabling skills and conditions as independent variables. (p<.05. two-tail)

Equation Number 1	Dependent Variable..	Crtv-J
Variable(s) Entered on Step Number	1..	Exp-t
Multiple R	.43047	
R Square	.18531	
Adjusted R Square	.15621	
Standard Error	.35339	

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	.79538	.79538
Residual	28	3.49681	.12489
F = 6.36883		Signif F = 0176	

Regression results were not found to be statistically significant.

Part III - Summary

The third part of the study investigated the relationship between a creative task assigned in the classroom and the enabling skills and conditions of Webster's model. As advocated by Amabile (1990) independent judges from the field were used to assess creativity. Criteria for the assessment of the creative activity was derived from Kratus (1985) and Feinberg (1973). The present study found only one statistically significant relationship between the judges' assessment and any of the enabling skills or conditions. This relationship was between the judges' mean score and expression as rated by the teacher. In a matrix of over 200 correlations this finding can be attributed to chance. Due to the low judge group reliability, the results from this part of the study cannot be trusted as a true reflection of the relationship between the creative task and the enabling skills and conditions of Webster's model. The null hypothesis could not be rejected because of

the low judge group reliability.

Tests of Hypotheses

Of the three null hypotheses, the first and second were rejected:

1) There are no statistically significant relationships between selected “enabling conditions” and the “enabling skills” in Webster’s model.

2(a) Given a specific compositional task to complete, there is no statistically significant shift from divergent to convergent thinking in students’ composing behaviour, (b) there is no statistically significant increase or decrease in the use of time across the three periods.

The third hypothesis failed to be rejected at the .05 level of significance.

3) There are no statistically significant relationships between the criteria used to judge creative projects in the classroom and the “enabling skills” or selected “enabling conditions” in Webster’s model.

CHAPTER FIVE

Summary, Conclusions, and Recommendations

Introduction

There are four sections in this chapter. First, a summary of the study reviews its purpose and methodology. Second, the results of the study are outlined. Third, a discussion of the results from chapter four and conclusions are presented. Fourth, implications of this study's findings for further research are explored.

Summary of the Study

Purpose of the Study

The purpose of this study was to test selected aspects of Peter Webster's "conceptual model of creative thinking in music." The investigation proceeded in three parts; each part sought to answer a different question. The first part tested for relationships within the central or *thinking process* section of Webster's model. The second part tested the hypothesis that creativity moves from divergent to convergent thinking, and the third part tested, through an experimental study, the relationship of the *thinking process* section of Webster's model to a creativity project carried out in the classroom.

The following null hypotheses were tested:

1) There are no statistically significant relationships between selected "enabling conditions" and the "enabling skills" in Webster's model.

2(a) Given a specific compositional task to complete, there is no statistically significant shift from divergent to convergent thinking in students' composing behaviour, (b) there is no statistically significant increase or decrease in the use of time across the three periods.

3) There are no statistically significant relationships between the criteria used to judge creative projects in the classroom and the "enabling

skills” or selected “enabling conditions” in Webster’s model.

The Subjects

Subjects for this study were grade 4 students, ages 9 and 10, at the Lester B. Pearson School for the Arts in London, Ontario. These students receive an expanded arts curriculum in the areas of dance, drama, visual art, vocal music, instrumental music, and piano.

Collection of the data

In step 1 of the study, permission was obtained from the parents, the principal, and the London Board of Education to have the students participate in the study.

In step 2 the *Music Aptitude Profile* (Gordon, 1965) was administered.

Step 3 involved the administration of the *Measures of Creative thinking in Music* (Webster, 1994).

Step 4 ran concurrently with step 3, and involved both the parents and the home room teachers completing both the *Swanner Teacher Evaluation of Student Behaviour* survey and the *Swanner Parent Evaluation of Child Behaviour* survey.

For step 5, students were randomly assigned to pairs within their classes and assigned a compositional task to be completed over three class periods. The students were asked to set a given poem to music for presentation at an in-school composition festival (step 7).

In step 6, three work periods for each pair of students were audio-taped. The students’ compositional processes were analysed at a later date.

Step 7 was the students’ participation in the “composition festival”.

Selection of Variables

To test the various components of Webster’s model, the following variables were selected.

Dependent Variable:

1)creativity ranking - determined through a composite score from:

- i) craftsmanship
- ii) rhythmic interest
- iii) melodic interest
- iv) harmonic interest
- v) dynamic interest
- vi) tone colour changes
- vii) apparent formal structure

Independent Variables:

- 2) Gordon *Music Aptitude Profile*
- 3) Webster *Measure of Creative Thinking in Music*
- 4) Swanner *Teacher Evaluation of Student Behaviour* survey (1985)
- 5) Swanner *Parent Evaluation of Child Behaviour* survey (1985)

Test Instruments

Primary Measures of Music Audiation (Gordon, 1979)

The *Music Aptitude Profile* (MAP) is a test designed to yield scores for Tonal Imagery and Rhythmic Imagery, and Musical Sensitivity.

Measure of Creative Thinking in Music (MCTM, Webster 1994)

The *Measure of Creative Thinking in Music* is designed for children ages 6 to 10 and consists of 10 scored tasks divided into three parts. Three sets of instruments are used for this test. Through these instruments the subject manipulates the parameters of high/low, fast/slow, and loud/soft. Depending on the task, one or more of the parameters are used to score in each of the four factor areas. The four factors are:

- (1) musical extensiveness,
- (2) musical flexibility,
- (3) musical originality, and
- (4) musical syntax.

Swanner Teacher Evaluation of Student Behaviour survey, and the **Swanner Parent Evaluation of Child Behaviour** survey.

Swanner developed these two surveys to test for personality traits and motivational factors. A seven point Likert scale was used for each of the factors tested. These factors were: introversion, independence, curiosity, self-confidence, anxiety aggression, sensitivity, complexity, non-conformity, imagination, cognitive flexibility, expressiveness, originality, and syntax.

Time-Analysis of the Compositional Process

The following four categories were used to assess the time usage of each of the pairs of students in the completion of their assigned compositional task.

Exploration: The music sounds unlike music played earlier. No specific references to music played earlier can be heard.

Development: The music sounds similar to, yet different from, music played earlier. Clear references to music played earlier can be heard in the melody, the rhythm, or both.

Repetition: The music sounds the same as music played earlier.

Off Task: The students are not working on their composition. An analysis of variance, including a linear trend analysis, was performed to determine whether or not subjects showed a statistically significant shift from divergent to convergent activity.

Compositional Task Judging Criteria

The judging criteria used to rate the student compositions during the three work periods combined an assessment of the elements of music (melody, rhythmic, harmony, dynamics, tone-colour, form), and the criteria that Kratus (1991) used in his study of childrens' compositional strategies.

Analysis of the Data

The data collected were submitted to a number of statistical procedures. First, descriptive statistics were calculated for each of the variables. Second, judge group reliability for the composition scores was calculated. Third, a correlation matrix for all variables was calculated to

measure the degree of relationship between each of the variables used in the study. Fourth, multiple regression analysis was used to indicate the degree of relationship between the dependent variable and a combination of independent variables. And fifth, the analysis of variance, including the trend analysis was performed.

Summary of Results

The investigation proceeded in three parts; each part sought to answer a different question. Part I tested for relationships within the central or *thinking process* section of the model itself. Part II tested the hypothesis that creativity moves from divergent to convergent thinking, and Part III tested, through an experimental study, the relationship of the *thinking process* section of Webster's model to a creativity project carried out in the classroom. A brief summary of the results obtained from the statistical analysis in chapter four follows.

Descriptive Statistics

Descriptive statistics were carried out for both the musical and non-musical measures that were used to collect data. The administration of the *Music Aptitude Profile* (Gordon, 1965) and the *Measure of Creative Thinking in Music* (Webster, 1994) yielded scores for tonal imagery, rhythmic imagery, and musical extensiveness, musical flexibility, musical originality, musical syntax respectively. The distribution for all of these scores was mostly found to be fairly normal for all variables except musical extensiveness.

The Swanner *Parent Evaluation of Child's Behavior*, and the Swanner *Teacher Evaluation of Student's Behavior* each measured ten personality traits. Distributions for most of the data collected were mostly normal.

Part I

Relationships between selected enabling skills and selected enabling conditions were tested through correlation and multiple regression analysis. From the correlation matrix, statistically significant relationships at the .05

level were found between imagination as judged by the parent and the composite z-score of all the MCTM factors, as well as with musical flexibility and musical syntax individually. The composite MCTM z-score correlated with curiosity as measured by the teacher. The only correlation at the .01 level was curiosity, as judged by the teacher, with the variable musical flexibility. Only one significant correlation ($<.05$) was found from the correlations between tonal imagery and rhythmic imagery, and the personality variables. This correlation was between tonal imagery and independence as measured by the parent survey. Multiple regression analysis found only one statistically significant factor in the stepwise analysis, expression as measured by the teacher survey.

Part II

Part II reported the time analysis of each group in creating an original composition based on the poem "Jabberwocky" by Lewis Carroll. Each of three work periods was audio taped and later assessed by the researcher according to the same criteria used by Kratus (1985). The categories for this assessment were exploration, development, and repetition. A fourth category, termed "off task", was also used for any time not spent on the compositional task. An analysis of variance was performed to determine whether or not the change in use of time within the three categories of exploration, development, and repetition was statistically significant. The analysis confirmed that the use of time was different statistically beyond the .01 level for all three categories. A linear test for trends suggested a systematic change in time-use across the three periods for each of the three variables.

Part III

A simple correlation analysis was conducted between the four judges' mean score from the composition festival (Crtv-J) and the enabling skills as determined by the MCTM and the MAP, and between the judges' mean

score and the enabling conditions as determined by the two Swanner surveys. From the correlation matrix, only one statistically significant relationship was found. This relationship was between the judges' mean score and expression as rated by the teacher ($<.05$). Multiple regression analysis also found only one significant relationship, again between the judges' mean score and expression as rated by the teacher. The results from this part of the study must be tempered though with the knowledge that judge group reliability was low at 0.57.

Discussion and Conclusions

Discussion

The aspects of Webster's model that were selected for testing in this study were (a) the relationships within the central or *thinking process* section of the model, (b) the hypothesis that creativity moves from divergent to convergent thinking, and (c) the relationship of Webster's *thinking process* component to a creativity project carried out in the classroom. The goal was to find out the extent to which Webster's model predicts the creative process as it may be observed in the classroom.

In general, the model appears to be a useful representation of the creative thinking process as applied to music. The general premise of the *thinking process* section of the model is the shift from *divergent thinking* to *convergent thinking*. The present study finds strong support for this premise. There is a definite shift of creative activity from divergent to convergent behaviors. The subjects who participated in this study were presented with a task requiring them to create a composition for public presentation after a given period of time. In all cases, at the beginning of this process the majority of time was spent exploring possible solutions to the problem by either talking through what the partners would do, or by playing phrases of music that might become part of the final piece. One pair of students spent most of their initial time playing phrases on their xylophones with no

discussion at all between the partners. It was as if two independent activities were occurring in the same room at the same time. After extensive individual work, the two students did begin to discuss and merge their ideas. A second pair used most of their first work period arguing over the instruments to be used, rather than working on the music. However, most pairs of students worked in a cooperative manner letting the words of the poem guide the types of sound they explored. After finding a novel musical idea, or what the pair of students agreed was a "neat" musical phrase, the students incorporated the idea into an overall structure. Most pairs of students decided upon an effect that they wished to achieve in a particular verse based on the words of that verse. then explored various sounds until they found something that fit their concept of the verse. As the students proceeded through the poem more of the overall structure was filled in. Gradually fewer new ideas were needed to complete the task, as previous sound ideas were brought back into the piece.

As the compositional task took place over the period of a week, students also spent some of their time trying to remember what they had "created" in their previous work period. Still, once ideas had been reestablished students moved back to completing the task of creating their own composition by either coming up with new ideas or by playing with the ideas they had already created. In the second work period, there was a considerable increase in the amount of time spent on developing previously created ideas. By the third work period, it seems that the need to prepare to perform the composition in front of an audience had become the main priority. Rehearsal of the composition was the predominant activity in the final work period before the composition festival. Groups spent their time playing over their composition, making minor intentional adjustments to the sounds. Generally it seemed that the subjects rehearsed in order to remember what they had created.

The four stages that Webster cites in the model (preparation, incubation, illumination, and verification) were not specifically tested in this study, however the overall shift from divergent to convergent activity was apparent. The divergent task of exploring sounds, and the convergent task of rehearsing sound was very evident over the three work periods used for the compositional task.

To think creatively in music, Webster's model suggests that there are certain "enabling skills" and "enabling conditions" that allow an individual to successfully complete a creative endeavor. The skills are categorized by four different areas. These areas are: aptitudes (extensiveness, flexibility, originality, tonal imagery, rhythmic imagery, and syntax), conceptual understanding, craftsmanship, and aesthetic sensitivity. The conditions are also categorized by four areas. They are: motivation, subconscious imagery, environment, and personality. The present study attempted to test the relationships of these two areas to (a) each other, and (b) the central premise of the model - the divergent/convergent shift in thinking. Part I of this study attempted to replicate the results found in Swanner (1985), which studied the relationship between the enabling skills and conditions. Although the results of this study are not as strong as Swanner, this study seems to support Swanner's findings. Five of the ten statistically significant relationships found in this study were also found by Swanner (1985). As well, the general trend of relationships found in this study was similar to Swanner's. The students tested in this study seemed to exhibit the personality/ motivation traits of imagination, independence, curiosity, and self-confidence.

It appears that these four personality/motivation traits are connected with creative thinking in music. There is no basis in the present study by which to draw a direct cause and effect relationship with the traits and creative thinking, but the various traits do seem to be accounted for within

the structure of the model. Imagination can be associated with divergent thinking. It is reasonable to believe that if one has imagination, the task of developing multiple solutions to a particular problem would be made easier. As well, curiosity can be readily associated with motivation. One who has a heightened sense of curiosity will be intrinsically motivated to complete a creative task. Both independence and self-confidence are not as easily incorporated into the model. They could both be attributed to convergent thinking. The will power and belief in oneself to make an independent decision, however, could both also be related to craftsmanship or aesthetic sensitivity. These personality/motivation traits do appear to be characteristic of individuals who find some success in musically creative endeavors.

The last part of the study attempted to test the relationship of the enabling skills and conditions to the central premise of the model - the divergent/convergent shift in thinking. The final part of the study is inconclusive, given the relatively low judge group reliability for the four judges used at the composition festival. The relationship of the divergent/convergent shift in thinking to the enabling skills and conditions that surround this central premise is still unclear. Why was the judge group reliability so low?

Both Amabile (1990) and Csikszentmihalyi (1988) (see chapter two) suggest that what is ultimately considered to be creative can only be judged by the community in which the creation takes place. On this basis members of the musical community were asked to judge the compositions created by the students. Two music teachers, both of whom are professional musicians, and two composers were asked to judge the compositions. If the conclusion reached by these judges concerning the relative success of the compositions matched the subjects predicted to be musically creative by the tests used to develop the model, then the model would be an accurate representation of the creative process as seen in the classroom. The judge group reliability

was too low to make an assessment of this type.

The reliability between judges may have been low for two reasons. The first, concerns the choices the students were given when first assigned the compositional task. The students had the a choice of three different approaches to the task. They could:

- 1) set the poem to music to create a sung song with accompaniment:
- 2) create music to be played as an accompaniment to the reading of the poem; or.
- 3) create a piece of music inspired by the poem.

The variety of settings by the students may have had an effect on the assessment by the various judges. The second factor that may have affected the judge group reliability was the components used for the composite judges score. Seven factors were used to compile the composite score: craftsmanship, rhythmic interest, melodic interest, harmonic interest, dynamic interest, tone colour changes and, apparent formal structure. Each judge may have had specific preferences within the components given for the composite. As a result, the judges may all have been judging the compositions differently.

Given that the reliability between judges was low, there still exists the problem of relating the act of creating with the community in which the creation is taking place. If the community is the ultimate judge of what is and is not creative, then a relationship must exist between the creating person and the time when people realize that the “thing” created is something new and unique. It may be argued that the Webster model only purports to represent the “thinking process” stage of the overall process of creativity. In that case the “newness” of the “thing” created need only be new to the creator him or herself. Although this situation may in fact be an act of creation by an individual, is this act what is considered creative in music and, more to the point of this thesis, what is considered creative in music

education? If the answer to this question is yes, then how do we test for this type of creativity by a student? The only person who can determine if something is new to an individual is the individual creator. If the answer to the question is no, then we are back to the fundamental question - what is creativity in music? The lack of consensus by the judges would seem to indicate that there is still wide disagreement over the criteria people use to determine what is and is not creative. The students were chosen for this study because of their musical skills and familiarity with musical creating. The school for the arts in which this study took place is specifically geared toward the delivery of a program that involves regular opportunities for creative problem solving in music, as well as the other arts. On the original test for tonal and rhythmic imagery, the *Primary Measures of Music Audiation* (Gordon, 1975), the students scores were so high a histogram of the results showed a straight line just below perfect. The results could not be used, so a second test was administered. This second test was the *Music Aptitude Profile* (Gordon, 1965). The grade 4 students of this study scored well above average in the grade 4 to 6 musically select category. This population of students showed the necessary enabling skills to successfully complete a creative task, yet the judges did not agree among themselves about the relative success of the students' compositions.

Although the relationships within Webster's model itself appear to be valid, what is considered musically creative by a community and what is predicted to be musically creative by the model were not clear. If this relationship cannot be established then there is no way to determine if a truly creative act is occurring. The student may engage in what is considered a creative activity, but never truly create.

Importance for Music Education

A valid, reliable model of musical creativity, be it creative thinking in music or the entire process of creativity as described by Amabile (1983) or

Csikszentmihalyi (1988), is needed. Without such a model efforts to develop curriculum are at best educated guesses. Ontario music educators are mandated to teach creativity in their classrooms, and some guidelines to develop student creativity are needed. Webster's model provides a basis to begin the work of structuring this curriculum. Although this study could not validate the relationship of the model with a creative task assigned in the classroom, there is much within the model that can be used to aid us in dealing with the creative aspect of the music program.

1) The process of moving from divergent thinking to convergent thinking appears to be a part of the creative process for music. Activities to foster both of these abilities will help students in their creative tasks.

2) The enabling skills of extensiveness, flexibility, originality, tonal imagery, rhythmic imagery, and syntax may provide a means to the development of creative ability.

3) The personality/motivation traits of imagination, independence, curiosity, and self-confidence appear to be related to musical creativity. These traits can be highlighted and developed when designing tasks for students.

Conclusions

In general the study supports Webster's model of creative thinking in music. The central premise of the model, that there is movement from divergent to convergent activity, and the relationships within the model appear to be well founded. The relationship of the model to a creative task assigned in the classroom, however, could not be addressed due to a lack of consensus by the judges used in the study.

Specifically, Part I of this study found support for selected relationships within the Webster model. Five relationships that had been previously reported by Swanner (1985) were also found to exist in the present study. With the duplication of these results in the present study, it

seems probable that the inclusion of the various enabling skills and conditions is solidly founded. Further research is still needed, however, to refine which specific enabling skills and conditions should be included in findings from the model. Part II of this study suggested that the central premise of the model, (i.e., that creative thinking in music moves from divergent to convergent activity), appears to be well founded. This study confirmed results (Kratz, 1985) that students, when given a creative task, begin with exploration as the most prevalent activity and finish with repetition as the most prevalent activity. The aspect of this study that could not be fully assessed was part III, the relationship of the model to an actual creative task assigned in the classroom.

Suggestions for Further Research

Research should continue to determine which relationships are most prevalent among the enabling skills and conditions for musical creativity. Further research is recommended in two areas: (a) a search for a greater array of different types of enabling conditions to determine whether or not more factors play a role in creative thinking in music, and (b) attempts to duplicate the results found in Swanner (1985) with different populations so as to test for generalizability.

With regard to the central premise of the model, further research should center on breaking down the steps within the movement from divergent to convergent activity to determine whether or not the creative process follows the four steps of preparation, incubation, illumination, and verification as Webster suggests. If these steps are not in fact serial, then what is the relationship of these four steps?

Finally, and most important, the third part of this study should be replicated to test for the relationship of the model to the types of creative activity that are regularly used in the classroom to teach creativity in music education. If Webster's model is in fact a realistic reflection of the process

of creative thinking in music. then the relationship of this model to typical classroom activity will be very useful knowledge for both the formation and assessment of music creativity curriculum in the future.

APPENDIX A
Letters of Permission

Letter to John Lewis, principal L. B. Pearson
School for the Arts

April 15, 1996

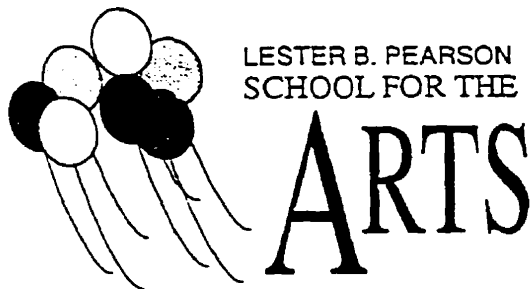
Dear Mr. Lewis.

Please find enclosed a copy of a proposal for a study concerning musical creativity. This study will test a model of creative thinking in music using students in an actual classroom situation who are working on a unit in musical creativity. The model has been put forth by Peter Webster of Northwestern University. I am proposing to conduct this study with the grade 4 students of Lester B. Pearson School for the Arts during the period of April to June 1996.

I am asking permission from the school to conduct this study as outlined in the proposal. Thank you for your time in considering this request.

Robert Cairns

**Letter to parents for permission for students to participate
in the study**



John Lewis
Principal

Janet Merrill
Vice-Principal

795 Trafalgar Street
London, Ontario N5Z 1E6
Telephone (519) 434-2124

April 15, 1996

Dear Parents,

At present I am involved in completing a Masters degree in Music Education. As a part of this program I will be conducting a study concerning musical creativity. The purpose of this study is to test certain aspects of a conceptual model of creative thinking in music which has been developed by Peter Webster of Northwestern University. With this letter I am asking your permission for your son or daughter to be involved in the study. The following is a description of how the study will be conducted. It should be noted that all information from this study will be kept confidential and the names of the students not appear in the study itself.

Step 1 of the study will seek permission from the parents, the principal, and the London Board of Education to have the students participate in the study. Data for this study will be collected over a three month period beginning in April.

In step 2 the *Primary Measures of Musical Audiation* (Gordon, 1979) will be administered. This test measures students ability to think using tonal and rhythmic

Step 3 will be to administer the Webster *Measures of Creative thinking in Music II*. This test consists of 10 scored tasks. Three sets of instruments are used for this test. These instruments are: (1) a round "sponge" ball of about 6 inches in diameter that is used to play tone clusters on a piano, (2) a microphone that is suspended in front of the piano and is attached to an amplifier and speaker, and (3) a set of five wooden resonator blocks. Through the use of these instruments the subject manipulates the parameters of high/low, fast/slow, and loud/soft. Depending on the task, one or more of the parameters are used to score in each of the four factor areas. The four factors are:

(1) musical extensiveness -- the amount of clock time involved in the creative tasks, (2) musical flexibility -- the extent to which the musical parameters of high/low (pitch), fast/slow (tempo), and loud/soft (dynamics) are manipulated, (3) musical originality -- the extent to which the response is unusual or unique in musical terms and in the manner of performance, and (4) musical syntax -- the extent to which the response is inherently logical and makes musical sense. Each child will be individually tested and video taped for analysis at a later time.

Step 4 will run concurrent with step three. This step involves both the parents and the home room teachers filling out the *Swanner Teacher Evaluation of Student Behaviour* survey, and the *Swanner Parent Evaluation of Child Behaviour* survey. These

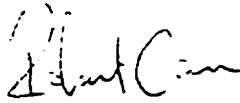
two surveys were developed to test for personality traits and motivational factors.

For step 5 students will be randomly assigned by pairs within their classes and assigned a compositional task to be completed over three class periods. The students will be asked to "set" a given poem to music for presentation at a music festival (step 7). In addition they will provide the adjudicators of the festival with a copy of their music. The students will be provided blank unlined paper to notate or draw the music in any fashion which helps them to remember what they are to play.

The three work periods of each of the pairs of students will be audio-taped in step 6 so that the students' compositional process may be analysed at a later date.

Step 7 will be the students' participation in the music festival. This festival will be organized similar to a non-competitive music performance festival, but will feature the students' compositions. Four adjudicators, two composers and two music educators, will be invited to listen to the students' compositions and make general comments to the students. Parents will be invited to this festival to hear the compositions the students have composed.

Participation in this study should provide the students with an excellent opportunity to explore their own abilities in music composition as well as the chance to receive encouragement and advice from our invited teachers and composers. If you have any questions regarding the study please feel free to contact me at the school.



Robert Cairns

(please cut off and return)

I give permission for _____ to participate in the musical creativity study as outlined above.

Parent signature: _____

APPENDIX B
“Jabberwocky” by Lewis Carroll

Jabberwocky

*"'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.*

"Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

He took his vorpal sword in hand:
Long time the manxome foe he sought —
So rested he by the Tumtum tree,
And stood awhile in thought.

And, as in uffish thought he stood,
The Jabberwock, with eyes of flame,
Came whiffing through the tulgey wood,
And burred as it came!

One, two! One, two! And through and through
The vorpal blade went snicker-snack!
He left it dead, and with its head
He went galumphing back.

"And hast thou slain the Jabberwock?
Come to my arms, my beamish boy!
O frabjous day! Callooh! Callay!"
He chortled in his joy.

*'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.*

by Lewis Carroll

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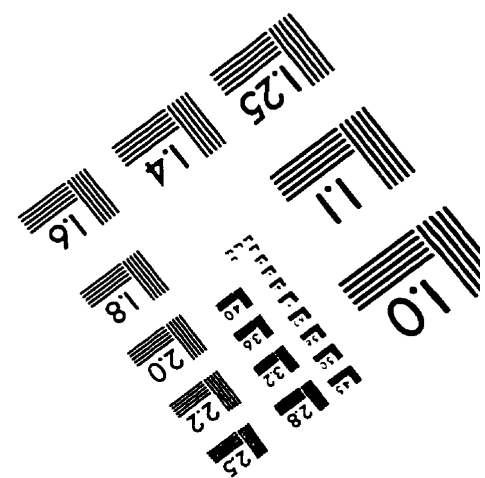
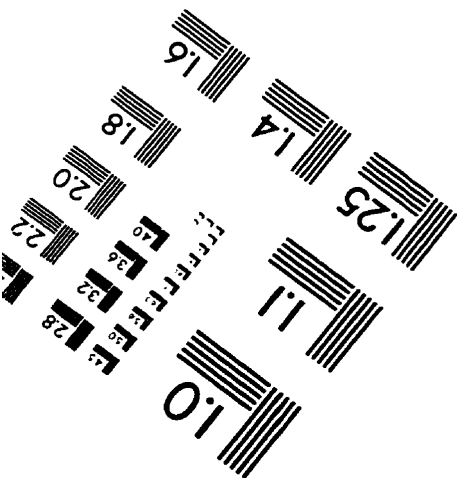
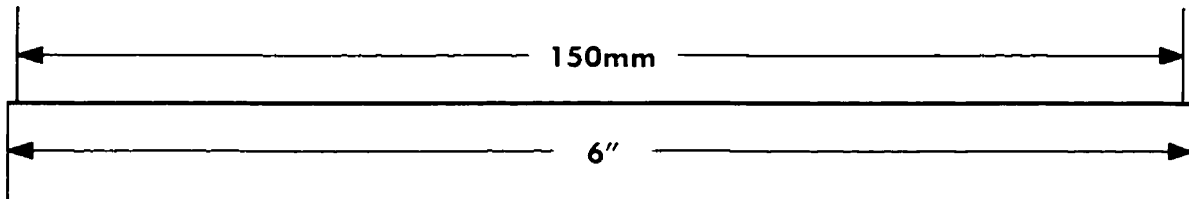
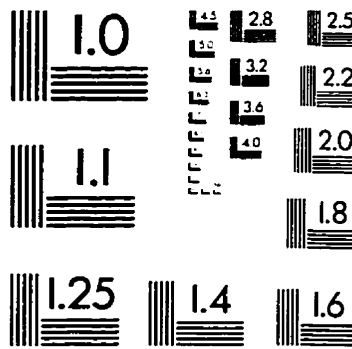
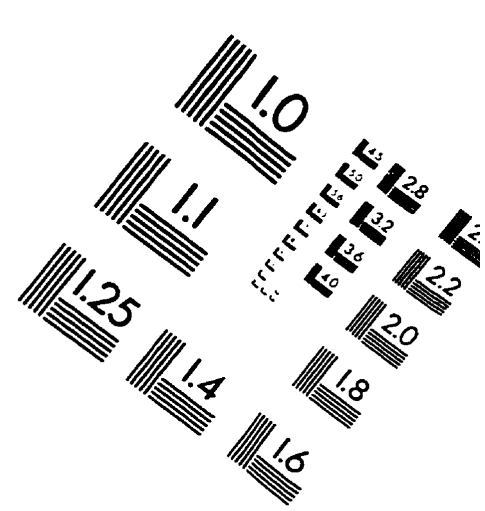
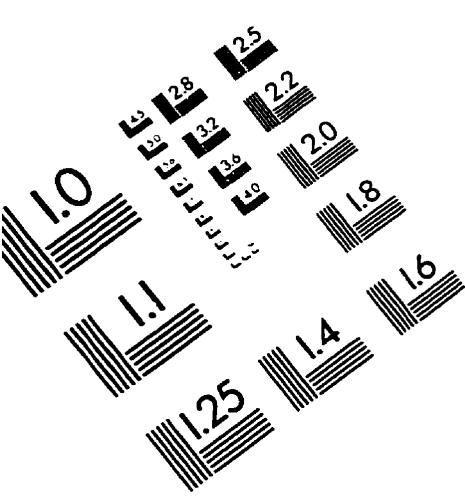
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