GIFTEDNESS: AN EXAMINATION OF CURRENT DEFINITIONS, A PROPOSAL FOR A NEW DEFINITION, AND A CONSIDERATION OF ITS IMPLICATIONS

by

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Giftedness: an Examination of Current Definitions, a Proposal for a New Definition, and a Consideration of its Implications.

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ABSTRACT

A study of the literature on giftedness, dating from the 1920's to the present, revealed a wide range of definitions of giftedness, from those based on theoretical research to those based on everyday observations and personal ideologies. An analysis of some of the key concepts common in definitions of giftedness revealed a lack of consistency and of clarity. The literature usually made no distinctions among theories, models, and views, grouping all of these under the general title of definitions. Examination of representative definitions of giftedness revealed a need for a model of giftedness that would provide a coherent and comprehensive conception of the phenomenon.

In order for a new definition to affect research and to encourage evolution in the concept of giftedness, it is necessary to abandon the restrictive premise that IQ tests are the best measures of intelligence available. As an alternative for correlational studies about giftedness, Piaget's cognitive development theory and Feldman's consequential assessments of levels of cognitive development show promise. Also, there are many assessment

methods and devices available to identify children for gifted programs.

The model constructed in the thesis is called the Chrysalis Model. The term denotes its accommodation of the complex processes and changes inherent in gifted students. It is an eclectic and heuristic model meant to promote and to respond to the evolution of knowledge of what truly constitutes giftedness.

There is a need to develop both an awareness of the many views of giftedness and a sound philosophical basis for the gifted. This new model has implications for educational practice, in both the area of the selection of gifted students and the area of designing appropriate curricula for them.

DEDICATION

À Yves, mon arc en ciel,
pour sa patience et son amour;
et à Carryl, le soleil dans les nuages,
pour son conseil et son aide

THE SAVIOUR SYNDROME

Oh gifted child
unto a woman born
and wrapped in swaddling clothes
a cocoon of hidden gifts
needed by a world
trapped and wrapt
in its own successes and excesses
avoiding nurturing
the potential of your life
unaware
that not another moth
but a butterfly
lies within
waiting to be fed
and furnished with knowledge
emotion and opportunity
to flower and burst out
with beauty of intelligence
in productive achievements
and evidence
of cognitive
creative accomplishment
rather than to die
unnurtured
unnominated
by IQ tests which curse the chrysalis
to a cross
of conative and circumfusive components
which crush and crucify
the potential of the gifted child.

- Kathryn Patten

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TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

There has long been an interest in exceptional children, but it is only in recent decades that widespread concern has generated a wealth of literature about, research on, and programs for the gifted. Along with the widespread interest in giftedness came the development of concepts, theories and a variety of definitions.

This thesis will begin with a glossary of terms and concepts related to giftedness, gleaned from a wide reading of literature about the topic. These terms were selected because they are inherent in any discussion of giftedness and are a necessary foundation for an understanding of the topic. The glossary in Chapter 1 will serve as an introduction for the reader to the building blocks that form the basis of a vast array of definitions, some of them widely recognized and based on years of research and development of theories, some simply articulations of general beliefs about giftedness, and others significant because of their widespread acceptance and application to practice. Chapter 2, a survey and analysis of these representative definitions of giftedness, will reveal that the study of giftedness seems to be in

something of a pedagogical rut, which represents the inability of theorists and researchers to break away from or at least to re-think the postulate that IQ test results are a necessary component in characterizing all aspects of human intelligence.

A further purpose of this thesis is to propose an eclectic model of giftedness, which would encourage both the continuance of research in a variety of areas and the pursuit of evidence in support of a variety of theories. It is expected that this definition would enable the many researchers into giftedness to work together to reach their avowedly common goal: provision of the best possible education for and the best treatment of these exceptional children. This new model is eclectic in that it is an attempt to recognize and unify the various aspects of giftedness that many different educators and theorists have discussed. This new definition is not a theory, although it has theoretical roots; it seeks to encompass various aspects of giftedness central to the field.

A discussion of the restrictions imposed on the evolution of the study of giftedness by correlation of research with IQ and the dependence on quantitative data as proof of the existence of facets of giftedness will precede the new definition. Alternatives to the

use of IQ tests will be suggested in light of the new definition, and a discussion of the implications of these proposals on research and practice will ensue, with a conclusion based on the changes that would result in selection, programming, and design of curriculum for gifted children.

Before beginning a discussion of giftedness, a literature survey of related fundamental concepts will be introduced in the form of a glossary. This survey is meant to provide the reader with a background in the variety of related concepts, which will create a framework for later chapters and also reveal a lack of conformity in conceptualization and definition of ideas. This selection of definitions of related concepts supports Gallagher's view that "the inadequacies of the definitions [of giftedness] are merely symptoms pointing to our incomplete knowledge about relevant concepts" (1979, 31).

It is the purpose of this thesis to present an overview of giftedness. It is not the intention to provide exact definitions of giftedness. As with all concepts of mental phenomena, there is a diversity of viewpoints related to its inherent complexity and abstractness. All of the viewpoints on each

concept will not be presented; those selected on the basis of recurrence in literature on giftedness show the variety of explanations claimed for each term and help to illustrate why there is so much confusion and lack of unity among those writing about gifted children. As writers cannot agree about concepts related to giftedness, it follows that there is little agreement on what giftedness actually is, and consequently, resultant programs and practices regarding gifted students are diverse and sometimes in conflict.

The rationale for providing a different education for children endowed with exceptional abilities involves the beliefs that these children do exist, that they can be identified, and that they are quantitatively and qualitatively different. Children endowed with a wide range of superior abilities will be called "gifted", [as opposed to "talented"]. The specifics of "giftedness" will vary according to each individual version of what constitutes giftedness and will be dealt with in detail in later chapters.

CHAPTER 1

CONCEPTS RELATED TO GIFTEDNESS

INTRODUCTION

There are related concepts which must be defined before giftedness can be examined in a thorough manner. The various interpretations of these concepts relate directly to issues which are topics of debate in the field of giftedness. This chapter will provide a glossary of these concepts, which were chosen because of their recurrence in literature and their importance to the discussion of giftedness. The many interpretations of each of these concepts are indicative of the wide range of views of giftedness presented to practitioners in the field of education.

INTELLIGENCE

When discussing giftedness, it is imperative that intelligence be defined. Gardner said of the word intelligence: "we use it so often that we have come to believe in its existence, as a genuine tangible, measurable entity, rather than as a convenient way of labeling some phenomena that may (but may well not) exist" (1983, 69). Because intelligence is an intanglible "phenomenon",

conceptions of it vary greatly. Definitions of intelligence can be divided into three categories: factor theories, developmental theories, and information processing theories.

FACTOR THEORIES

Factor theories describe intelligence in terms of structure, or traits. Terman and Spearman are the modern originators of this type of theory. Terman, (1926) in his Genetic Studies of Genius, equated a single factor, IQ, with intelligence. Spearman (1927) introduced factor analysis into psychology with his two factor theory. He proposed that a single factor (*g* for general) underlies all general intellectual operations, a factor addressed by IQ tests. This *g* factor is the ability to perceive, manipulate, and use relations, and although it varies freely from individual to individual, it remains constant for any one individual. The remaining elements of intelligence are composed of specific factors (*s*), which are independent of the g factor. This *s* factor not only varies from individual to individual, but even for any one individual, it can vary from ability to ability. Although both *s* and *g* factors exist in every ability, they may not be equally influential from ability to ability. Spearman's theory states that:

> "all branches of intellectual activity have in common one fundamental function (or group of functions), whereas the remaining or specific elements seem in every case to be wholly different from that in all the others" (1927, 76).

In each of the specific factors, there are imbedded multiple components which contribute to its uniqueness. Spearman attempted to isolate certain abilities using his *tetrad equation,* (rap x rbq - raq x rbp = O), where correlations between the measurements of different abilities are used to isolate independent parts or factors, namely *g* and *s* .

Thorndike (1925) expanded this concept by arguing that there are *many* specific and independent abilities or factors.

Guilford developed a three-dimensional Structure of the Intellect Model which attempts to incorporate all cognitive abilities in a multi-factor theory (See Appendix A). This model poses 120 abilities which are defined in terms of three dimensions: operations, products, and contents. Each dimension is broken down, giving five types of operation: evaluation, convergent production, divergent production, memory, and cognition; six types of product, namely: units, classes, relations, systems, transformations, and implications; and four types of content, namely: figural, symbolic,

semantic, and behavioral. These combinations collectively yield the 120 abilities. Each of these intellectual abilities is differentiated from others by uniquely combining a specific type of mental operation, a specific type of informational content, and a specific type of informational form or product. Guilford writes that, "Intelligence itself is defined as a systematic collection of abilities or functions for processing different kinds of information in different ways, information differing both with respect to content (substance) and to product (mental construct)" (1975, 109).

In contrast to Guilford's multi-factor theory, Gardner proposed a theory of multiple intelligences which are "fashioned and combined in a multiplicity of adaptive ways by individuals and cultures" (1983, 9), based on evidence taken from studies of prodigies, gifted individuals, brain-damaged patients, idiots savants, normal children and adults, and individuals from diverse cultures. Using this "converging evidence from diverse sources" (1983, 9), Gardner gives credibility to an "intelligence" or "frame of mind" if it meets the following criteria: 1) potential isolation by brain damage; 2) existence among idiots savants, prodigies, and other exceptional individuals; 3) identifiable by psychometricians, experimental

researchers and/or experts in the field as a core operation or set of operations; 4) distinctive developmental history along with a definable set of expert "endstate" performance; 5) evolutionary history and plausibility and; 6) susceptibility to encoding in a symbol system.

To arrive at his theory, Gardner has closely examined the biological perspective on intelligence, and cites such intriguing hypotheses as the geneticist view of talent, which argues that combinations of genes correlated in such a way as to cause production of enzymes affect specific structures in a particular region of the brain, causing them to become larger, to have more connections (or synapses), culminating in greater potential for higher achievement in a specific area (1983, 34). A study by Vogt supports this hypothesis. Research showed a renowned painter to have a very large fourth layer of cells in the visual cortex and a musician with perfect pitch to have larger cells in a vast region of the auditory cortex (Gardner, 1983, 43). Obviously, the advancement of this particular area of research is limited by the difficulty of establishing suitable experimental methods on humans, but, as Gardner suggests, it could hold a vast reservoir of knowledge to

forward or demarcate his and other related theories.

Such research in neurobiology as Vogt's supports the conception that certain parts of the brain correspond to certain forms of cognition, which Gardner calls "intelligences" and defines as different intellectual strengths or competences. He states that "there is not, and there can never be, a single irrefutable and universally acceptable list of human intelligences .... There will never be a master list of three, seven, or three hundred intelligences which can be endorsed by all investigators..." (1983, 60). Gardner's multi-factor theory of intelligence is composed of six domains: a) linguistic, b) musical, c) logical-mathematical, d) visual-spatial, e) bodily-kinesthetic, and f) personal. The personal domain bears elaboration. There are two personal intelligences: intrapersonal, or the identification and discrimination of one's own emotions and behaviour; and interpersonal, or "the ability to notice and make distinctions among other individuals, ... their moods, temperaments, motivations, and intentions" (1983, 239). These two domains can be linked to the "socially talented" with leadership ability mentioned in the United States Office of Education definition (Marland, 1972) and the British Columbia Ministry of Education Enrichment and Gifted

Education Resource Book (1981, 7). It might be noted by way of criticism of including "interpersonal abilities" or "social talent" in a definition of intelligence that Goertzel and Goertzel, as a result of their data based on two studies of a total sample of seven hundred eminent personalities, concluded that these intelligent individuals "treasure their uniqueness and find it hard to be conforming, in dress, behavior, and other ways..." (1962, 338); in other words, they are non-conformists and sometimes are socially maladjusted. Examples of eminent personalities who fall into this category include: Oscar Wilde (Ellman 1987), Vincent Van Gogh (Goertzel and Goertzel 1962, 36), Albert Einstein (Goertzel and Goertzel 1962, 248,252), and Thomas Edison (Goertzel and Goertzel 1962, 236,248), who did not exhibit strong interpersonal skills.

The six intelligences, Gardner stresses, are "fictions" for discussing processes and abilities that are not separate, distinct entities, but only separately defined to aid in their examination as scientific constructs (1983, 70). Gardner does not purport to have found the definitive theory, but maintains that "a prerequisite for a theory of muliple intelligences, as a whole, is that it captures a reasonably complete gamut of the kinds of abilities valued by human

cultures" (1983, 62).

Gallagher's Model of Intellectual Productivity, (IP), is what he terms a "Theory in Use of Intelligence" (1986, 22). Intellectual Productivity "is a function of many different factors and their interactions" (1986, 23). These factors, signified by letters, are as follows: A = capacity for mastery of symbol systems; B = opportunities for talent development; C = parental encouragement of talent; D = self-confidence in environmental understanding and mastery; E = subcultural approval of intellectual activities; and F = peer influence. Gallagher asserts that these factors can and do contribute to IP in varying degrees of strength and in various combinations. Factors A to F are ingredients to which Gallagher has attached estimates of proportionate influence (See Appendix B). These factors, he claims, can help to explain disparities in achievements of similarly talented individuals (1986, 26,27).

While Guilford sees intelligence as a construct of diverse but interacting abilities, and Gardner argues that intelligences are forms of cognition which can never be summarized in a list, Jensen claims that intelligence is "an unclear hypothetical construct (or class of constructs) ... for the time being" (1982, 257). Rather than

get caught up in the argument of whether what is measured by IQ tests should really be labeled "intelligence", he feels research should concentrate on finding what the phenomenon is and if it is worth measuring (1982, 258). He feels that weak hypotheses are those that cannot be substantiated or denied by statistics, and strong hypotheses are those that can, and which result in "cumulative, systematic scientific knowledge - an increased understanding of the phenomenon" (1982, 260). The aim of his research on intelligence is "to establish reliable phenomena in need of theoretical explanation" (1982, 293), rather than forming a theory and seeking to substantiate it. He believes that factors must be found, verified, and identified before an adequate theory of intelligence can be articulated.

DEVELOPMENTAL THEORIES

In contrast to factor theorists who view intelligence as displays of cognitive abilities, or performances, developmentalists see intelligence as the processes which create the performance.

Piaget's sequential periods of development, namely sensori-motor, pre-operational, concrete operational, and formal-operational, each extending, reconstructing, and surpassing the

preceding one, are rooted in the premise that, "Intelligence proceeds from action as a whole, in that it transforms objects and reality, and that knowledge... is essentially an active and operatory assimilation" (1969, 28). He views man's course of intellectual development as a conquest of his environment, where man reacts and seeks to control. A child progresses from stage to stage as a result of adaptation, or interactions with the environment, which consists of two processes: assimilation of the environment into the child's existing mental structures, and accommodation, or modifying his/her mental structures to fit demands from the environment. These two processes are complementary and result in creation of new structures, or organized patterns of dealing with input from the environment.

During the sensorimotor stage, which Piaget sets at birth to eighteen months, the child has not yet acquired language and exhibits intelligence through manipulation of objects. The second stage, that of preoperations, set at ages eighteen months to seven years, sees the acquisition and refinement of language and symbolic behaviour, and the lack of conceptual conservation, or the lack of ability to recognize that matter is conserved. Piaget also terms the

preoperational child as egocentric, or lacking understanding of others' points of view. Donaldson accuses Piaget of incorrectly labeling the child under seven as being "very restricted intellectually" and "not much of a thinker" (1978, 34) and the results of her research conflict with his idea of egocentric behaviour among children; her testing results showed that seven year olds *can* see a situation from a different perspective (1978, 38).

Feldman, taking Piaget's developmental theory, refines and extends it. Using map drawing as a medium, as Piaget and Inhelder (1969) did, Feldman has identified six phases in each of Piaget's developmental stages and has also designed an elaborate diagnostic procedure to determine, "with reasonable accuracy" (1986, 295), where in a transition cycle a given child is. He terms his studies "universal" in that they deal with "unselected samples of children" (1986, 295) or not with specifically selected children. Unlike Piaget, Feldman directly applies his studies to the identification and definition of giftedness, which will be discussed in more detail in the following chapter.

INFORMATION-PROCESSING THEORIES

Information processing theories try to define the processes

and sequence of steps individuals use to solve problems. Perhaps the most widely known information-processing theory is Robert Sternberg's Componential Theory of Human Intelligence (1981). Rather than looking at common factors of intelligence, he examines the information-processing component, which he defines as "an elementary information process that operates upon internal representation of objects or symbols" (1981, 86). He further compares the two by stating that a component "can translate a sensory input into a conceptual representation, transform one conceptual representation into another, or translate a conceptual representation into a motor output" whereas a factor is "a latent source of individual differences ..." (Sternberg 1981, 86).

Sternberg sees problem solving as being composed of three types of components: Metacomponents, which are "higher-order control processes that are used for executive planning and decision making in problem solving" (1981, 89); Performance Components, which are "processes used in the execution of a problem solving strategy" (1981,89); and Acquisition, Retention, and Transfer Components, which are skills involved in learning and utilizing information (1981,90). The six Metacomponents identified by

Sternberg are: 1) hierarchical problem recognition, or what is the nature of the problem, and if there is more than one, establishing which one needs to be solved first; 2) generation and selection of steps, or which steps need to be utilized to solve the problem; 3) strategy selection, or which order the steps are to be used in and when they are to be applied; 4) selection of representations for information, or which is the best method of conceptualizing the problem; 5) allocation of componential resources, or which requires more resources in terms of time and energy; and 6) solution monitoring, or using feedback to decide if the plan is faring well, and if it needs revision, also, being flexible in problem solving.

The second type, Performance Components, executes what the first type, Metacomponents, plans. The seven general types of Performance Components are: 1) Encoding, or identifying the necessary facts; 2) Inference, or detecting relationships between objects and/or ideas; 3) Mapping, or relating aspects of one domain in the problem to another; 4) Application or making predictions; 5) Comparison, or comparing predictions made in component 4 to alternative options; 6) Justification, or verifying the best option; 7) Response, or communicating the solution of the problem.

The third type of component has three facets: those of Acquisition, Retention, and Transfer. The Acquisition component refers to the skills involved in acquiring new information; the Retention component refers to the skills involved in retrieving previously acquired information, and the Transfer component refers to the generalization of retained information from one situation to another. Sternberg notes that "research has not yet reached the point where we are able to specify what these [Acquisition, Retention, Transfer] components are" (1981, 90), but some variables which affect the three components have been identified, such as: number, frequency and recency of occurrences of information, variablity of contexts for presentation of information, perceived importance of information to target or receiver, ease of decontextualization of information, and helpfulness of stored information to understanding presented information.

He later laments that "intelligence is seen solely in terms of performing certain operations, not in terms of understanding and quality of performance" (1981, 197), and that we are caught up in the irony of an inadequate mental concept of intelligence which restricts our vision and research on clarifying what intelligence is.

Rather than viewing intelligence as simply a process, Jellen and Verduin (1986) view intelligence as the potential to process information accurately and quickly. Jellen and Verduin define intelligence as "the cognitive potential of the gifted learner to develop abilities to learn abstract content fast and to criticize what is learned, as well as to deal with new and challenging situations" (1986, 33). They state that intelligence must be understood in terms of an intelligent act, which requires "concept recognition, concept formulation, concept operation, and concept application" (1986, 33). Similar to Sternberg's variables in Acquisition, Retention, and Transfer components, Jellen and Verduin recognize that speed, flexibility, fluency, and accuracy are key features to effective transfer of concepts.

In conclusion, there exists a variety of definitions of the basic concepts underlying giftedness. In many cases these definitions form the bases for current issues, such as the nature/nurture argument. Such arguments have largely been avoided, as they do not directly pertain to the main issue of this thesis, the definition of giftedness. Some definitions of intelligence have facets and ideas in common (Guildford 1965 and Gardner 1983), while others are

disparate (Guilford 1965 and Piaget 1969), but theorists agree that we are operating in a field without adequate research which is further limited by concerns of definition. A new definition of giftedness must be proposed which allows and encourages various explorations, whether they be psychological or neurological, of what actually constitutes intelligence, and concommitantly, giftedness.

TALENTED

There are innumerable definitions of "talented"; those presented here represent a survey of current meanings ascribed to the word which illustrates the disparity of views. I will also stipulate a meaning, derived from the survey, for the purposes of this paper. Definitions of talented can be divided into two categories: those which equate talent with giftedness, and those which make a distinction between talent and and giftedness.

Passow equates the two and defines talented as "the capacity for superior achievement in any socially valuable area of human endeavor, but limiting the areas to such academic fields as languages, social sciences, natural sciences, and mathematics; such art fields as music, graphic and plastic arts, performing arts and mechanic arts; and the field of human relations" (1981, 6-7).

Rice also equates "talent" with "gift" and cites Havighurst's definition: "Talent is superior performance in any area of complex human activity" (Havighurst 1962, 355). He states that "mental giftedness is but one kind of potential talent" (Rice 1985, 39), and that the term talent is too vague and "should be preceded by a descriptive adjective, for example academic talent, musical talent, athletic talent" (Rice 1985, 39). Rice also cites Ward's definition of giftedness, which includes "general intelligence" and "specific aptitudes (or talents)" (1985, 11), and goes on to delineate six categories of talent, namely: 1) academic, 2) creative, 3) psychosocial (leadership), 4) performing arts, 5) kinesthetic (athletic), and 6) perceptual-psychomotor.

The United States Office of Education (USOE) definition (1972), cited by both the British Columbia Ministry of Education (1981) and the Alberta Education Service (1983), considers "gifted" and "talented" as synonyms.

Francoys Gagné (1985) addresses the problem of a lack of distinction between the terms talented and gifted, and defines talent as referring to "performance which is distinctly above average in one or more fields of human endeavor" (1985, 63), which

is contrasted to the gifted individual's "competence which is distinctly above average in one or more domains of ability" (1985, 63). Talented, then, according to Gagné, is concerned with observable performance within fields of endeavor, and gifted with domains of ability, or "characteristics which 'explain' the observed performance" (1985, 108).

Ronald Taylor acknowledges that a subtle difference exists between the terms gifted and talented, where "Gifted often refers to cognitive and creative superiority in combination with strong motivation, whereas talented refers to a special ability, aptitude, or accomplishment" (1984, 83).

The State of Delaware, according to Zettel, offers a differential definition which defines the talented as children "who have demonstrated superior talents, aptitudes or abilities, outstanding leadership qualities and abilities, or consistently remarkable performance in the mechanics, manipulative skills, the art of expression of ideas, oral or written, music, art, human relations or any other worthwhile line of human achievement" (1979, 63) in contrast to the "high intellectual capacity and ... native capacity for high potential intellectual and scholastic achievement

..." (1979, 63) of the gifted.

Kitano and Kirby make a distinction between intelligence, which is general ability, and talent, which is specific ability (1986, 41). Feldman's research, based on a sample of children extremely gifted specifically in chess, mathematics and music, illustrated that achievement in these areas was precipitated by extreme training and education in these specific fields (1979), or areas of talent, implying that giftedness is a general ability and talent is giftedness manifested as a result of training and education in specific areas.

Barrow states that giftedness is "a very general term ... [which] covers intelligence, creativity and imagination, but even when its meaning is less wide than that, it remains a broad term covering a range of talents over a spectrum of activity" (1990, 98), implying that talents encompass many areas and that a many-talented person falls into the category of gifted.

The Webster's dictionary defines talented as "a mental or physical ability: aptitude" or as "superior natural ability: genius". For the purposes of this paper, it is necessary to make a distinction between the terms talented and gifted. "Talented" will refer to a

person with superior skills or abilities in a single, specific area. For example, an idiot savant, (a mentally retarded person who has a remarkable special skill), would not be classified as gifted, but as talented. Similarly, Ben Johnson would be classified as talented, but not gifted. The greatest distinction between what is here termed talented and what is here termed gifted would be that a gifted person is multi-talented, and one of these talents would be intellectual, whereas a talented person could have a special ability in a sport or some other practiced skill or ability, such as typing or ballet. For example, if someone types 190 words-per-minute, this alone would not qualify him/her to be classified as gifted, but as talented. Sellin notes that talent "has the dimension of performance or production of a product that is culturally and socially valued" (1981, 50). The keys here are "performance or production", signifying an observable behaviour, and "culturally and socially valued", as someone who was very adept at picking his/her nose would not be labeled here as talented.

CREATIVITY

A universally agreed upon definition of creativity would simplify the discussion of giftedness, as many theories include it as

a major component. Unfortunately such a thing does not exist. The words originality and novelty pervade the literature on creativity. The World Book Dictionary defines originality as: "new, fresh, novel; inventive; not copied, imitated or translated from something else" and novelty, its synonym, as: "a new or unusual thing or occurrence; innovation". One must ask, original and novel in respect to what or to whom? Obviously a person considered original or novel in one century might not be regarded as such in another century. Therefore, creativity is in some sense and in some respect relative and contextual. For example, we may not consider a child who discovers a new way to pick his nose "creative". Bessemer and Treffinger identify context, relativity and other aspects of the creative process in their Product Analysis Matrix (see Appendix C), referring to them in their criteria list as "original, useful, [and] valuable" (1981, 16). Gowan (1967) also relates creativity to cultural relevance when he differentiates between personal and cultural creativity, stating that anyone can be creative on a personal level, but that only a few, whom he calls gifted, are creative in a way which benefits an entire culture.

Torrance sees creativity as a rational thinking function and

defines creativity as "the process of sensing problems or gaps in information, forming ideas or hypotheses, testing and modifying these hypotheses, and communicating results" (1963, 4). Torrance's conclusions in his booklet Creativity are drawn from over five hundred research reports on creative thinking. He briefly discusses such concepts as curiosity, imagination, discovery, innovation, and invention; contrasts creativity with conformity; and cites another definition of creativity as "a successful step into the unknown" (1963, 4). He espoused to teachers a turn from the narrow perspective of creative writing and art to a broadened look at creativity. This perspective of seeing creativity as a process rather than simply a product became popular and was formative to the present view of creativity and creative thinking skills. His Torrance Tests of Creativity (1974) are widely used in screening candidates for gifted programs today.

Guilford concludes that the abilities in his Structure of the Intellect Model which are contributors to successful creative thinking are the two general categories of divergent thinking and transformations (1967, 85). Guilford defines the creative child as:

> ...less bound by what we agree to as reality; he is ready to reinterpret it and to change it to suit his purposes, In this sense, he is closer to the brink of insanity than most other children, but not necessarily in any great danger of going over the brink. He does things that appear odd in the context of the behavior of other children. He takes liberties with what he observes and knows. He has a playful attitude toward his experiences. His thinking goes off in unusual directions. He is sometimes referred to as a rebel ... (1967, 88).

Joan Freeman also recognized that "effectively creative children are confident and have freedom and security to take risks, to be curious and to be adventurous" (1979, 118).

In the same article as his behavioural observation, is Guilford's definition of creative thinking:

> Creative thinking has two defining characteristics. First, it is autonomous; that is, it is neither random nor controlled by some fixed scheme or external agent, but is wholly self-directed. Secondly, it is directed toward the production of a new form - new in the sense that the thinker was not aware of the form before he began the particular line of thought. (1967, 89)

In Guilford's earlier writing, the term creativity refers to "the abilities that are most characteristic of creative people" (1950, 444), and is related to motivational and temperamental traits. He

also notes that creativity and creative productivity "extend well beyond the domain of intelligence" (1950, 445), and views people as having "different types of creative ability" (1950, 451). His research is based on what he called a factorial approach, wherein he set out to establish the existence of several primary factors or variables, connected to the thinking processes involved in creativity, namely: 1) sensitivity to problems; 2) ideational fluency (for example, how many titles a subject can give for a picture in a given period of time); 3) ideational novelty; 4) flexibility of set; 5) synthesizing ability; 6) analyzing ability; 7) reorganizing or redefining ability; 8) span of ideational structure (or complexity); and 9) evaluating. In this factorial conception, creativity "represents patterns of primary abilities, patterns which can vary with different spheres of creative activity" where "each primary ability is a variable along which individuals differ in a continuous manner" (1950, 454).

Torrance and Guilford have delineated steps in what they individually perceive to be the creative process, but Coleman argues that the process need not be identical for all (1985, 241). For instance, the refined creative process for a scientist may differ

from the refined creative process for a musician, although the general process may be the same. He sees creativity as a developmental process that becomes refined and restructured over time, and his definition of creativity is infused with the process: "Creativity is a general process that is expressed in many aspects of life and becomes expressed in increasingly more specific ways as age increases" (1985, 242). He espouses measuring the quality by comparing the result with similar results by peers; in this way, children's lego contructions should be compared with other children's lego constructions and architects' work with the work of other architects; in other words, results should be categorized before judgement is rendered on their creative value. Coleman states that creativity is "field-related" and should be "rated in comparison to criteria relevant to a field of inquiry" (1985, 242).

Coleman cites the Wallas Model, which breaks the creative process into four steps: 1) preparation, where the question or paradox is involved; 2) incubation, where there is unconscious examination of possible solutions; 3) illumination, or the moment of insight where one solution is chosen; and 4) verification, where the solution is evaluated. Coleman notes that this model is merely a

satisfactory method of conceptualizing the creative process, and not the process itself (1985, 243).

Kitano and Kirby define creativity as "the ability to generate an idea or a product that is new and useful" (1986, 216). This definition would negate the inclusion of art because in a utilitarian sense, it could be argued that art is not "useful". It is obvious that this definition is too ambiguous and utilitarian to be advantageous in addressing attributes of the gifted, although some of Gaudi's works might qualify if they were incorporated into park benches.

Gowan (1979) cites, in his creativity theory of hemispheric specialization, that the two hemispheres of the human brain specialize in different modes of processing information: the left cerebral hemisphere dealing primarily with verbal, abstract, logical, sequential, and analytic operations, and the right cerebral hemisphere dealing primarily with non-verbal, spatial, holistic, concrete, intuitive, and imaginal operations. These hemispheres do not specialize in certain tasks, but in methods of processing tasks. Gowan maintains that the right hemisphere is the source of creativity and that creative individuals are predominantly right hemisphere thinkers (1979).

Barrow, in his examination of creativity, considers that "a creative person is one who, in one or more areas of life, intentionally produces something of originality or quality, to some extent consistently" (1990, 159). His criteria for judging whether a work is creative include examinations of the individual's consistency (was this a one-time show), intention, quality, and originality, and concludes that there are objective criteria for judging an individual's work to be creative (1990, 168). It can be argued conversely that there are no objective criteria which are without bias, for evaluation implies a personal judgement and bias is inherent in judgement. However, there are objective criteria in the sense that there are material objects that have actual existence on which a comparison for a judgement can be based. For example, the works of Antonio Gaudi, such as La Sagrada Familia, the cathedral in Barcelona, Spain, were (and still are) judged to be creative by comparing them to other architects' works.

In conclusion, an eclectic definition of creativity will be given: creativity is an intentional activity which results in an original work whose quality is contextually exceptional. This work is not the result of chance, but is sought by the creator; it is

relative to the context of the culture in which it is created, and is widely recognized as being unique and exceptional. For example, if a person created a machine which could detect if an individual picked his/her nose, this would not be judged to be creative because it is not relative or valuable to our culture. The creation need not be valuable in a utilitarian sense, but could be valuable in an aesthetic sense, such as a statue or a painting. In a truly creative act, the actual process of creativity will vary somewhat, depending on the task and the individual, but the product will meet all of the above criteria.

DIFFERENTIATED CURRICULA

Differentiated curricula, also called differential education for the gifted or DEG, is another term acknowledged to be without a concise, functional definition (Maker, 1986, 121). Ward called the current educational curricula for gifted "a growing miscellany of practices that exist in the absence of a comprehensive theory" (1980, ix). Ward laments the current aversion to philosophy and its extension to theoretic work and the antipostulate that belief must be attached solely to empirical data. He argues that "authentic theory, [must be] grounded in both the most dependable yields from

cumulative empirical inquiry and the most balanced and reflective judgment which reflects the primary essence and feel of live experience with gifted youth" (1986, 266). Providing a different education for individuals "endowed with positively exceptional biopsychological potentiality, in accord with need derivative of their extraordinary capacities for learning, thinking and diverse achievements ... is an inherent obligation of democratic societies" asserts Ward (1986, 264). Although most educators and persons otherwise concerned with education would agree, with the exception of Adler in The Paidea Proposal (1982) who vehemently disagrees, the precise terms of differentiated curricula vary according to whether or not the proponent(s) of the term regard gifted children as being quantitatively different or qualitatively different. For those who regard gifted children as quantitatively different, a faster pace (or acceleration) through the educational system qualifies as differentiated curricula. For those who regard gifted children as qualitatively different, differentiated curricula are defined alternatively, and are more complex, being different in kind as well as in rate. Because the definition of the term differentiated curricula is important to the last two chapters, the interpretation

of both sides will be examined here, and a definition selected for its implications on programming for the gifted.

According to Ward (1986, 266), Kaplan (1986), Simpson (1984), and Maker (1986), the conception of providing differentiated curricula is a given and must be based on the idea that gifted students are qualitatively different.

Maker addresses the issue of qualitative differences in her book, Critical Issues in Education (1986), and notes that most research supports the idea that differences between normal children and gifted children are in magnitude or degree rather than in kind. She argues that because intellectually gifted children progress through cognitive stages at a faster rate than normal children, and since children at different stages are qualitatively different, then gifted children are qualitatively different (1986, 120). If a gifted child's level of cognitive development exceeds that of his/her peers, if for example, a gifted child has developed abstract reasoning skills and his/her peers have not, then that child's learning need will be qualitatively different.

Maker states that gifted children spend more time operating at higher levels of thinking, that they can learn research skills at an

earlier age, that they can master material at a faster rate and deal with ideas which are more complex; gifted learners, she states emphatically, "have a greater capacity to develop thinking skills" and this capacity requires a unique or different education (1986, 118).

Foster (1986) does not agree with Maker, and accepts that the gifted are intellectually better *by degree*, but not different *in kind*; he can see qualitative differences only retrospectively when looking at an individual's accomplishments. However, the implication is there, that if a gifted individual's accomplishments are qualitatively different, it is possible and even likely that s/he has an underlying qualitative difference from whence sprang the accomplishment.

It can also be argued that if the learning disabled require a qualitatively different program because they progress or learn at a different rate, then, as a direct corollary, gifted students also require differentiated curricula.

Berliner supports Maker when he says: "Nature abounds with examples of discontinuities where 'more' (or less) always becomes different" (Maker 1986, 35).

Tremaine's study titled, "Do Gifted Programs Make a

Difference" (1979) supports different programs for the gifted. Gifted students enrolled in special programs in her sample of one hundred and thirty-three students had higher GPA's and SAT scores, took on more challenges, both academic and social, won more scholarships, had higher educational goals, better regard for school and teachers, and were more involved in school and community activites than their non-enrolled gifted counterparts.

Jellen and Verduin define differentation, their term for differentiated curricula as: "A plan for meeting individual differences in gifted learners. The contents, methods, and evaluations chosen for DEG differ in degree of difficulty, range of student interests, quantity and quality of content, as well as timing in order to meet the gifted learner's academic and developmental needs" (1986, 49). Kaplan (1986) goes so far as to describe what this differentiated curriculum should not be and also sets out a method of categorizing the different programs according to the types of definition of giftedness; for example, model-specific (Guilford) and trait-related (Renzulli). However, it is not the intention here to specify or detail a single differentiated curriculum, but to argue in favour of validating its existence.

Webster's dictionary defines qualitative as: "of, relating to, or concerning quality" and defines quality as: "essential character: nature; an inherent or distinguishing attribute: property; degree or grade of excellence". There can be little argument against gifted children having distinguishing attributes and different degrees of excellence than non-gifted children, indeed numerous lists of attributes have been designed, (Barbe 1965, 203-255; Torrance 1966, 53-57; Renzulli and Hartman 1971, 243-48; Freeman 1979, 15-16; Whitmore 1980, 156-157; Abraham 1981, 24-26; Coleman 1985, 29-30; Kitano and Kirby 1986, 70), some as devices for selecting gifted children. If qualitatively different is being defined for educational purposes, and indeed here it is, then children whose needs are not being directly or sufficiently met because of their differences, which, empirically speaking are largely intellectual, deserve, just as any other perceived intellectually different group such as the learning disabled, an education whose quality is indeed different from their non-gifted peers.

Other arguments aside, there is significant evidence to indicate that gifted individuals are qualitatively, in every sense of the word, different. A study by Grubar (1986) in France gives some

credence to this idea. Grubar examined sleep patterns of gifted children based on the hypothesis associating sleep and cognitive activities. This study, according to Grubar, is the second study of gifted sleep patterns and the first study of gifted children's sleep patterns. He found that, "Although total sleep time and sleep latency of the gifted and normal children were very similar, the course of their sleep, i.e. the stages and cycles repetition, were completely different" (1986, 125). The sleep phase he calls paradoxical sleep (PS), commonly known as rapid eye movement sleep (REM), is accepted as constituting a hypothetical substratum for cognition (Grubar 1986, 124). Undifferentiated sleep (US) occurs when REM is absent. Gifted children exhibited a ratio of PS to US of 1.18, while normal children exhibited a ratio of PS to US of 0.57. In mentally defective children, this ratio of PS to US was 0.35 (Grubar 1986, 126). Also, gifted children's sleep cycles showed that a PS stage followed each US stage, whereas with the normal children, the US stages did not "interlock" with PS stages. Grubar notes in his discussion that: "The rate of PS is positively correlated with IQ ($r=.744$ $p<.001$) and is particularly high in gifted children" (1986, 128).

Another interesting aspect of Grubar's discussion regarding gifted sleep patterns concerns oculomotor frequencies ratio (R), (or ratio of frequency of movement of the eyeball within the socket), which is also positively correlated with IQ ($r=.679$, $p<.01$). The oculomotor ratio increases with age, and, "The higher the R observed in gifted children, similar to that seen in adults, may testify to a better ability to organize information" (1986, 128).

In Taiwan, Sheng-Ying conducted a study on hemispheric specialization and creativity which used Torrance's validated test, "Your Style of Learning and Thinking" (1977) to show that gifted students scored significantly higher than their normal peers on right hemispheric specialization and on integrated style, while normal students scored significantly higher than gifted students on left hemispheric specialization (1986, 144). Sheng-Ying claimed that these findings "give support to the speculation that intellectual giftedness may be associated with right hemisphere and integrated dominance" (1986, 144), and lend additional credence to the argument that gifted children are qualitively different.

Baker made a special note of "Qualitative differences in intelligence: - (a) Superior learners tend to learn by complex

associative methods rather than by simple, direct rote drill. By such associative processes, they are able to make many connections or to use many mental facets upon which they may draw when putting meaning into learning ... (b) a second qualitative characteristic is that superior children look for the abstract or generalized rules underlying all school subjects ... "(1949, 153,154).

Barbe also stated: "data reveal that the gifted child is superior in both quantitative and qualitive intelligence" (1965, 250). Carroll found that gifted children characteristically exhibit early development of self-criticism, iniative, independence in thinking, and ability to see relationships, make associations, adapt abstract ideas to concrete situations, and observe and remember details (1940, 115-121). He also indicated that gifted children are superior in such characteristics as desire to learn, desire to excel, originality, and power to learn (1940, 112). Bristow added to this list: a broad attention span, a high degree of insight into problems, and the ability to generalize (1951, 14). In addition, based on her review of animal and brain/mind research, Clark (1983) suggested that gifted individuals: exhibit accelerated synaptic activity, resulting in more rapid information processing; have biochemically

richer neurons, perhaps allowing more complex cognitive patterns of operation; show more use of the prefrontal cortex, possibly allowing more insight and intuitive behaviour; access and remain longer in alpha state brain activity, which scientists hypothesize improves memory; and have more patterned and synchronized brain rhythms, allowing deeper concentration.

To conclude, there is significant evidence to support the claim that gifted individuals are not only quantitatively different, but also qualitatively different, and that they deserve differentiated curricula which will meet their needs.

CHAPTER 2

DEFINITIONS OF GIFTEDNESS

INTRODUCTION

There exists in educational literature a variety of definitions of giftedness. Directly related to the ambiguity of such underlying concepts as intelligence and creativity as examined in Chapter 1, these definitions of giftedness cover a wide range of views.

It is my contention that none of these definitions adequately defines giftedness. In this chapter, a selection of definitions representative of the literature in the last half century will be examined to illustrate their inadequacies and to show the reader that a new definition is needed.

The factors to be considered in examining the definitions will be:

A. Incorporation of postulates of giftedness

B. Validity relative to current research

C. Suitability as a basis for research

D. Relevance to current societal values and needs

E. Provisional direction for curricula or programming

The definitions of giftedness have been divided into three sections: 1) those based on historically significant and representative models and theories; 2) those which are simply semantic renderings of vague ideologies; and 3) those on which most current programmes and curricula are based, or, the operational definitions. Because literature on giftedness does not make any distinctions between the words *theory*, *definition*, and *view*, a discussion of semantics will not be embarked upon here, and the terminology used in the literature will be maintained.

HISTORICAL DEFINITIONS

TERMAN

Lewis Terman, who conducted one of the most widely recognized and cited longitudinal studies of the gifted, beginning in the 1920's, defined giftedness as "the top 1% level in general intellectual ability, as measured by the Stanford-Binet Intelligence Scale or a comparable instrument" (1926, 43). This definition, which set a precedent of equating giftedness with intelligence, and has had prolonged historical impact on the study

and definition of giftedness, will be discussed in more detail in the chapter which follows. Terman's definition's obvious limitation is that it addresses only one aspect of giftedness, namely intelligence, and even in that sphere, it is limited by its reliance on a measuring device designed in 1905 to predict academic success in school.

There is not room here to indulge in the argument of whether or not IQ tests measure intelligence, but all post-Spearman (1927) definitions of intelligence that have achieved any measure of recognition in academic circles describe an IQ test as an empirical representation or approximation of a single facet of intelligence, as one of the traits of giftedness, and common practice uses IQ tests as a main selection device for screening students for gifted programs.

Despite its narrow definition and restrictive selection, Terman's study, later continued by Melita Oden and others, was historically significant as it helped dispel myths that gifted children were physically and socially inferior, and also created interest in the topic of giftedness.

Terman and Oden's "Summary Portrait of the Typical Gifted

Child" in "The Terman Study of Intellectually Gifted Children", lists the following traits for gifted children: being capable of mastery two or three grades beyond their peers, showing a degree of interest maturity two or three years beyond the age norm, and exhibiting superior intellectual, volitional, physical, moral, social, emotional, and aesthetic traits (1976, 65-67).

This study has problems because the sample of 1,528 was selected on the basis of a survey of teachers' choices of the brightest, second brightest, and third brightest child in each classroom. These students were then administered a group intelligence test and those who scored high were given the Stanford-Binet Intelligence Test. Many studies have shown that teachers who are not trained in selection are not accurate selectors of gifted children, but tend to select those who achieve and exhibit their giftedness (Carroll 1940, 8; Bristow 1951, 16; Humes and Eberhardt 1980, 23; Nasca 1980, 69; Coleman 1985, 80; Maltby 1986, 429). Hodge and Cudmore, in their review of twenty-two studies on teacher judgements of gifted students found only four studies that revealed teachers' ratings of students to be significantly related to test scores, and two studies that show

negative correlations (1986, 406-407). The other studies showed neglible to poor correlations. This oversight in the Terman study sampling method set a false premise on which other studies have been based: that gifted children are only those who demonstrate their giftedness by remarkable performances. This faulty premise is exhibited in later definitions which value achievement or task commitment as a significant factor (Hollingworth 1931, 17; Renzulli 1978, 261).

LETA HOLLINGWORTH

Belonging in the same time frame and school of thought regarding giftedness as Terman, Leta Hollingworth, an American clinical psychologist, directed her studies of gifted to the top level of the distribution curve of intelligence, and defined gifted as the top one percent in general intelligence of the population. She defined general intelligence as the "power to achieve literacy and to deal with its abstract knowledge and symbols" (1931, 195). This definition is too narrow, its focus being on individuals who performed exceptionally well on IQ tests, which, according to Hollingworth, are tests of literacy and abstract knowledge. The main accomplishment of this definition appears to be a

distinguishing of men from animals, which are neither literate nor abstract thinkers. Like her contemporary, Terman, Hollingworth relied excessively on the IQ test as a definitive device, and this limited the application of her definition to the educational practice of selecting students for programs for the gifted on the basis of IQ scores.

GUILFORD AND GARDNER

Guilford and Gardner do not explicitly define giftedness (Shaunessy 1986, 67), but their theories are important because they examine the concept of intelligence, underlie later definitions, and are used as ideologies behind some programs for the gifted. The implicit definition in Guilford's Structure of the Intellect Model is that the gifted are those who exhibit high levels of abilities, combining informational content, informational form or product, and intellectual operations. By 1973, nearly one hundred of these one hundred and twenty abilities had been verified through factor analysis (Kitano and Kirby 1986, 45-46). Clarizio, in his thorough examination of Guilford's SOI model, drew a number of conclusions: 1) the SOI model has severe psychometric limitations relating to reliability and validity; 2) lack of sufficient data for

effective interpretation of individual profiles; 3) lack of data on measurement of standard errors of the profiles; 4) methodological difficulties relating to lack of control groups and lack of comparative instructional approaches, no consideration of practice effects, regression toward the mean, and treatment effects; and 5) SOI analyses are limited and their application in the classroom is controversial (1986, 77). While Guilford's factor analysis approach is popular among theorists and researchers, Renzulli is scornful that the SOI model is often "offered as the rationale for special programs" (Will the Gifted Child..., 1980, 6). He criticizes the practice implied by Guilford's SOI model, claiming that educators "are filling each 'cell' of the Guilford model with isolated processes according to a structured and predetermined lesson plan" (Will the Gifted Child..., 1980, 7), and aptly states that "reliance upon the process models [such as the SOI model] has undoubtedly resulted from a popular but completely unsupported belief that the gifted person is 'process oriented'" (Will the Gifted Child..., 1980, 7). While the SOI model has not been well utilized in educational programming, that does not mean it is without educational merit. It has created an awareness of many factors of the intellect which

can be examined and researched, and thus has served some educational purpose.

Gardner's Theory of Multiple Intelligences would imply that a gifted individual would demonstrate to a high degree intellectual strengths or competences in one or more of the six process domains, a) linguistic, b) musical, c) logico-mathematical, d) visual-spatial, e) bodily-kinesthetic, and f) personal (1983, 278), as discussed in Chapter 1. Renzulli denounces the practice of applying such process theories to the gifted and comments that the "process models" involve "mental processes that should be developed in all children" (1980,602), and argues that "prophets of process", (referring to those who misuse the process models by teaching processes in isolation), denigrate the importance of knowledge; he says that the gifted exhibit advanced levels in a taxonomy, but that the gifted are higher in *each* level (such as in Bloom's taxonomy, see Appendix D) than the non-gifted (1980, 602).

GAGNE

Gagné's model is more recent and borrows from previous work and theories on the topic of giftedness. It is representative

of more recent models which attempt to incorporate more than just intelligence, mental processes, and exhibited abilities, but also includes factors of motivation and environment. It diverges from Terman-based models which exclude children who do not exhibit their giftedness in any overt performance.

Regarding a relatively recent dilemma in semantics, Gagné differentiates between giftedness and talent, associating "giftedness with domains of ability, and talent with fields of performance" (1985, 108). Domains, specifically intellectual, could include Guilford's 120 abilities, although Gagné does not delineate the specifics of his "Ability Domains". His contrast of definitions between giftedness and talent follows:

> Giftedness corresponds to competence which is distinctly above average in one or more domains of ability.
>
> Talent refers to performance which is distinctly above average in one or more domains of ability (1985, 108).

A talent, according to Gagné, is an observable performance or competence measured by comparing it to other works or achievements in a similar field. Giftedness, he says:

> is somewhat different in that abilities are generally identified using more unidimensional and standardized measures so as to connect together in the purest form possible those individual charcteristics which 'explain' the observed performance" (1985, 108).

Because an individual must perform in order to be "talented", Gagné claims that "every talented individual is necessarily gifted, although the inverse is not true; a gifted individual is not necessarily talented" (1985, 108). Talent then, is a manifestation of being gifted. Underachievers, in Gagné's definition, are gifted, but not talented.

Gagné's Differentiated Model of Giftedness and Talent, (see Appendix E), has three main parts: 1) Giftedness Ability, containing both general and specific domains; 2) a Catalyst, dealing with environment, personality, and motivation; and 3) Talent, undefined specific fields of talents. Gagné has designated four general domains of giftedness: intellectual, creative, socio-emotional, and sensori-motor; and a fifth domain called "Others" to allow for expansion of the model. The specific ability domains remain unspecified, "owing to important differences among authors and to insufficient research" (1985, 109).

The model presents giftedness as "exceptional competence in

one or more domains of ability, and defines talent as exceptional performance in one or more fields of human activity. Motivation "... becomes one of the principal catalysts of the actualization of giftedness into talent .... This ... permits the acommodation of many talents such as sports and athletics, musical or theatrical interpretation, trades, and leadership ..." (1985, 111).

Gagné's model of giftedness is exceptional in that it synthesizes many theories and covers a multitude of areas in which research on the gifted has been conducted. It includes domains of abilities, differentiates between gifted and talented, and addresses the psychological constructs of motivation, personality, and effect of environment.

Its weaknesses lie in the lack of adequate detail, especially in the areas of specific ability domains and specific fields of talent. Regardless of Gagné's claim that various authors have different views on what should fill these blank spaces in the model, it is his model and his synthesis and should contain what he perceives to be an adequate survey of these abilities and fields.

In the ability domains, where psychomotor has been termed sensori-motor, inclusion of this particular domain is questionable.

As examples of the sensori-motor domain, Gagné lists "marksmanship, wine tasting, [and] perfume analysis" (1985, 109). While employment of the senses is important to the processing of information, as indeed the senses provide primary information, the value of these specific abilities is questionable regarding the term giftedness, especially since a sense-handicap, (such as blindness), does not exclude an individual from being gifted. If cultural validity is an important criterion (Barrow 1990,190; Kitano and Kirby 1986, 216), then the question must be asked: Are these abilities highly valued in our culture? Perhaps marksmanship is highly valued in Lebanon or Israel, but in general, it is not an ability which meets such criteria, nor is wine tasting or perfume analysis. According to Gagné's definition of giftedness, *any* highly skilled performance is an exhibition of giftedness. I would rather that giftedness could be evidenced by some specific, extraordinary, culturally valid, and relevant performance. Perfume analysis may exhibit the scientific laboratory skills of a gifted person, but of itself, it is not evidence of giftedness, but rather would be considered a talent.

The middle section of the model, titled the "Catalyst" lacks

lacks clarification. Perhaps Gagné felt Environment, Personality, and Motivation were self-explanatory, but it would be interesting to know the reasons, (if there are any), for the shape, the encompassing of Personality and Motivation by Environment, and to have expansion on the two "etc."s in this part of the diagram.

Gagné's syntax is well chosen; using the different terms "abilities" for different domains of giftedness and "fields" for areas of specific talent yields clarity in the differentiation of definitions for gifted and talented.

In summary, Gagné has done a commendable job of attempting to combine many ideas and research results about giftedness. However, his eclectic definition requires further detail and clarification, as well as research, to validate it.

GALLAGHER

Gallagher would define a gifted individual as one who is intellectually productive, or one who exhibits a combination of the factors A-F. His Model of Intellectual Productivity (IP), discussed briefly in Chapter 1, regards IP as the criterion variable and factors A-F as the predictors in a multiple regression equation. These factors, which he claims contribute to or "predict"

giftedness, will be described here in detail.

Factor A, *the capacity of symbol systems*, is the most important or has the greatest ability to affect productivity. Language is the major symbol system, but music, mathematics and other activities also involve symbol systems. Gallagher states that "the receptive central nervous system is the most powerful factor in intellectual productivity" (1986, 24), and accounts for thirty to fifty percent of the variance.

Factor B, *opportunities for systematic talent development,* is the aspect of education and/or schooling on IP. This factor, claims Gallagher, contributes ten to twenty percent of the variance.

Factor C, *parental or family encouragement*, was found by both Bloom (1985) and Goertzel and Goertzel (1962) to be a major factor in the success of eminent men and women. Goertzel and Goertzel found that of the four hundred personalities they studied, "In almost all the homes there is a love of learning in one or both parents. .... Fewer than ten percent of the parents failed to show a strong love for learning" (1962, 272). Coupled with this love for learning in families was "the driving need to be doing something,

learning something, changing something, or going somewhere to better themselves" (1962, 4).

Factor D, *self-confidence in environmental understanding and mastery,* is what Gallagher paraphrases as "a feeling tone and attitude" (1986, 25). He argues that if a child understands a situation, s/he will have confidence and be more likely to approach a problem assertively and more likely to find a solution. The more a child understands her/his environment, the more s/he will feel s/he can master or control it. Factor D exerts ten to fifteen percent of the influence on the total IP.

Factor E, *subcultural group encouragement,* refers to groups other than the immediate family which influence an individual. These may be classmates, friends, or even a dead relative who serves as a role model. If these groups also support the efforts of the individual, s/he is more likely to be classified as IP. Gallagher notes that "in the U.S. several ethnic subgroups seem clearly to value high intellectual productivity" (1986, 25), particularly Asian and Jewish families, and it is interesting to note that Hollingworth (1926, 70), Barbe (1965, 209), and Gruber (1986, 250), found a proportionately higher incidence of gifted

children in those same cultural groups. According to Gallagher, Factor E accounts for five to ten percent of IP.

Factor F, *peer influences,* is suggested by Gallagher to have a five to ten percent influence on success in intellectual pursuits. He claims that the more interaction gifted individuals have with gifted individuals, the more likely they are to achieve status in some field of intellectual endeavor.

Finally, Gallagher cites another fifteen to twenty-five percent of the variance contribution of IP to be attributable to the interactions or combinations of A to F.

Gallagher's cart-before-the-horse representation of giftedness is fraught with difficulties; indeed, it raises more questions than it answers. Gallagher created his theory with the gifted in mind; he wanted to get the most out of the potential of the gifted, "to bring ... society forward" (1986, 21), to solve world problems such as "international conflicts, hunger, population explosion, [and] pollution" (1986, 21). For this reason, he wrote his treatise "The Conservation of Intellectual Resources" expounding the model of IP. He was propelled by his pragmatic, utilitarian theory that if "we can enhance the abilities of gifted

youngsters", we will be greatly serving public interest (1986, 22). In short, Gallagher's view of the gifted suffers from what might be termed "the saviour syndrome".

The major problem here is that his model is based on retroactive studies where the lives of eminent gifted individuals were examined to determine which factors made them different from others. Coleman termed this type of theory "ex post facto" (1985, 7). It is Gallagher's desire that the Intellectual Productivity factors A to F are to be enhanced so that gifted children can repair society's ills, but Gallagher's gifted children are those whose lives result in some significant achievement, or those who exhibit their giftedness. Using Gallagher's reasoning, it would be difficult to determine which children should have these factors enhanced, unless they were already displaying these factors. Since researchers agree that giftedness should be enhanced at as early an age as possible (Witty 1958, 48; Torrance 1970, 203; Coleman 1985, 61; Davis and Rimm 1989, 106), Gallagher's theory runs into problems, unless *all* gifted persons are prodigies at a very early age, which most are not.

There are several problems related specifically to the

factors of IP. Gallagher delineated only six factors, but conceded that "there are numerous other factors that one might wish to include into such a formula" (1986, 26) and grants that "the readers can add their own favorite factors" (1986, 26). However, even his six factors have excessive overlap. For example, Factors E and F, respectively *subcultural group encouragement* and *peer influences* , can easily be grouped together because Factor E, as Gallagher says, can include classmates and/or friends. Also, Factors B and C, respectively *opportunities for systematic talent development* and *parental or family encouragement*, can be grouped together since it follows that if parents support and encourage their gifted child, they will provide opportunities for his/her talent(s), even at the cost of sacrificing the comforts of other members of the family (Goertzel and Goertzel 1962). Gallagher entitled this overlap "interaction of facts" (1986, 26), but there is a distinct difference between factors which do not operate independently and factors which are similar. It would have been more definitive to include similar factors under one title and to consider other "ex post facto" predictive factors, such as love of learning, dominating mothers, or dislike of school

(Goertzel and Goertzel 1962).

Gallagher's tactic of comparing these factors to predictors and estimating "variance contributions" is a facsimile of scientific procedure, an allusion to empirical technique, as Gallagher gave no evidence that these factors are measurable, no methods to determine to what degree these factors must be present to be perceived as productive, no data to show they correlate with gifted achievement, nor any procedure to determine which factors need to be enhanced.

Gallagher wanted to define the gifted by delineating factors which contributed to gifted achievement, but it can be argued that each of these factors can be applied to the productivity of any child, regardless of ability or potential. These factors are not exclusive to the development of gifted children, and with the possible exception of Factor A, *capacity of symbol systems*, all factors (B to F) are applicable to the achievement of all children. Gallagher's model does not define any difference between the average ability child and the gifted child. It therefore does not have any clear implications for educating or selecting the gifted, unless one deduced that Gallagher wants all children to have the

same education. However, such an inference would be in direct contradiction to his "saviour syndrome" attitude, which seems to imply that the gifted are special and have a special mission: to solve world problems and save the world from disaster. Goertzel and Goertzel (1962), Terman and Oden (1976), and Hollingworth (Pritchard 1951) have established that eminent gifted adults have benefited from the positive influence of factors comparable to Gallagher's. Gallagher has nothing new to say; he has only condensed factors discovered in previous research into a vague, overlapping list. His Model of Intellectual Productivity is non-productive; it is not a definition of giftedness which is useful to educators because it is loose, vague, and retroactive; it is not useful in selecting gifted children, educating gifted children, or directing research on giftedness. Gallagher's definition is a hybrid; not a horse which can produce (or reproduce), but a mule, sterile for practice or curricula, and infertile for the growth of theory and research on giftedness.

STERNBERG

Sternberg's model examines intellectual processes and their various combinations which he claims produce different types of

gifted adults. His Triarchic Theory of Intellectual Giftedness (1986) is a refined development of his Componential Theory of Intellectual Giftedness (1981) discussed in Chapter 1. Sternberg states in his theory that "intelligence, in general, and hence, intellectual giftedness, in particular, must be understood in terms of three aspects: the internal world of the individual, the external world of the individual, and the interface between these two worlds as it unfolds through experience" (1986, 145). Intelligence is the internal property which is measured by the "objectified proxy" of IQ tests, which Sternberg claims, are incomplete but sometimes useful measures of the structures and processes of intelligence. According to this theory, three kinds of mental processes: metaprocesses, performance processes, and knowledge-acquisition processes, operate upon both linguistic and non-linguistic (abstract) mental representations of information. Metaprocesses plan, monitor and evaluate strategies for problem solving; performance processes carry out the strategies of metaprocesses, and knowledge-acquisition processes are used to determine "how to solve the problems in the first place" (1986, 145).

While Sternberg recognizes that the current measuring devices, such as IQ tests are useful, he cautions against excessive reliance on them as selection devices, warning that: "A little bit of knowledge is a dangerous thing, but that knowledge is much less dangerous if we are cognizant of just how little it is" (1986, 147). He distinguishes by example three types of intellectual giftedness: 1) synthetic abilities, 2) analytic abilities, and 3) practical intelligence, and claims that IQ tests primarily measure analytic abilities. He argues that IQ tests "scarcely" measure synthetic abilities and do not measure practical intelligence very well (1986, 144), and maintains that "the best predictor of future behavior is past behavior of the same kind" (1986, 144). An individual's past displays of ability should be considered in assessing and encouraging giftedness, he concludes.

Sternberg's "intelligence as an internal property" (1986, 145) combines the metaprocesses and performance processes of his earlier theory, (or the processes used to plan, carry out, and monitor problem solving), which he also calls "analytic intellectual giftedness". Intelligence as an external property uses primarily the knowledge-acquisition processes, or the processes

used to figure out "how to solve the problem in the first place" 1986, 145). A person with this type of intelligence would be an expert at applying intelligence to the everyday world, and rather than simply solving the problem, would recognize and shape the problem into a solvable medium or representation. This is known as "practical intelligence". The last type of intelligence, an interface between internal and external, or what Sternberg labels "synthetic intellectual giftedness", utilizes all three componential processes: metaprocesses, performance processes, and knowledge-acquisition processes.

Sternberg has attempted to consolidate his earlier Componential Theory with his new Triarchic view of gifted individuals' interpersonal interactions with the world. The result is a confusing compound of seemingly parallel ideas which the reader must assimilate in order to understand. It would have been easier to create a simple visual model than to use the lengthy examples Sternberg gives to illustrate the amalgamation of the two theories. This has been attempted in the paradigm which follows:

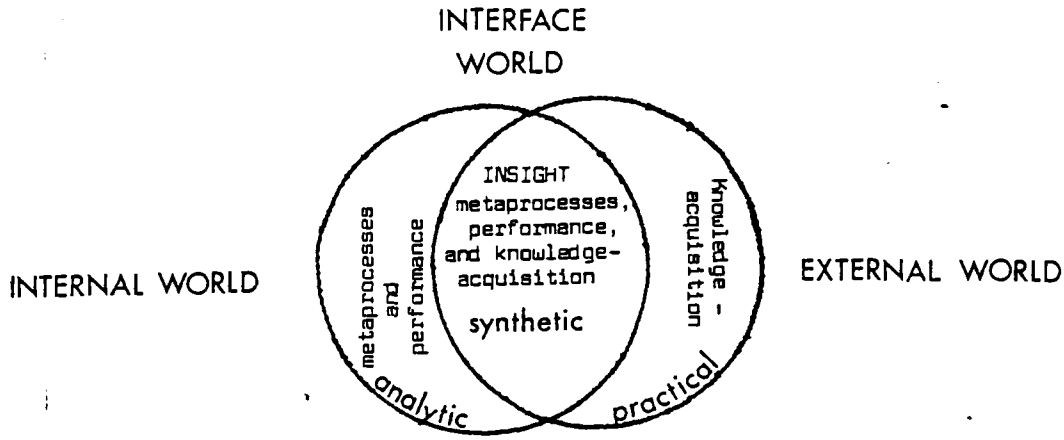


Figure 1 Paradigm of Sternberg's Triarchic Model

Sternberg is currently designing tests to measure his three types of intelligence. The strength of his Triarchic Model is that it considers the gifted individual's interaction with others, adding to the componential approach a human or psychological dimension. For purposes of clarification, Internal and External could be replaced by more relevant terms, or expounded to reveal their semantic origins in relation to his theory. As a process oriented theory combined with a psychological construct, the Triarchic Theory of Intellectual Giftedness lacks consideration of creativity and its corresponding testing and also of motivation, the why behind individuals' interactions with the world which place them in the internal, external or interface worlds of Sternberg.

FELDMAN

Feldman, like Piaget, is a developmentalist. However,

Feldman took his expansion of each of Piaget's developmental stages into six phases and directly related these to gifted children. Feldman questions the belief that giftedness is a stable trait and sees it rather as "a complex interaction of human qualities, cultural responses, and traditions of excellence in specific domains" (1986, 285). His research focuses on the transition mechanisms which account for movement from one stage of development to the next, believing that "if we understand development, we will begin to understand giftedness, and vice versa" (1986, 285). Rather than attempting to identify traits of giftedness, he concentrates on the underlying processes of intellectual functioning. He specifies that he is a *stage* developmentalist who sees giftedness as domain specific. He believes that a gifted individual manifests a particular talent rather than another particular talent "due to the continuous interaction of an individual with various potentials and a world with various possibilities" not due to "reinforcement contingencies in the environment" or "ambient factors in the utilization of general ability" (1986, 287).

According to Feldman, giftedness is the mastery of a

challenging domain, mastery of existing forms, and creativity is reorganization of the structure of that domain coupled with mastery. He differentiates between giftedness and genius by saying a genius is an individual who masters a domain and then fundamentally reorganizes the entire domain, using as examples, Darwin, Freud, and Piaget (1986, 287).

Gifted children, in his view, not only excel in the number of stages which they advance through (these stages being universally sequential), but they also differ in the difficulty of the domain in which they choose to pursue mastery or excel. For example, a gifted child may reach the concrete operational stage early, and also choose to demonstrate this stage in the game of chess. Not only does Feldman see giftedness in regards to domain specific stage development, but also as a function of:

> "qualities of the individual; propensities such as talents and personality differences; characteristics of the context within which an individual pursues mastery; characteristics of those who are critical influences on the process such as parents, teachers, and peers; and the state of development of all the various fields that might be mastered at a given moment in time" (1986, 291).

Feldman recognizes that this broad concept "brings with it

many problems" (1986, 291) of determining and understanding these varied components and their interactions. He decries the view of giftedness as simply IQ and creativity scores and finds the current attempts to teach creativity or raise IQ scores ludicrous and paradoxical because the psychometric traits of intelligence and creativity, he maintains, are not true traits if they (or their psychometric representations or test scores) can be altered (1986, 294).

Feldman presumes that children can manifest their giftedness in three ways: by moving through phases and/or stages at faster rates than the rates defined by the universal studies for that specific domain, by reaching more advanced levels than their peers, and by having a deeper understanding of each level reached. Some gifted children may exhibit all three of the manifestations. It is his hope that certain fundamental processes of transformation and change, such as those discovered in mapping, are common to all domains (1986, 296).

The main criticism of Feldman's theory is the whole assumption that a study of map drawing can be applied to other domains of giftedness, despite the fact that Piaget and Inhelder

(1969) used the same technique to establish their theory of cognitive development and many of the tenets of their work have been validated by Donaldson (1978) and accepted by others (Guilford 1967, 44; Laycock 1979, 69; Carter and Ormrod 1982, 110-111; Gardner 1983, 17; Albert and Runco 1986, 345; Weinert and Waldmann 1986, 60). Feldman recognizes the lack of empirical research to validate his views (1986, 295), acknowledges that his studies may not have addressed the environmental aspect of giftedness and its impact on map drawing (1986, 296), and stated that "there is much to be done" (1986, 296). His studies continue. Feldman's theory holds promise because his theory is not dependent on the accomplishments of a child nor on the identification by factor analysis of isolated traits or processes, but on the often neglected aspect of cognitive development, rather than achievement, be it cognitive or creative. Feldman has developed an elaborate diagnostic procedure to determine where a given child is in the stage/phases of cognitive development, be s/he gifted or not. Using his method of determining if a child is gifted or not gets away from the habit of using IQ test results of 130 (or two standard deviations above the

norm) as a cut off point, which is arbitrary and artificial. On the basis of Feldman's theory, curricula would be developed to enhance the depth of understanding of each phase and to provide practice at each phase, so that mastery could occur and the child could progress to the next phase.

SEMANTIC IDEOLOGIES OF GIFTEDNESS

There is an abundance of literature which expresses vague ideas about giftedness. It seems that every educator who writes about giftedness or advocates a certain approach to program design for curricula has put his/her definition on paper. Four definitions which are representative of this group will be given.

BORLAND

Borland states that: "The term 'gifted child' refers to those students in a given school or school district who are exceptional by virtue of markedly greater-than-average potential or ability in some area of human activity generally considered to be in the province of the educational system" (1986, 103). He attempts a utilitarian definition in an educational sense, but its nebulous quality marks it for inapplicability. For example, if a child in a school for learning disabled was to tie his shoes faster than his

fellow classmates, it is conceivable, using Borland's definition, to classify him/her as gifted. Borland's definition is typical of those in local districts or schools which attempt to establish a philosophy on which to base special programs for gifted children. It neglects to specify what types of abilities are to be included and does not clearly define the parameters of "some areas of human activity generally considered to be in the province of the educational system." Borland also does not specify how much greater-than-average this potential or ability must be to qualify a child as gifted, nor how this potential or ability is to be identified. As it exists, this definition is open to misinterpretation, and because of its generality, is not useful to guide selection or to produce programs for gifted children.

WITTY, KITANO AND KIRBY

Witty, Kitano and Kirby's definitions qualify the accomplishments of gifted children specifically as being valuable to society.

Witty defined gifted as "any child whose performance, in a potentially valuable line of human activity, is consistently remarkable" (1958, 62). Kitano and Kirby, motivated by the mutual

exclusivity of many current definitions, equate the gifted and the talented and define them as: "individuals of any age who possess superior ability in an area valued by society" (1986, 30), and state their underlying philosophy "that gifted education includes more than an emphasis on academics for gifted and talented students" (1986, 31).

Both of these definitions are vague, although they do attempt to address the issue of social relatedness of giftedness. However, both definitions are open to interpretation, and hence are not valuable as bases for research or selection regarding the gifted. These definitions have been cited as they are typical of many other authors' generalized, blanket definitions of giftedness (Albert 1976, 316; Passow 1955, 6; Ward 1965, 46). Povey, wanting to base his definition on "a cohesive group of investigations into gifted children" (1980, 11), resorted to "'high IQ' children" as his definition of giftedness (1980,11). This is extremely regressive, going back to Terman and Hollingworth's studies, and simplistic, ignoring recent research and explorations into intelligence.

These lesser known definitions lack substance and

substantiation; perhaps that is why they remain in relative obscurity.

POPULAR OPERATIONAL DEFINITIONS

The two definitions which stand out as most often cited as the basis for programs are the United States Office of Education (USOE) definition and the Renzulli Triad Model. While both are cited in the British Columbia Ministry Resource Book (1981), and the USOE definition is endorsed by the Council for Exceptional Children in both Canada and the United States, they are problematic and outdated.

UNITED STATES OFFICE OF EDUCATION DEFINITION

One of the most widely referred to and educationally applied definitions of the gifted is that of the United States Office of Education (USOE), presented in 1972 by S. P. Marland, which reads:

> Gifted and talented children are those identified by professionally qualified persons who by virtue of outstanding abilities are capable of high performance. These are children who require differentiated educational programs and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society.
> Children capable of high performance include those with demonstrated achievement and/or potential in any of the following areas, singly or

in combination:

(a) general intellectual ability
(b) specific academic aptitude
(c) creative or productive thinking
(d) leadership ability
(e) visual and performing arts
(f) psychomotor ability

In 1978 the U.S. Congress revised Marland's definition to read:

> (The gifted and talented are) "... children and, whenever youth who are identified at the pre-school, elementary, or secondary level as possessing demonstrated or potential abilities that areas such as intellectual, creative, specific academic or leadership ability or in the performing and visual arts, and who by reason thereof require services or activities not ordinarily provided by the school."
> (U.S. Congress, Educational Amendment of 1978 [P.L. 95-561, IX (A)])

The major difference between the 1972 and 1978 versions is the omission of psychomotor ability in the latter definition. Davis and Rimm state that "The reason for change is that artistic psychomotor talents (for example, dancing, mime) could be included under performing arts, and athletically gifted students are already very well provided for" (1989, 12). Gagné counts the omission of psychomotor ability as a gross error, citing the

example of a surgeon whose giftedness relies heavily on psychomotor skills (1985, 107).

While the USOE definition called attention to the need for differentiated curricula, attempted to include a wide range of abilities, including creativity, leadership, and psychomotor, and allowed inclusion of the underachieving gifted by including in its wording "demonstrated achievement and/or potential ability", it has several problems. It has a blatant grammatical error in the first sentence. If it is to be interpreted as it is written, it could be concluded that the "professionally qualified persons" are "capable of high performance" by virtue of their outstanding abilities. The misplaced relative pronoun reference beginning with "who" should relate to "the gifted and talented children".

Another and far more serious problem is that the USOE definition is open to misuse and misinterpretation in its vagueness. As Treffinger and Renzulli state, "the categories are frequently ambiguous, undefinable, or overlapping, and are frequently adopted without regard for their actual implications for identification or programming" (1986, 152). Gallagher makes a similar observation (1979, 31). An example of this overlapping

would be ballet, which could belong in the deleted psychomotor category, or in the visual and performing arts category. Sellin and Birch further point out that "the structure of the definition encourages the common but inaccurate assumption that the categories are separate entities rather than overlapping attributes" (1981, 44). Not only are the abilities themselves imbricated, but the terms "gifted" and "talented" are used synonymously when many researchers, as we have seen in Chapter 1, regard them as separate and distinct terms.

Rubenzer attempted to clarify the term "abilities" in the USOE definition:

> ... children of generally high intellectual ability will function exceedingly well in almost all academic areas. Children who exhibit specific aptitudes typically excel in perhaps only one or two academic areas. The child with exceptional creative ability can be described as the pupil who generates unusual, frequent, and high quality ideas or solutions to problems. Children with leadership ability demonstrate consistently exceptional capacity to motivate and organize other children. High ability in the visual and performing arts will often be indicated by exceptionally good aesthetic production in such areas as the graphic arts, sculpture, music and dance. The child with exceptional mechanical reasoning skills or superior athletic ability can be classified as possessing talent in the psycho-

motor area of functioning (Jackson 1980, 77).

While this expansion of the USOE definition gives more detail about the abilities, it still has not made the USOE version acceptable. The USOE definition still treats the five abilities as exclusive entities, still appears to equate mechanical and intellectual abilities, and does not even acknowledge the 1978 United States Congress deletion of psychomotor abilities.

The list of categories in the USOE definition created its own set of problems. As recognized by Renzulli (1978, 181) and Kirk and Gallagher (1979, 62), the six categories are not parallel. Area (b) specific academic aptitude, and area (e) visual and performing arts, focus on fields of human endeavor or general performance areas in which talents and abilities are manifested, while the other four are more nearly processes that can be applied or brought to bear on these performance areas or disciplines. For example, one could not be a Mozart without creative thinking and without having finely tuned psychomotor ability. This part of the definition also needs to clarify "creative or productive thinking", and to clearly state whether these are two separate entities or whether the two terms are interchangeable. Sellin and Birch also

argue that "Creative or productive thinking, leadership ability, psychomotor ability and the like are processes that are the applications of general aptitude" (1981, 44) and state that "It is doubtful that creativity and leadership exist apart from specific performance areas to which they are applied" (1981, 44).

While the first two, "creative or productive thinking" and "leadership ability" could be applications of general aptitude, "psychomotor ability" does not necessarily involve intelligence. For example, a sprinter does not have to use his intelligence to win a race, but a soccer player must use strategy to be a star player.

Not only are the various abilities referred to unclear, but so are the processes whereby gifted children will be identified. The USOE definition does not state whether these "professionals" should be teachers, diagnosticians, psychologists, counsellors, other gifted people, or all of the preceding. Such vagueness regarding abilities of the gifted, processes used to identify them, and people who should identify them, has resulted in many interpretations by local school districts.

While the definition refers to "high performance" and

"demonstrated achievement and/or potential ability", it does not state how these are to be determined or measured and what the levels of demarcation are. This detail is necessary if the definition is to be applied and used with any degree of uniformity.

A further problem with the USOE definition is "its failure to include nonintellectual (motivational) factors" (Renzulli 1978, 81), although according to Renzulli (1979, 14) and Sellin and Birch (1981, 44), research shows these factors to have significant influence on the performances and the recognition of gifted children.

It is interesting to note that in the United Kingdom, a definition similar to that of the USOE is espoused by Wallace and "adapted from those generally accepted by Her Majesty's Inspectorate, the Schools Council and the Local Education Authorities. It is as follows:

> Able and talented pupils are those capable of high performance and includes those with demonstrable achievement and/or potential ability in one or more of the following areas:

general intellectual capacity
specific academic aptitude
creative or productive thinking
leadership ability or social skills
visual and performing arts
physical talents
mechanical ingenuity
exceptional motivation in a particular field
(Wallace 1985, 8).

The major difference between Wallace's definition and that of the USOE is the inclusion of the mechanical ingenuity as a separate area, and the motivation factor.

In conclusion, the USOE definition is an eclectic, social definition, or as Coleman calls it, "a Christmas tree definition" where "everyone gets a present" (1985, 10). It is a definition fraught with ambiguities which allow it to be used and/or misused as a research base, allegedly provide direction for curricula, and purport to provide a basis for identification. Such differentiation in interpretation as is fostered by the USOE could quite conceivably allow a child to be accepted into a gifted program in one school or district, and to be rejected in another. The most important fault of the definition, however, is that it is an eclectic oversimplification that does not deal with the nature of giftedness, but only the supposed manifestations or potential

manifestations of it. Treffinger and Renzulli rightly call the USOE definition "categorical" and lament that it and others paraphrased from it are "frequently adopted without regard for their actual implications for identification or programming" (1986, 152). It is true that the continued use of this definition ignores "thirteen years of continuous progress and expansion of our understanding of human abilities" (1986, 152). Indeed, this definition is presented as the basis for programs in the B.C. Ministry's Enrichment and Gifted Education Resource Book which calls the USOE definition (1972 version) "The most popular definition of the gifted" (1981, 7).

RENZULLI TRIAD MODEL

The well-known Renzulli Enrichment Triad Model, or Three Ring Conception definition states that:

> Giftedness consists of an interaction among three clusters of human traits - these clusters being above average general abilities, high levels of task commitment, and high levels of creativity. Gifted and talented children are those possessing or capable of developing this composite set of traits and applying them to any potentially valuable area of human performance. (1978, 261)

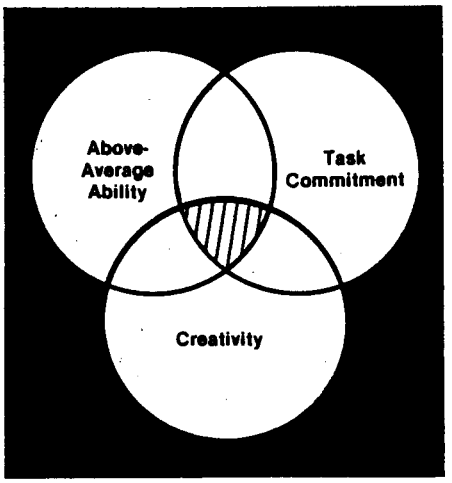


Figure 2
Renzulli's
Triad Model

Each of the three areas is an equal partner, and it is the combination of the three that Renzulli claims is characteristic of a gifted child. Above average ability is that which is traditionally measured by IQ tests. Creative ability includes: the dimensions of originality of thinking, constructive ingenuity, the ability to set aside established conventions and procedures when appropriate, and a flair for effectiveness and originality showing human awareness and social purpose (1978, 184).

Task commitment is defined as "energy brought to bear on a particular problem (task) or specific performance area" (1978, 182). Task commitment is exhibited by persistence in the accomplishment of goals, integration of diverse goals, self-confidence, freedom from feelings of inferiority, and drive to achieve (1978, 183).

Like the USOE definition, Renzulli's definition broadens the concept of giftedness to include a variety of general performance areas, which, in his application of the Three-Ring Conception, he expands to include specific performance areas (See Appendix F).

Renzulli's definition also adds the new dimension of task commitment. He cites evidence that negates the use of intelligence and achievement test scores as the single criterion for identifying and/or defining the gifted, a common practice for many researchers such as Terman, Hollingworth and Spearman, and many programs, (see also Hoge and Cudmore 1986, 402). Claiming empirical studies as proof, Renzulli claims that IQ does not necessarily reflect potential for creative/productive accomplishment, and that one of the major errors made in identification procedures is "overemphasis on superior abilities at the expense of the other two clusters of traits" (1978, 182). Concommittant with this, Renzulli advocated that a variety of methods be used to determine the co-existence of the three traits. While he agrees that standardized tests have some merit to be utilized, he argued that they are not in themselves adequate at identifying or assessing gifted individuals. He stipulated that

"student products are in fact an appropriate form of data. The products may not be as objective or convenient as test score data, but it is far better to have imprecise information about the right product than precise information about the wrong product" (1980, 602).

Although Renzulli presented his definition as "operational, i.e., useful to school personnel, and defensible in terms of research findings" (1978, 180), it has many shortcomings.

Jellen describes Renzulli's Three Ring Conception as "a lot of new nomenclature with little or no psycho-educational meaning" (1985, 12) and calls *above average ability* and *creativity* "two cognitive terms of a dubious and redundant nature" (1985, 13). Contemplating the vast, complex, and relatively unknown nature of giftedness, it is admittedly questionable to think that giftedness can be broken down into three functions. In addition, these functions, especially those of creativity and above average ability (or intelligence), are not narrowly defined.

Gagné criticizes Renzulli's model for not dividing above average ability into separate ability domains and claims that "Renzulli's text leaves the distinct impression that these abilities

are intellectual" (1985, 106). If Renzulli wants his definition to be based on research, such studies as those done by Sheng-Ying (1986), Grubar (1986), and Vogt (Gardner 1983, 43), indicate that distinct domains do exist. Gagné also argues that "Creativity may be regarded as a major determinant of exceptional performance in certain kinds of endeavors, but not in all (1985, 106). He would prefer to see creativity "considered as one ability domain, among others, in which giftedness can express itself" (1985, 106).

In addition to his other criticisms, Jellen is concerned that Renzulli's definition does not deal with the affective domain, specifically empathy or altruism, which he states "is to be found in many gifted individuals" (1985, 13).

The ambiguity of Renzulli's operational definition has made it a simple task for school districts to break giftedness into three packages which they have neatly re-defined as the measurable entities of intelligence, creativity, and accomplishment. Correspondingly, and for practical purposes, these three functions are theoretically measured by: IQ tests, such as the WISC or Stanford-Binet; creativity tests, such as the Torrance Tests of Creative Thinking; and through observation and records of

accomplishment, such as school grades. It can be surmised that the Renzulli Enrichment Triad Model is widely used because its vague quality lends it to easy translation into measurable and observable qualities, and not because it is precise or psychometrically defined. In Renzulli's Revolving Door Identification Model, he lists the general types of psychometric measures to be used in screening, but does not specify which specific tests or what the cut off values are to be (1981, 33-35).

As with the USOE definition, Renzulli has failed to make a distinction between gifted and talented; although it could be inferred that gifted children possess a higher level of the three traits, but Renzulli has not specified how far "above average" a child has to be to qualify. Davis and Rimm state that "Within the popular RDIM [Revolving Door Identification Model], a full 15 to 20 percent of the school population is identified" (1989, 13), which far surpasses the top two percent of the population espoused to be gifted by Terman and Hollingworth.

Renzulli also failed to indicate what constitutes a "potentially valuable area of human performance". Such ambiguity begs the questions: "Potentially valuable" to whom? Valuable

intrinsically or extrinsically? Would someone's creation of a toilet that did away with the necessity of toilet paper be as valuable as someone's composition of a musical masterpiece? Or would it be more valuable? This silly example is used only to point out the ambiguity of Renzulli's language.

In the definition of task commitment, the word "sustained" should be inserted before "energy brought to bear on a particular problem (task) or specific performance", as commitment has an element of degree implicit in it, and just "bringing energy to bear" on a task does not imply commitment; an individual could bring energy to bear on a task for thirty seconds.

Beyond the ambiguity of the terms lies a problem more serious in nature, the validity of Renzulli's assumptions. Jellen rightly claims that each one of Renzulli's three interacting concepts has "little psychological grounding" and "lacks not only conceptual clarity and focus, but also meaningful empirical backing" (1985, 12).

Renzulli's definition is based on studies done by Sir Francis Galton, Lewis Terman, A. Roe, D.W. MacKinnon, J.C. Nicholls, and H.G. McCurdy, whose subjects were selected because of their

outstanding performance and/or demonstrated genius. Specifically, in the case of Roe's study, the sample was sixty-four eminent scientists, and in the case of MacKinnon, the sample of architects was selected entirely based on their demonstrated creativity. Indeed Renzulli admits that in many of the studies on which he based his findings, "the persons ultimately selected for intensive study were in fact recognized *because* [italics from original] of their creative accomplishments" (1978, 184). Clearly, Renzulli has based his study on a biased sample, with no control group of gifted individuals who did not achieve any fame and it is obvious why Renzulli came to equate "gifted" with "eminent creators", and why creativity surfaced as a major component of his model, considering it was the outstanding criterion for selection of the MacKinnon sample, which was one of the major studies upon which Renzulli based his work (Renzulli, 1978, 184).

Borland (1986) questions the validity of Renzulli's work because of the heavy reliance on the Galton and Terman studies, which date from the early 1900's, and asserts that there is no guarantee that characteristics crucial to success then are still crucial now. As well, Borland draws attention to the context in

which Renzulli defined giftedness, and argues that context changes dramatically in a technological world. For example, in the 1920's and 1930's, the eras of Terman's initial studies, and the 1950's when MacKinnon's studies were conducted, the role of women was vastly different from what it is today; technology has to some degree freed women from the menial chores of marriage and childrearing and given them more time for creative endeavors. Also, creative endeavors, for both men and women, have more scope and license in the technological aspect.

Not only can the validity of Renzulli's Three Ring Conception be questioned because the studies are based on a selection-biased sample and because they are dated, but also because they are solely based on studies of adults. Borland stated that Renzulli's definition "violates the basic rule of developmental psychology that children are not merely miniature adults" (1986, 102) and that a child's cognition and conceptions of reality are vastly different from those of adults. It may be invalid to assume that behaviours exhibited by creative/productive adults are related and/or characteristic of gifted children. Therefore, those behaviours should not be listed prescriptively in a definition of

the same. Children, by virtue of their intellectual and emotional lack of maturity, can, as a whole, have short attention spans and lack commitment to a task. As claimed by Highet, based on his research, the gifted child is "apt to rush at everything he sees, jump every fence, climb every hill, race down every valley" (1977, 2), implying that gifted children exhibit early behaviours which reveal a lack of task commitment.

An additional criticism is related to sampling. While Renzulli wants his definition to catch those children who do not perform well on IQ and other such tests, his definition is largely based on Terman's studies where the sample was selected solely on the basis of IQ tests. Gagné states that "all the studies which he [Renzulli] cites examine the role of IQ (or its manifestation in academic performance) as a precursor to exceptional performance at an adult age" (1985, 106).

Relating directly to the component of task commitment, Renzulli wants only motivated children in gifted programs ("Will the Gifted Child...", Gifted Child Quarterly, 1980, 5), and Busse and Mansfield agree wholeheartedly (1980, 132). This is a denial of a differentiated curricula for the underachievers or the

unrecognized gifted. Such an exclusive philosophy begs some questions: What if the gifted child is what is referred to as a "late bloomer" or an "off-the-wall gifted"? What if the child has not received any encouragement or has not been motivated appropriately? If a child has an IQ of 140, just because s/he is not motivated, does that mean s/he is not gifted (Gagné, 1985, 11)? It is like saying, "Well, if Bobby is not committed to such and such a task now, he never will be committed to any task, ever!" Experience has shown that gifted children have been excluded from gifted programs because they are committed to the wrong task, such as selling drugs. Renzulli's demand that task commitment must be present as an essential element in order for a child to be gifted negates his claim that his definition is "operational", as children do not always "operate" like eminent scientists, eminent achievers or eminent architects.

Indeed, if Renzulli's definition of giftedness is to be accepted as a combination of creativity, above average ability, and task commitment (or achievement), then many of Terman's "geniuses" would not qualify as gifted because they did not attain any great accomplishments of merit in their lifetimes; indeed,

some women never pursued a career, and others held jobs as secretaries or clerks.

In conclusion, while Renzulli's definition aided in the expansion of the concept of giftedness and encouraged use of a combination of both subjective and objective selection methods, it lacks clarity and validity. Jellen goes so far as to call it "Renzulli's three ring misconception" of giftedness and is emphatic about its lack of psychometric validation and empirical evidence for the three constructs (1985, 13). Clearly, it should not be the basis for programming until more recent research can be seen to validate its constructs and contribute to any clarifying semantic revision. A new model is needed which is neither vague nor restrictive, but which incorporates new ideas evolving from recent research on the gifted.

CHAPTER 3

THE IQ TEST: MISLEADING POSTULATE

INTRODUCTION

There is a pervasive problem with research which dates back to 1905 when the first intelligence tests were developed (Ushijima 1962, 315). Much of the research on giftedness is based on a faulty premise: that all aspects of intelligence are represented by intelligence test scores, and consequently, that sample selections, substantiations and/or correlations of research on giftedness should be based on IQ test scores. Getzels and Jackson rightly assert that the practice of validating new tests for giftedness with old IQ tests "effectively perpetuates the original conception of intelligence and guards it from serious theoretical and empirical scrutiny" (1962, 3). This original conception is that giftedness is equated with high intelligence test scores (Terman and Oden 1926, Hollingworth 1926, Spearman 1927), and that this intelligence is absolute.

PROBLEMS WITH IQ TESTS

In The Triarchic Mind, Sternberg (1988) devoted a chapter

called "IQ Tests: Measuring IQ, Not Intelligence" to revealing the "'lies we live by'" regarding IQ tests, mentioning specifically the Stanford-Binet and the Weschler Intelligence Scales (20). He stated that "many IQ tests, and tests like them, operate on assumptions that do not correspond with what we know about intelligence" (1988, 22), and proceeded to describe four fallacious assumptions of IQ tests: 1) intelligent people solve problems more quickly; 2) people who score well on reading comprehension, scholastic, and aptitude tests, or people said to have "high verbal" (1988, 20) ability, read everything with great care and comprehension; 3) intelligent people have large, sophisticated vocabularies, and 4) intelligent people solve problems in the same way as less intelligent people, but better. He advocated using behavioural checklists (1988, 36) to supplement intelligence tests, and argued that if criterion information, such as a portfolio, were available for a candidate for a gifted program, it "should receive the lion's share of attention in serving as the basis for decisions on future performance" (1988, 36).

Renzulli deplored that "up to this point in history we have

continued to view giftedness as an absolute concept, something that exists in and by itself, without relation to anything else" (Will the Gifted Child... 1980, 4) and argued that this "absolute conception" causes us, despite our "platform rhetoric about multiple talents and multiple criteria for identification" (Will the Gifted Child... 1980, 4) to rely heavily on intelligence test scores as a selection device. He stated: "the sad fact remains that [for] most students participating in special programs... the major criteria for selection is a pre-determined cut-off score of 125 or 130 on an intelligence test" (Will the Gifted Child... 1980, 4). Carter and Ormrod support the claim that the gifted "are typically defined using IQ tests" (1982, 110).

Albee also supported the view that there is an over-reliance on and misuse of intelligence test scores when he states that the view that IQ test scores accurately reflect intelligence "is not shared by many experts in measurement, who view the IQ test as a measure of prior learning of skills and knowledge, not as a measure of some underlying native ability" (1980, 386).

Jensen is not totally in agreement and argued that "it is

well established that IQ is substantially correlated with children's scholastic performance" (1982, 258) and that IQ tests "undoubtedly yield quite highly reliable measurements" (1982, 258). As to what exactly IQ tests measure, he said it is a "point on which prominent psychologists still express strongly differing notions" (1982, 258) and classified these "notions" or factors as follows: 1) prior learned knowledge; 2) prior learned cognitive skills and problem solving strategies; 3) innate learning ability; 4) motivation (or willingness to put forth effort to do well on the test). Jensen agreed that IQ tests measure the first two factors to some degree, but qualifies that by saying that factors 1 and 2 are not intelligence but "merely reflections or indicators of intelligence" (1982, 260). Regarding factor 3, learning ability, he states that "Learning and memory per se seem to be a poor paradigm for understanding intelligence" (1982, 261). The last factor, motivation, he claimed "does not seem to be an important source of variance in IQ" (1982, 261).

While Jensen (1982) intended to support the use of IQ tests, his examination of the factors supposedly measured by

IQ tests negated the usefulness of IQ tests by stating that the factors claimed to be measured are simply "reflections or indicators" of intelligence, not intelligence itself.

Gardner accused "the IQ movement" of being "blindly empirical" (1983, 17), because the movement is based on tests "with some predictive power about success in school and, only marginally, on a theory of how the mind works" (1983, 18). His criticisms of IQ tests state that:

> There is no view of process, of how one goes about solving a problem: there is simply the issue of whether one arrives at a correct answer. For another thing, the tasks featured in the I.Q. test are decidely microscopic, are often unrelated to one another, and seemingly represent a "shot-gun" approach to the assessment of the human intellect. The tasks are remote, in many cases, from everyday life. They rely heavily upon language and upon a person's skill in defining words, in knowing facts about the world, in finding connections (and differences) among verbal concepts. (1983, 18)

Clearly Gardner espoused using a method of determining intelligence which involved the assessment of the processes involved in intellectual activities.

Strang laments the fact that many investigators use IQ tests for selection and validation since IQ is "an inadequate

measure of intelligence" (1962, 60). Guilford looked at fifty-two studies related to giftedness and found that two out of three of the investigators used IQ tests in selection of subjects and/or correlation of data (1967, 33). Guilford also denounced the pronounced use of IQ tests because he claimed IQ tests are not sufficient "to encompass the ranges of intellectual abilities as we know them today" (1967, 37). Eighteen years later, Gold wrote of the "whole world's disenchantment with intelligence testing - and also the contrary and continued reliance in practice upon intelligence test scores" (1985, 253). Weinert and Waldmann, in a paper presented at the 1986 Conference for the World Council for Gifted and Talented Children, stated that there exist "a number of recently published investigations, which apparently show there is no strong relation between performance in intelligence tests and reasoning tasks" (1986, 53), and cited eight different studies to corroborate this, all but three of which were conducted in the 1980's. It is unfortunate that while there has been an ongoing dissatisfaction with IQ tests as the basis of selection and definition, in almost two decades no real focus

on intellectual processes as selection devices has been established.

Cleary, there is well-founded and widespread concern with and distrust of the uses of IQ test scores in regard to selection of and research on the gifted. It is unfortunate that so much of the empirical data on giftedness is based on a measurement whose validity in measuring what it purports to represent is so doubted, questioned, and even denounced. Albee went so far as to call IQ tests "a social evil" (1980, 386). However, despite such widespread negative views, researchers continue to use IQ test scores in their studies (e.g., Albert and Runco 1986, 349; Borland 1980, 86-89). Considering the controversy surrounding IQ test scores and their application to giftedness, it seems logical to search for an alternative.

THE ALTERNATIVE - WHERE?

Even if it were discovered that giftedness can be ascertained neurologically, we cannot operate on potential candidates for programs for the gifted or studies about the gifted to determine their gifted status. Rice (1980) suggested the use of EEG (electroencephalograph) readings as one

alternative. Current research at The Brain Research Laboratories at New York University Medical Center under neuroscientist E. Roy John is examining EEG readings and other measures of electrical activity of the brain for determining "brain potential" (Rice 1980, 94). However, it was startling to discover that even such things as electroencephalograph readings and other types of measures of brain activity are confirmed largely by correlation with IQ test scores (Rice, 1980, 94). The propensity for using IQ measures to validate all new research is dismaying.

Cornell's Uric Neisser says, "The ideal way to measure intelligence would be to combine all the relevant dimensional measurements into one overall index. In practice, however, this ideal is unattainable: many of the relevant dimensions [of intelligence] cannot be measured in any standard way" (Rice 1980, 99).

CONCLUSION

Until such time as an as-yet-undeveloped method of ascertaining the neurological or intellectual differences between gifted individuals and their normal, average peers is

developed, we must rely on methods related to observable and identifiable performances. A new model must allow for the development and application of a variety of methods to differentiate between the gifted and the non-gifted.

CHAPTER 4

ALTERNATIVES TO IQ TESTS

INTRODUCTION

The overwhelming reliance on IQ tests as devices for selection of children for gifted programs, and in many cases, as the sole basis for psychometric corroboration of data, is striking. In a national survey done by Alvino, McDonnel and Richert, under contract from the United States Office of Gifted and Talented and conducted throughout the United States, IQ tests were found to be the most frequently used selection device, used nearly twice as often as achievement tests (1981, 130). These authors cited two problems prevalent in the practice of selection: a) inappropriate use of testing instruments, and b) inadequacy of existing measures to identify gifted children in certain subpopulations, such as the disadvantaged and the culturally different (1981, 124). Concurrently, in the literature there has been a widespread concern with the wholesale use of IQ tests as the postulate for research and practice. Not only is an alternative for IQ tests needed, but other types of assessment currently available should be more widely utilized.

DEVELOPMENTAL ASSESSMENT

The developmentalist approach, beginning with Piaget's theory of cognitive development and continuing with Feldman's work, seems to offer the most promise as an alternative to the heavy reliance on IQ tests to differentiate gifted children from their normal ability peers. While there are problems with Piaget's theory, extensions and refinements of his theory show promise as an alternative or at least as a complement to IQ tests.

While giftedness is typically defined in terms of superior performance on traditional norm-referenced intelligence tests such as the Stanford-Binet, Weschler Intelligence Scale for Children, or Weschler Intelligence Scale for Children - Revised, tests used in Piaget's research are praised for their real-life situational tasks, which contrast with IQ tests whose tasks are "remote, in many cases, from every day life" (Gardner 1983, 18) and rely heavily upon language, vocabulary, prior learned knowledge, and verbal concepts and connections (Fox 1981; Sternberg 1988). Gardner approved of Piaget's inclusion of issues which philosophers view as central to human intelligence, such as time, space, number and causality (1983, 20), as well as Piaget's

avoidance in his tests of memorized forms of knowledge or facts.

Laycock noted that Piaget "stands somewhat apart from the measurement tradition behind the other definitions [of giftedness]" (1979, 69), and it is this "apartness" which is the key. Weinert and Waldmann (1986) note this as a distinction between intelligence and the thinking processes:

> Differences in intelligence among children change very little; thinking itself is subject to a considerable change in childhood. Jean Piaget's stage theory of cognitive development is the most encompassing attempt to give a universal description of these changes. (60)

Carter and Ormrod (1982) suggested that intelligence could be defined by a child's comparative progress though Piagetian stages of cognitive development, since research has indicated that all children, regardless of race or education, follow the same pattern of stage progression and sequence (Roeper 1978; Weisz and Zigler 1979). Carter and Ormrod's (1982) data showed superior performance by gifted children on Piagetian tasks when compared to performance of normal ability children on these same tasks at each age level tested. Gifted children acquired

formal operational thought at an earlier age, also demonstrated earlier transitions to the next stage, and made more rapid progression within a stage. They concluded: "Since our data showed strong differences between the cognitive abilities of gifted and normal children, Piagetian assessment may be useful for identifying gifted children" (1982, 114). Ironically, the strong influence of IQ tests is revealed by Carter and Ormrod's suggestion that giftedness could be defined by contrasting the progress of gifted children through Piagetian stages of cognitive development with that of their chronological peers and then comparing this data with subjects' IQ scores (1982, 119)! Carter later conducted such a study in 1985 when he compared children's IQ scores with their performance in Piagetian stages. The results of the study showed the group of gifted children to be approximately two years ahead of the normal ability group in cognitive development and to have superior scores on the intelligence tests. However, this trend was not found to be consistent across all age levels nor across gender, which Carter surmised might be attributable to the ceiling effect and possible sex bias of the intelligence test used. In general, despite the

problems of his study, Carter's (1985) results supported earlier research (Keating 1975; Carter and Ormrod 1982), and Carter noted with renewed enthusiasm that "Piagetian assessment may provide an invaluable tool for the identification of the gifted" (1985, 184). Gold also noted with interest that a project in Nigeria successfully used Piagetian tests for early identification of gifted children (1985, 253).

Clearly there is support for the use of Piaget's theory of cognitive development in the identification of gifted children. However, before such a practice is endorsed, Piaget's work should be examined more closely.

PIAGET

Jean Piaget began his career in the 1920's as a researcher in the laboratories of Alfred Binet, the originator of modern intelligence tests. These laboratories were at that time supervised by Theodore Simon. Piaget became interested in the types of errors children made when attempting items on an intelligence test. He became convinced that it was not the *accuracy* of the child's answer that was important, but the *way* in which the child reasoned in order to arrive at the answer. He

concluded that children's thinking processes were qualitatively different from adults' thinking processes and went on to theorize that cognitive development could be characterized by an invariant succession of qualitatively distinct stages, which are the foundation of his theory, and have been summarized briefly in Chapter One of this thesis. Piaget's diversion from the "how much" of intellectual skill to the "what kind" of intellectual skill in his stages of cognitive development is a significant one. The closest he comes to quantifying intelligence occurs when he assigns average ages for each of the four stages of cognitive development. However, he emphasized that these ages must not be assigned too rigidly (Brainerd 1978, 16).

Piaget (1969) asserted that intellectual development and knowledge evolve as the child actively constructs hypotheses and generates knowledge as he accommodates his activity to the properties of the object or event, and structures or restructures to assimilate information with existing intellectual organization. There are three key Piagetian concepts which comprise intelligence: stucture, function, and content. Briefly, cognitive structure is the *form* of cognition typical of a stage of cognitive

development; it is the abstract organizational pattern which underlies a stage of cognition. Cognitive functions are purposes or goals which express the direction of cognitive development, the main invariants being organization and adaption, (ranging, for example, from simple to complex, from concrete to abstract). Cognitive contents are specific intellectual acts that comprise intelligence at any given stage of cognitive development, such as a visual image, an abstract symbol, or problem solving skills. However, it is only the latter of the three concepts, cognitive contents, which Piaget believed to be measurable.

While Piaget's theory is widely applauded, it has also been comprehensively criticized (Gardner 1983; Cornell, Borke, Ennis and Siegel 1978). Gardner (1983), despite his praise, found problems with Piaget's theory, primarily that it is based on only one sort of development, cognitive, and does not consider creativity. He also cites the findings of Donaldson (1978) and Feldman (1986) which charge that the ages Piaget ascribed to certain stages are not true of the general population, and that not all ablilities develop in sequence with cognitive abilities (Gardner 1983, 21). Because the work of Piaget and his

collaborators is so vast and spans more than half a century, detailed inspection of each part of his theory has been conducted and discussed in elaborate technicality by such authors as Siegel and Brainerd in Piaget's Theory of Intelligence (1978), and Cornell, Borke, Ennis, and Siegel in Alternatives to Piaget (1978). Cornell, Borke, Ennis, Seigel and others found Piaget's assigned ages for the first two stages to be inconsistent with their findings, specifically when related to egocentric behaviour and object permanence. While these researchers do not contest the *results* of Piaget's testing, they do question some of the *interpretations*, and have proposed various alternative interpretations. They also proposed corrections of techniques which they feel contributed to his misinterpretation of test results, such as acknowledging that other factors not meant to be tested, (for example, creative ability), are contributing factors (Siegel and Brainerd 1978, xii).

The undeniable strengths of Piaget's theory have made him *the* theorist of cognitive development. However, these strengths coexist with certain weaknesses. Siegel and Brainerd (1978) advocate "a prudent middle course . . . somewhere between

rejecting the theory and refusing to recognize its weaknesses" (1978, xiv), and state that while they "ask the questions [about Piaget's theory]; definitive answers will have to await those who come after us" (1978, xiv).

FELDMAN

Feldman's (1986) expansion and clarification of Piaget's theory offers hope for an alternative to reliance on IQ tests for differentiating between gifted children and their normal intelligence peers.

Feldman called himself a stage developmentalist, in the tradition of Piaget. He applauded the creativity movement of the 1950's for "defining giftedness as something beyond IQ" (1986, 285), but lamented that this movement neglected to "question the assumptions of the psychometric tradition itself" (1986, 285). As a developmentalist, he regarded IQ as "a remarkably confining and limited notion of intellectual giftedness" (1986, 285), and also questioned the idea that giftedness is a stable trait.

Feldman felt that three features of stage developmentalists "may imply they could lead to a reconceptualization of the basic concepts used to define the field" (1986, 287). These three

features are: developmentalists emphasize processes of intellectual functioning rather than exhibited traits or performances; developmentalists chart sequences of stages or levels of mastery rather than measuring general ability; and thirdly, developmentalists see giftedness as domain specific. In Feldman's view, giftedness is high level mastery of existing forms of a domain, and creativity is the construction of new forms within a domain, or novel interpretation of existing forms. Giftedness need not be domain specific per se, but may be exhibited in specific domains, as gifted children often favour a specific field, such as chess or computers, in which to manifest their giftedness.

In accordance with this, Feldman noted that micro developmentalists, (those who examine a specific area, for example, information-processing), see giftedness as a "function of utilizing one or a combination of ... core abilities to master a specific domain" (1986, 288). In further support of this idea, Weinert and Waldmann (1986) stated that "high level performance [of gifted adults] does not depend only on high initial giftedness, but also on acquisition of the necessary domain specific

knowledge" (58).

Feldman's basic premise about giftedness is that "there is much to be learned about becoming a master in a given domain by studying the *mechanisms of transition* [italics are original] both within that field and in general" (1986, 290). He has narrowed his area of study to two topics: studies of child prodigies in music and chess, and the transitions between stages in the drawing of simple geographic maps, focussing on the processes of transformation and change. Feldman recognized the methodological problems in his type of research and emphasized that his results are suggestive and of heuristic value, leaving many questions yet to be answered (1986, 290-291).

Feldman's research took Piaget's equilibration model, an account of how a child moves from stage to stage, and refined and extended this formulation, emphasizing changes in a child's cognitive structures in a much more detailed account than did Piaget (1986, 294). Feldman and his colleagues focussed on one aspect of developmental transitions - the occurrence of novel ideas in an evolving system of cognitive development.

In conjunction with Samuel Snyder, Feldman identified six

phases that occur between each of Piaget's developmental stages of map drawing. They have developed an elaborate diagnostic procedure which can determine where in a transition cycle of spatial-logical interaction, (a type of cognitive development), a child is. Based on this research, Feldman hypothesized that giftedness can manifest itself in three ways: gifted children can move *faster* through the stages of a domain; they can ultimately reach *more advanced* levels, which few of their peers may reach; and they can have a *deeper* understanding of each level (1986, 295). His studies of child prodigies showed that they advance through the same stages as normal ability children, but that they do so at a much faster rate, but not in all functions or areas (1986, 299).

Feldman also included examination of creativity, or "novelties" (1986, 296) in his studies of map drawing "not because we [Feldman and Gruber] believe that creativity of all sorts is the same but rather because we hope that certain fundamental processes of transformation and change are common to all creative advances" (1986, 296).

Acknowledging that these ideas are in their infant stages,

he noted that: "The key is to establish those things that are common to mastery of all domains and those things that are perhaps unique to a single domain" (1986, 296).

Feldman's and his colleagues' work in identifying the processes of cognitive development and in developing a diagnostic device to determine where a given child operates in the stages of a given domain offer a promising alternative to using IQ tests as primary selection devices. That is not to suggest that the use of IQ tests be abandoned, but that alternatives be considered which can supplement, and if they prove themselves to be superior, perhaps replace IQ tests.

IDENTIFICATION ALTERNATIVES

While Feldman's work promises an alternative for using IQ test scores as correlational data in research as well as in selection of children for gifted programs, there are many other selection devices available. Despite this availability of other widely recognized selection devices, Davis and Rimm (1989) state, "It is common for a stated plan to endorse the USOE multiple-talent definition, but then use IQ scores for the selection procedure" (48). While not all practitioners follow this

practice, clearly many practitioners need to be made cognizant of the selection devices available and of the danger of relying so heavily on a single criterion for selection.

While it is not the purpose of this paper to assess selection devices or supply an exhaustive list of selection methods, a brief overview of the types available and a few widely-recognized examples will be given.

Selection devices can be divided into two general categories: formal assessment, which includes standardized tests, rating scales, and product evaluation forms; and informal assessment, which is largely nominations. A further category can be identified when formal and informal evaluations are combined in what are called multi-dimensional assessment devices.

FORMAL ASSESSMENT

Standardized tests are formal assessment devices which include intelligence tests, achievement tests, creativity tests, and aptitude tests. The two most commonly cited individual intelligence tests are the Stanford-Binet, Revision IV (SB,RIV), and the Weschler Intelligence Scale for Children - Revised (WISC-R). The SB,RIV produces four subscale scores, which rate verbal

reasoning, quantitative reasoning, visual/abstract reasoning, and short term memory, as well as give a composite score. The WISC-R produces a *Verbal* IQ score, a *Performance* (non-verbal) IQ score, and a combined *Full-Scale* IQ score. The Enrichment and Gifted Education Resource Book (1981) cites the Stanford-Binet Intelligence Scale as being "the most widely-used intelligence test" (201). Both the SB,RIV and the WISC-R must be administered by trained professionals, such as psychologists.

Group intelligence tests "continue to be routinely administered in many school systems" (Davis and RImm 1989, 76), despite the fact that they are less reliable and less valid than individual intelligence tests. Perhaps the comparatively low cost of administering them and their convenience perpetuate their use. Commonly used group intelligence tests are the Raven Progressive Matrices, the Otis-Lennon School Ability Test, and the Cognitive Abilities Test (Coleman 1985, 66).

Achievement tests are useful in identifying areas of specific academic talent. A list of popular achievement tests would include: the Stanford Achievement Tests (SAT), the Metropolitan Achievement Tests (MAT), the SRA Achievement

Series, and the California Test of Basic Skills (CTBS) (Davis and Rimm 1989, 76). These standardized tests produce grade-equivalent scores, percentiles, or stanine scores, which reveal general academic achievement. Further diagnostic testing must be used to determine superior skills in specific areas, such as mathematics. Achievement tests, based on national norms, are frequently administered by counsellors or district staff.

Creativity tests are useful in identifying students who do not exhibit their creativity in visible ways. Davis and Rimm warn that creativity is "a complex ability that can take innumerable forms..." making it "...impossible to measure with exactness" (1989, 78). Tests of creativity differ from achievement tests in that they attempt to measure "a broad area of functioning that is independent of traditional content areas" (Coleman 1985, 73). Creativity tests commonly used include the Torrance Tests of Creative Thinking, Creative Tests for Children, (developed by Guilford and others), *Gift* or Group Inventory for Finding Creative Talent, and the SOI Screening Test.

Aptitude tests are batteries which generally measure four areas: abstract reasoning, numerical ability, language usage, and

verbal ability. They are useful for identifying students' general academic development in relation to their peers. Aptitude tests commonly used include the Academic Promise Test, Differential Aptitudes Test, and the Guilford-Zimmerman Aptitude Survey. These tests can be administered by classroom teachers who have been instructed in their use.

RATING SCALES AND INVENTORIES

Rating scales and inventories are used in selection of children for gifted programs by teachers, parents, peers, and students themselves. Rating scales differ from inventories in that rating scales indicate frequency and/or intensity, and inventories simply indicate if a behaviour typical of a gifted child is present. Inventories are used less often because rating scales provide information regarding *degree* of behaviour as well as *existence* of a behaviour, such as "Wants to know how things work" (Davis and Rimm 1989, 94). While there are published versions of rating scales, individual districts also design their own (Davis and Rimm 1989, 78).

There has been much controversy about the validity of teacher selection of gifted students, but Coleman (1985) as well

as Davis and Rimm (1989) and Borland (1980) accurately point out that if teachers are adequately trained, they have been found to identify a significant number of gifted children. Coleman also notes that teachers "Can supply information about specific characteristics and abilities which standardized tests cannot" (1985, 80), and suggests that teachers' selections be used to supplement other identification methods. Nasca (1980) has developed a teacher rating scale, as have Renzulli and Hartman (1971) and Kranz (1981).

Parental ratings of gifted children are recognized as being more valid than teacher ratings (Davis and Rimm 1989, 92; Coleman 1985, 80-81), perhaps because they have frequent and *prolonged* interaction with their children and have the opportunity to observe their children in more diverse circumstances, as well as in less-structured situations. Tongue and Sperling (1976) have developed a form which evaluates precocious cognitive development, creativity, leadership, motor coordination, energy and persistence, and other characteristics of gifted children (Davis and Rimm 1989, 82).

Peers are recognized by Davis and Rimm (1989, 82) as being

"very good" at identifying gifted children. Davis and Rimm examined a number of studies which used peers as identifiers of gifted behaviour, but Coleman warns that more research is needed before this method is recognized as being reliable (1985, 82). Peers seem to have the advantage of observing gifted children in a variety of settings, including those observed by both teachers and parents, as well as situations outside the observations of both teachers and parents.

Rating scales designed for self-selection are usually a series of descriptive statements about interests, abilities, preferences, and descriptions of behaviours associated with giftedness. Both Coleman and Davis and Rimm agree that students are more realistic at assessing themselves regarding gifted behaviour than are their teachers and parents. A self-rating scale used in Charlottesville, Virginia was developed to correspond to the areas of talent addressed by the USOE definition, again illustrating the widespread use of the USOE definition referred to in Chapter 2. Renzulli (1987) states that the self-rating form is the only identification method he uses or recommends for use in high-schools for his Revolving-Door

Program.

Product evaluation is a formal method of assessing a student's exhibited giftedness. The special products or accomplishments of a child are rated by experts according to a structured and objective scale, such as the general form devised by the State of Michigan Education Department (Davis and Rimm 1989, 96). Specific forms to assess such fields as art, computers, or drama are developed by institutions and schools to select students for giftdness in specific fields.

INFORMAL ASSESSMENT

Nominations are the informal recommendations of children potentially suitable for gifted programs made by parents, peers, teachers, and students themselves. Informal nominations may simply be: "I think _____ should be in the gifted program because _____." Davidson (1986) advocated informal peer nomination for use with students in the intermediate to secondary levels to identify gifted students who may be excluded from gifted programs by poor performance on standardized tests. He advocated that nominations be used in conjunction with other selection devices. The obvious problem with such a selection

method is its arbitrariness and subjectivity. Generally, informal nominations are considered along with other assessments by a committee, which makes final selections of children for gifted programs.

Another type of informal assessment is the work sample. Here teachers informally assess pupil products such as art work or science projects, and recommend them for gifted programs. Davis and Rimm recommended that informal assessment of work samples only be used when more than one teacher's judgement is considered (1989, 83). Central to this method is the role of the expert in the field who is trained to observe certain specific detail. Products which might be included as work samples are: diaries, poems and essays, hobbies and collections, inventions, art work, musical performances, and school work from any relevant area.

This method of assessment uses past performance to determine suitability for gifted programs and while it does not assess potential ability, it can be useful in identifying children who may not perform well on standardized tests due to lack of verbal ability, cultural bias and/or gender bias, but who may

exhibit their abilites elsewhere. Coleman says use of work samples "seems to be the least researched measurement technique" (1985, 86).

MULTI-DIMENSIONAL SCREENING DEVICES

There are assessment devices which combine a variety of assessment methods. One such device is the Kranz Talent Identification Instrument (KTII) (1981). This device utilizes: trained-teacher assessment; scale rating by peers, parents, and pupils; and a screening committee. It is designed to assess the talents of underachieving students in the areas corresponding to the USOE definition.

Another multi-dimensional screening device is the Baldwin Identification Matrix (BIM) (1980) which combines several standardized test scores, (including IQ and achievement tests), motivational, creativity, and leadership test scores, and teacher and peer nominations. The BIM also includes an informal assessment of psychomotor ability, which corresponds to the sixth category in the original USOE definition of giftedness.

CONCLUSION

Piaget's developmentalist view of intelligence has been refined by Feldman into a promising tool for assessing intellectual development. This method for determining a child's level of cognitive development in relation to his/her peers could serve as a viable alternative to current practice of relying heavily on IQ tests as identification measures and as corroborative statistics for research data. There also exists a wealth of optional assessment and identification methods and devices. A model of giftedness is needed which can not only incorporate these options for identification, but which also will address the many facets of giftedness, and by this multiplicity, advocate a selection process involving several identification methods.

CHAPTER 5

A NEW DEFINITION: THE CHRYSALIS MODEL

INTRODUCTION

Preceding chapters have illustrated the variety of concepts and definitions of giftedness. The lack of a modern definition which encompasses recent theories and research has been discussed. A new model might hopefully serve as a forum for ideas and research about giftedness, research which ought not to be based on outdated practices such as reliance on IQ tests for identification and validation. The need for an up-to-date model with the capacity to evolve to some degree with continuing research and practice is evident. Renzulli succinctly puts it this way:

> I believe that "practical theory" is the best of both worlds, because the two approaches (theory and practice) working together side-by-side can provide actual learning activities that will help to validate the theories and models and provide a framework within which numerous creative people can contribute practical applications of a given theory or model. Second, if the field is to advance, we need competitive and even conflicting theories so that we may test one against the other in a never-ending search for better ways of serving

gifted and talented youth. (1980, 4)

The purpose of The Chrysalis Model is to respond to that need. The Chrysalis Model, illustrated below, will be explained and defended using the criteria applied to the other various models and definitions of giftedness in Chapter 2.

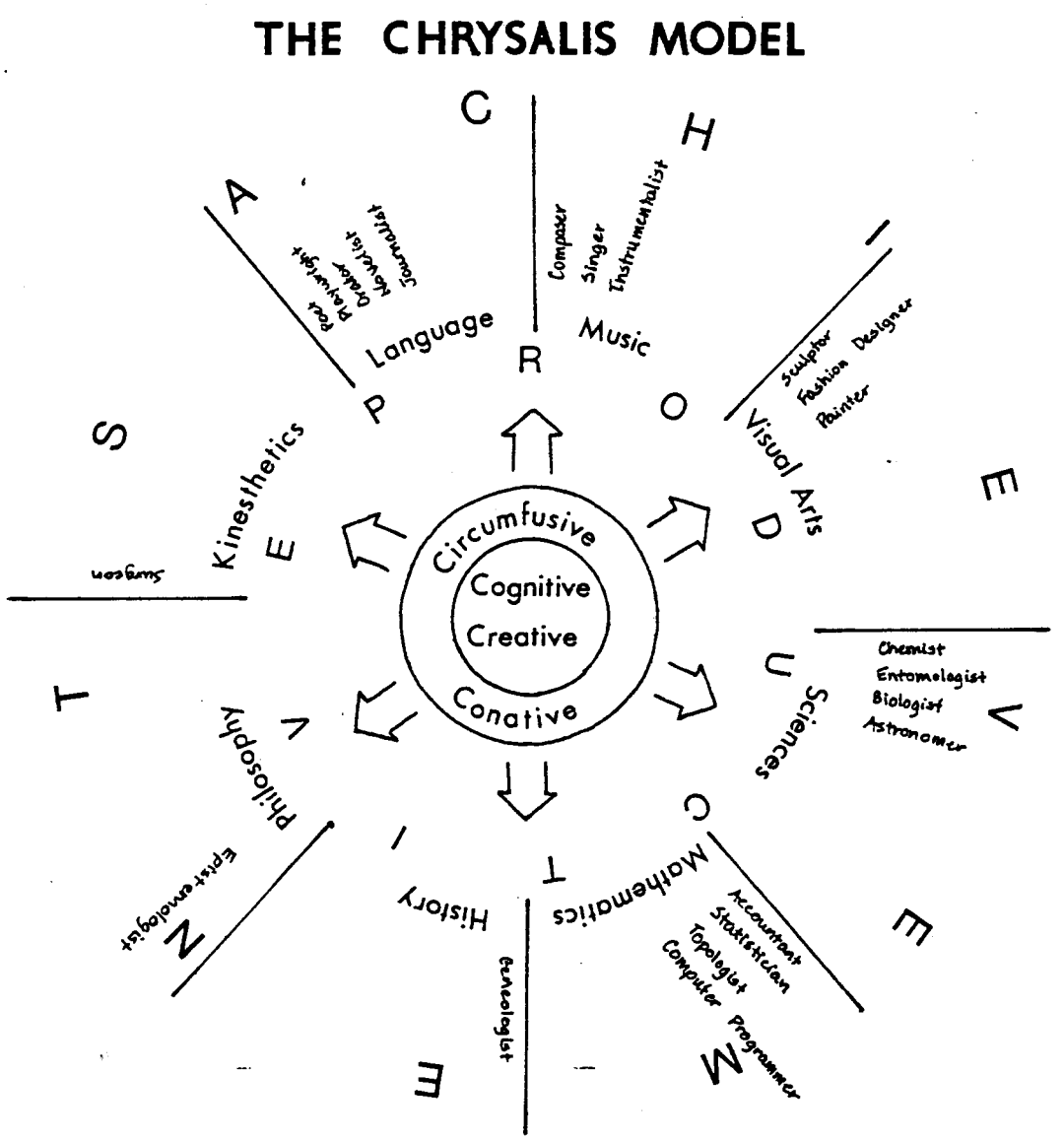


Figure 3 The Chrysalis Model

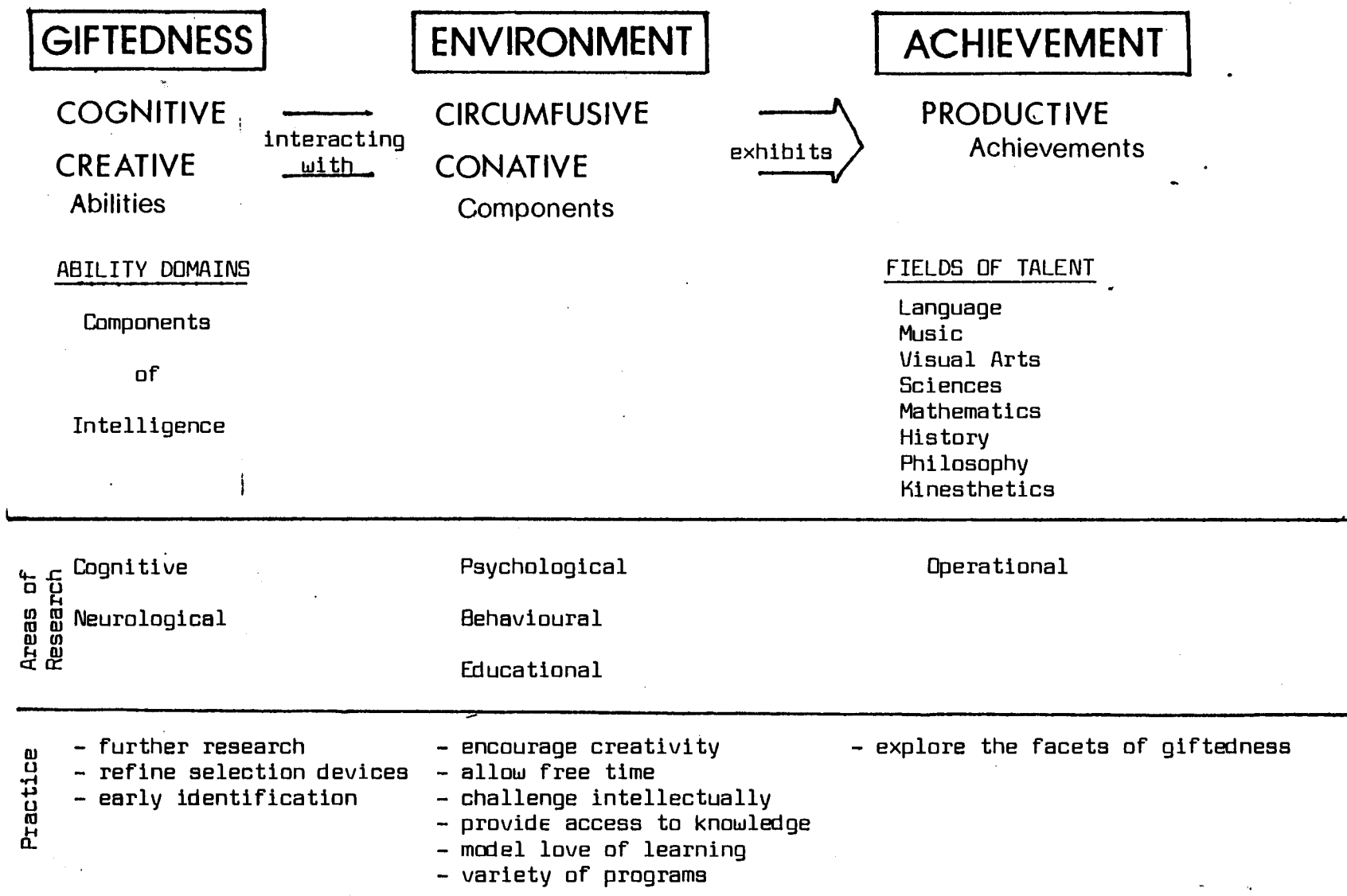


Figure 4 The Chrysalis Concept

PURPOSE

The purpose of providing this new model is not to produce the decisive definition. It is not a paradigm of what gifted children or adults are, for it is not really known what constitutes giftedness; it is only their demonstrable traits which have been identified. This model tries to encompass what is both hypothesized and known about giftedness. The concept of giftedness inherent in it is grasped more easily if viewed as a somewhat amorphous thing inside a cocoon. As yet, there is no method of describing what constitutes the matter inside of the cocoon; it is only when the cocoon matures that the butterfly's demonstrated attributes can be analyzed and categorized. The purpose of providing yet another model is to create a framework that encompasses dominant theories, the results of research, and leads from these to direct implications for curricular planning for the gifted. This model is designed in light of present knowledge, methods, and practice. It does not inhibit any particular lines of research. It is intended as an heuristic model.

This model is not proposed to further the "saviour

syndrome" which views children as the saviours of our world, whose holy mission is to free and preserve us from the destruction of war, pollution, crime and other illnesses of our cultures. Rather, this heuristic model is put forward so that gifted children can get the best possible educational experiences which will enable them to reach their potentials, to live full, satisfied lives, and to be productive rather than inhibited, fulfilled rather than frustrated. Their productivity may only enrich their own lives, or it may enrich the lives of thousands, but this model proposes that an individual is not to be judged as gifted solely on the basis of how many people are affected by his/her productivity. The Chrysalis Model is meant to provide the practitioner with a workable model; it is an eclectic model with practical value.

THE MODEL

COGNITIVE AND CREATIVE ABILITIES

Giftedness consists of superior, innate cognitive and creative potential abilities. These abilities, corresponding to the inner circle of the model, constitute the matter inside the cocoon and make the gifted child qualitatively and quantatively

different: qualitatively different in that her/his cognitive development is at a more advanced level and in that s/he can master more complex materials than her/his peers; and quantitatively different in that they learn at a faster rate and spend more time operating at higher levels of thinking. Cognitive abilities, or what Hebb refers to as "underlying native abilities" (Jensen 1982, 258), are best described as the components of intelligence. Creative abilities are those which result in original products whose quality is exceptional and whose value to society is evident.

Researchers such as Guilford (SOI Model, 1967) have attempted to define the two components of Cognitive and Creative collectively, while Torrance has concentrated on the creative abilities and Sternberg's Triarchic Theory (1981) focuses on the cognitive functions. Guilford's SOI Model is based on the premises of the physical basis of intelligence, research that has attempted to determine which parts of the brain correspond to certain functions (1967, 347-386), and has tried to identify these functions through factor analysis.

CIRCUMFUSIVE AND CONATIVE COMPONENTS

A gifted child is born with the propensity to exhibit his/her innate cognitive abilities or components of intelligence and innate creative abilities. The degree to which this occurs is largely determined by environment, both external and internal, here signified by the respective terms Circumfusive and Conative, the second circle of the paradigm. Circumfusive means "to pour out or about; to surround" (World Book Dictionary 1964). Relating this to the cocoon metaphor, the environment or circumstances surrounding the cocoon, and the events or happenings "poured" on the cocoon, determine how much development occurs within, and if the larva becomes a chrysalis, and later a flying insect. Conative refers to motivation (effort or desire), and this is co-contributor to the development of the gifted child. Motivation is closely linked with environment, as Goertzel and Goertzel's (1962) studies show. For example, if the parents love learning and encourage the child, they help foster motivation, the desire to create, to persevere, and to succeed. Often they provide resources or provide direction to resources for the child. A child's physical

and/or psychological environment may be initially impoverished, but if some opportunity is provided for the development of her/his abilities, through the efforts of a teacher or relative, for example, then an outlet for the child's potential is created. If the environment, physical and psychological are conducive to the development of a gifted child's potential abilities, then productivity will result.

PRODUCTIVITY AND AREAS OF ACHIEVEMENT

If the Circumfusive and Conative factors are favourable, then it is more likely that the innate abilities will result in productivity, or achievements, which will enrich the lives of the creators and perhaps enhance our culture.

Achievement, in this model, includes *general* areas of productivity, or fields of talent, and *specific* areas of productivity, or performances, which are the result of abilities coupled with knowledge and training. The fields of talent include: language, music, visual arts, sciences, mathematics, history, philosophy, and kinesthetics. Within each of these fields of talent are many specific areas of productivity or performances. For example, the visual arts would include such

things as sculpture, fashion design, and painting. These areas of productivity are not distinctly separate, but can be overlapped or fused. An example of this overlapping or fusion of areas of productivity would be choreography, which combines visual art with music and kinesthetics. It is not accidental that the areas of performance correspond with types of knowledge.

Kinesthetics is included as a field of talent because it is necessarily involved in other talents, such as playing the harp, or being a ballerina, or being a skilled surgeon. The word *kinesthetics* was chosen in this model over the term *psychomotor* because the latter has connotations of athletics, due to the interpretation of the USOE definition (1972), which in practice, has been translated into sports ability. The World Book Dictionary (1974) defines *kinesthesia* as: "1) the sense of muscular activity. 2) the sensations caused by stimulation of sensory end organs in the muscles, joints and tendons" (1974, 1: 1146).

It seems reasonable to claim that The Chrysalis Model can be applied to all children; what makes it a concept of

giftedness is perceived differences in degree, in kind, and also, in its application: gifted children have superior cognitive and creative abilities that enable them to be exceptional and multi-talented (Weinert and Waldmann 1986, 62). Gifted children have superior and different abilities which empower them to exhibit superior *and* different achievement(s) when compared to their peers. They may only apply these abilities to one field of talent or one performance, but they have the potential to exhibit talents in many fields, and often do.

DIFFERENCES BETWEEN GIFTED AND TALENTED

To return again to the metaphor, all winged insects go through the same stages: egg stage, caterpillar or larva stage, chrysalis stage, and finally, winged adult stage, but not all develop into butterflies. Some, by DNA design, become moths, or other insects. So too with children; all children go through the same developmental stages, according to Piaget (1969), Feldman (1986), and others (Carter 1983; Donaldson 1978), but not all children will become eminent achievers; not all have the potential to become eminent achievers. Not all children are gifted, but those who consciously make worthwhile

contributions to society and achieve eminence through valuable achievement(s) are gifted; they are *productive* gifted children.

In an earlier chapter, the distinction was made between gifted and talented: a gifted individual is multi-talented and a talented person exhibits a skill that is not necessarily intellectual in nature and exhibits exceptional skill in one area: an example is Ben Johnson. Such an individual does not qualify as being gifted because he is talented in a *single* skill which is not intellectual in nature, and his achievements are not deemed valuable and worthwhile *contributions* to society, nor are they deemed creative. It may be that in some societies, such as early native Indian cultures, running quickly was valuable and worthwhile, as it ensured the preservation of a race through its contribution to feats in battle and food collection, but today running quickly is not valued to such a degree in the way that the word is used here; it is simply admired. Running the fastest mile does not constitute giftedness, but is simply an exhibition of muscular superiority in a primal skill. It is not productive; it does not produce a worthwhile and valuable contribution to society. In contrast, finding a cure for AIDS

would be productive, and obviously a worthwhile and valuable contribution to the world. Gruber states it well when he says:

> The kind of gift that interests me is the kind that can be transformed by its possessor into effective work for the aesthetic enrichment of human experience, for the improvement of our understanding of the world, or for the betterment of the human condition and of our prospects for survival as a species" (1986, 247).

While he suffers here a little from the "saviour syndrome", Gruber delineates what constitutes the exhibition of giftedness: an *effective* creative work which enriches and improves, not just entertains.

SUBSTANTIATION OF THE MODEL

The following criteria, put forth in Chapter 2, will be applied to the Chrysalis Model:

A. Incorporation of postulational facets of giftedness

B. Validity relative to current research

C. Suitability as a basis for research

D. Relevance to current societal values and needs

E. Provisional direction for curricula or programming

Incorporation of postulational facets of giftedness will

be dealt with first. The majority of definitions in the last two decades include both cognitive and creative abilities as being fundamental to a definition of giftedness. Research has shown that intelligence and creativity are two distinct facets of giftedness (Getzels and Jackson 1962, 3; Torrance 1962, 126; Gowan 1967, 39-40).

While there are many variations as to what constitutes cognitive abilities, from Guilford's SOI Model (1967) of one hundred and twenty abilities (two of which relate directly to creativity) to Sternberg's Componential Theory (1981) which addresses the cognitive abilities used in information processing or problem solving, no one would deny that cognitive abilities are a given when dealing with giftedness. That intelligence, and concomittantly giftedness, is largely a product of innate ability is also widely accepted. According to Jensen, the idea that IQ (to him representative of intelligence) is not inherited is "overwhelmingly rejected by a preponderance of evidence, including the most recent studies of IQ heritability" (1982, 259).

While Cognitive and Creative address the native or innate

component of giftedness, the Circumfusive and Conative address the affective component. The elements of the model labelled Circumfusive and Conative are also represented in many models of giftedness (Gagné 1985, Gallagher 1986, Sternberg 1985, Wallace and Acklaw 1982, Renzulli 1976), and acknowledged by others whose models do not directly include environmental factors (Terman and Oden 1976, 65-67; Gruber 1986, 250; Eysenck 1986, 97). Albert and Runco aptly warn about explaining achievement of gifted children only in terms of cognitive abilities "without including personality variables and family processes in the picture" (1986, 332). Of Gallagher's (1979) six factors of giftedness, five factors concern Circumfusive and/or Conative aspects.

Feldman's view of giftedness as "a complex interaction of human qualities, cultural responses, and traditions of excellence in specific domains" (1986, 285) would certainly fit into the Chrysalis Model with its Cognitive, Creative, Conative, and Circumfusive components. The "human qualities" Feldman referred to correspond to the inherent Cognitive and Creative abilities of the gifted child, as well as to the Conative or

affective aspect of the Chrysalis Model. The "cultural responses and traditions of excellence" relate to the Circumfusive aspects of the proposed model.

Gruber validates the inclusion of productive as well as Circumfusive and Conative aspects in the model when he says: "If the transformation of a gift into a creative achievement [or field of talent] is to be understood, the end point of process must be studied as an integral part of improving our concept of giftedness" (1986, 261). The productive end of The Chrysalis Model specifies particular fields of talent. Feldman calls these domains and verifies their inclusion in the model when he writes: "performance is virtually always domain specific, and it is, after all, performance or achievement that gives the gift whatever legitimacy it may attain" (1986, 302).

In this definition, the stress placed on the idea that fields of talent should be socially valued corroborates with Jackson and Butterfield's (1986) survey of twentieth century conceptions of giftedness. This survey also validates the postulate that "childhood giftedness is the potential for adult productivity" (1986, 151).

The criteria of being related to current research and suitable for research are incidental, and will be dealt with together. While it is at times lamentable that so much stress is placed on the reliance on empirical data, such as IQ tests, to validate giftedness, more varied research is needed to determine what actually constitutes giftedness and why and how a gifted child differs from his/her peers. Not much is known about intelligence and exactly how the brain functions, and unless a modest proposal is accepted for raising a race for experimental purposes, science is not apt to make rapid advances in determining how the brain functions and what exactly physiologically or neurologically constitutes giftedness.

At this point in time, studies such as Grubar's (1986) investigation into dream brainwave patterns are relatively few and many of the advances in determining cognitive functions are determined through the superficiality of factor analysis, prime examples being Guilford's studies (1967 and continuing) and Jensen's work (1982). Factor analysis is a general procedure which allows the researcher to determine the

number and nature of variables constituting a set of measures, such as the subtests of block designs and vocabulary subtests of the Weschler Adult Intelligence Scale (WAIS). When different subtests correlate with one factor but not with any other, the subtests that have the highest correlation with each factor are examined to determine what that factor represents. The correlation epitomizes the fundamental phenomena being measured by the subtests. For example, if spelling, vocabulary, and reading comprehension subtests held a high inter-correlation and had negative correlations with mathematical, problem solving, and object manipulation subtests, then it could be concluded that a common factor underlies the first three subtests of spelling, vocabulary, and reading comprehension. This factor might be labelled language skills.

Much of the current research into giftedness uses factor analysis in diverse approaches (Thorndike 1973, Guilford 1965 and continuing, Gardner 1983, Gallagher 1976 and continuing, Jensen 1982), to determine a wide variety of cognitive and creative processes and their interactions, as well as the motivational processes that drive the cognitive ones.

Sternberg rightly believes "that alternative approaches to studying intelligent behavior are leading us to highly overlapping sets of macroscopic principles of cognitive development" (1985, 416). It is this complementary nature of research on giftedness that resolves the Chrysalis Model to its general terms of Cognitive and Creative. This model allows for all of these alternative processes to be examined and/or applied to giftedness, as well as the neurological research which is examining such things as physical differences in brain composition (Gardner 1983, 43), areas of the brain associated with different factors or abilities, (Sheng-Ying 1986, 144; see also Guilford 1967, 359-364), and differences in the functioning of the brain (Guilford 1967, 365; Eysenck 1986, 109; Jensen 1982,). There is also the work done by Feldman (1986) in the area of refining the stages of Piaget's theory of cognitive development which deserves closer examination.

The Chrysalis Model is relevant to current societal values and needs. Our society increasingly cites the individual as having a crucial part in the collective responsibility to our race and planet. Our world faces new and more complex

challenges every day, and these challenges require the best cognitive and creative minds in order to reach viable solutions. Neufeld declares that "bright students are the most important natural resource. Our education of them must become much more effective because we can't afford to waste them" (1986, 18). These children who are both quantitatively and qualitatively different deserve a differentiated education.

Our society values equality of opportunity, and if we spend millions of dollars to ensure that the mentally handicapped reach their potential, then we must be prepared to spend additional millions on the remainder of their peers, including the gifted. It is interesting to note that many of the findings of research on giftedness, such as Feldman's development of cognitive levels (1986), Sheng-Ying's investigation of brain functions (1986), and Sternberg's examination of the interaction of the environment and intelligence (1986), also have applications to children with lesser abilities.

It is hoped that the Chrysalis Model will provide direction for curricula or programming in that it is multi-faceted and

heuristic. This implies that programs for gifted children should address all facets of giftedness and that these programs should evolve to meet with children's changing needs as well as to acknowledge advances in the field of giftedness. If such evolution is to take place, programs must be monitored and assessed on a regular basis.

The idea that innate potential abilities are the basis of giftedness in this model infers that children should not be excluded from gifted programs based solely on their lack of achievements, as some gifted children may come from environments where Circumfusive and Conative factors have not been conducive to productivity. These children deserve the opportunity to perform. This implies that if there is some evidence that a child is gifted, such as exceptional drawings or insightful answers, yet this conflicts with other evidence, such as low test scores, then the child should be allowed into the program, or to use the vernacular, given the benefit of the doubt.

Since the affective domain is addressed through the Circumfusive and Conative components, it can be inferred that

the psychological needs of a child should be addressed, and hence the implication that a good program for gifted children should have counsellors with training in dealing with the special needs of gifted children (Rathjen 1976).

As the Chrysalis Model is heuristic, it does not promote any specific program or concept of giftedness. It seeks to be the model Renzulli wished for "that will serve as the vehicle for a great in-house dialogue directed toward providing a true meaning" (Will the Gifted Child... 1980, 4) of what makes a gifted child unique and how this uniqueness qualifies her/him for a differentiated education.

CONCLUSION

Weinert and Waldmann agree that "we cannot produce any simple theoretical models from which we can draw any clearcut conclusions concerning what has to be done in educational practice" (1986, 62). However, although the Chrysalis Model is eclectic and does not espouse any one specific mode in which to design a program for the education of gifted children, there are some inherent implications.

Firstly, the Chrysalis Model sees the gifted child as someone who is both qualitatively and quantitatively different and who deserves and can greatly benefit from a differentiated education, including a teacher with special training (Sisk 1981,4; Bruch 1984, 15; Zha 1986, 33).

Secondly, this child should be selected for this differentiated program using a variety of selection devices (Schlicter 1977, 5; Alvino, McDonnel, Richert 1981; Fox 1981, 1108; Sapon-Shevin 1984, 92; Yewchuk 1984, 123; Hatch and Gardner 1986, 150; Zha 1986, 31-32; Davis and Rimm 1989, 91-92), such as interviews, standardized tests, portfolios, teacher/parent/peer/self recommendations, personality

inventories, and behavioural checklists. The Chrysalis Model, with its multiple components of giftedness, implies the use of a multiple-device assessment approach for the identification of gifted children. An excellent overview of devices available is presented by Davis and Rimm in Education of the Gifted and Talented (1989). However, in view of Piaget's and Feldman's findings, researchers and practitioners in the field of giftedness should be discouraged from using specific demarcations in IQ test scores (commonly under 130, or two standard deviations above the mean) (Nasca 1980, 67) to exclude children from gifted categories and/or programs.

Thirdly, before a program is instituted, it is hoped that philosophical clarification will take place, that those involved would be widely informed and cognizant of the variety of research and views available, and that they carefully assess the needs of the particular students, community, and school before selecting or designing a program. It is further suggested that the planning of the program include on-going assessment and re-evaluation, to allow changes and updating as research and new understanding of giftedness occurs.

Fourthly, the Chrysalis Model necessitates that all areas of giftedness be addressed: the Conative, Circumfusive, Creative, and Cognitive. How this is to be done, will depend on the needs of the students and the informed decisions of the practitioner.

The range of ideas encountered in the concepts underlying giftedness signals the vast array of theories, definitions, and models of giftedness which confront and often confuse the practitioner. New models and theories gain momentum and collect an array of disciples who publish and press a particular theory on the largely uncritical practioner in the classroom, who uses certain selection devices, such as IQ tests, without questioning their validity, interpretation, or application.

This thesis attempts to untangle this conglomeration of concepts, theories, and definitions, to create awareness of the variety of ideas put forth in the name of giftedness, and to invite analysis and philosophical investigation leading to an understanding of giftedness.

The study of giftedness can be limited by clinging blindly to tenets which are questioned in the world of research, although current in practice, such as the use of IQ tests as the primary

device for selection of children for gifted programs (Alvino, McDonnel, and Richert 1981). As Feldman put it:

> The idea of a single metric such as IQ or a creativity test score encompassing the many qualities of giftedness and the many forms in which individuals can produce creative works seems in need of differentiating and sharpening if understanding of giftedness is to be furthered (1986, 292).

Weinert and Waldmann support this when they conclude in their 1986 address to the World Council of Gifted and Talented Children Congress that: "For several decades now, test procedures have been used to define and to diagnose intellectual giftedness to no great effect" (61). They suggest, as does this thesis, that rather than rely on IQ tests, the scientific world should be looking more closely to "observe the developmental processes of children" (Weinert and Waldmann 1986, 62).

Widely used definitions such as the USOE's (1972) and the Renzulli Triad Model (1978) are respectively vague and restrictive, and collectively questionable in light of more recent developments in the field of giftedness. They should be replaced by a model that allows for the inclusion of all known components

of giftedness. The Chrysalis Model is proposed to serve as a suggestion that could enable practitioners to collect the best ideas and to create programs that meet the specific needs of the children, the community, and the school where they operate.

The Chrysalis Model is an heuristic one, created to allow for the osmosis of ideas, the free exchange of views, theories, data, and definitions, so that the field of giftedness can advance.

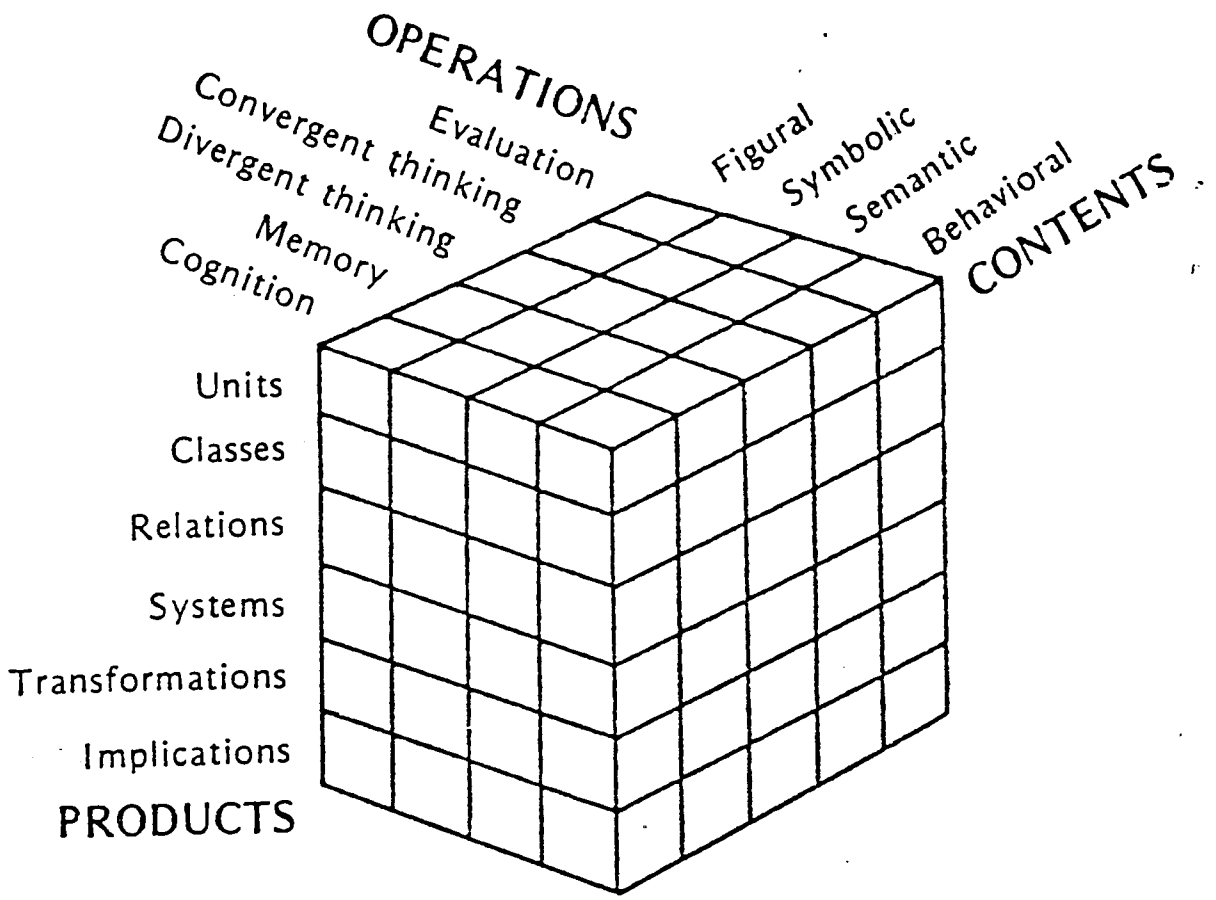
Weinert and Waldmann support the concept that many options about what constitutes giftedness must be simultaneously pursued (1986, 62). It is hoped that the Chrysalis Model will facilitate fresh understanding of the term "intelligence", one that exceeds the scope of IQ tests.

It may seem a paradox that while the fact that there is such a wide range of concepts and views about giftedness has been lamented, the proposed model encompasses a wide variety of the same. However, all avenues of this vast amorphous blur called intelligence must be explored if the essence of giftedness is to be found, even if each one of those with a sincere interest in the field must be a Sisyphus and risk being crushed by the rock of ignorance as s/he pushes it up the grueling hill of discovery, only

to have it rush back down to be pushed up again in yet another attempt to identify and define what truly constitutes that elusive abstraction, giftedness.

APPENDIX A

Guilford's Structure of the Intellect Model
in Gifted Children, Laycock, 1979, p. 68



APPENDIX B

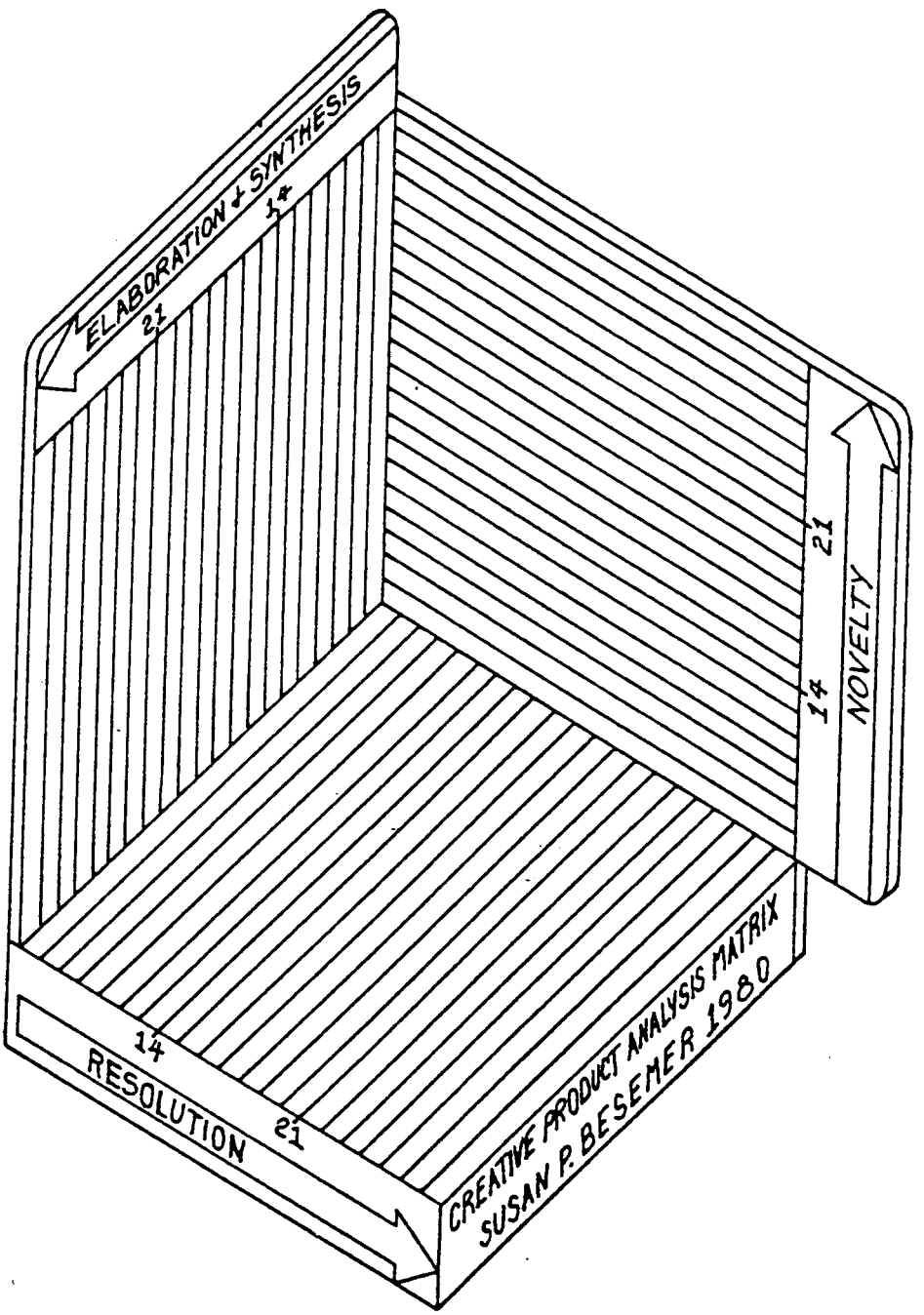
Gallagher's Model of Intellectual Productivity in Giftedness: A Continuing Worldwide Challenge, 1986, p. 23

Intellectual Productivity → (f) [(A) (B) (C) (D) (E) (F) . . . (AB) (BC) . . .]

Key Factors			*Estimated Variance Contribution*
A	=	Capacity for mastery of symbol systems	30—50 %
B	=	Opportunities for talent development	10—20 %
C	=	Parental encouragement of talent	10—15 %
D	=	Self-confidence in environmental understanding and mastery	10—15 %
E	=	Subcultural approval of intellectual activities	5—10 %
F	=	Peer influences	5—10 %
A x B, B x C, etc.	=	Interaction of key factors	15—25 %

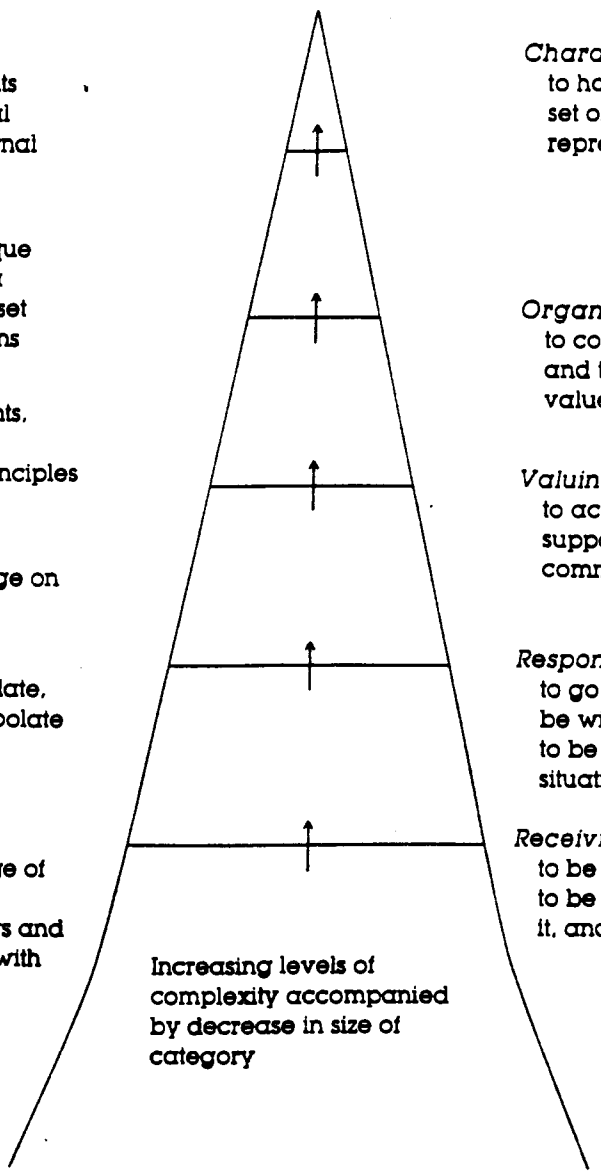
APPENDIX C

Besemer's Matrix for Analyzing Creative Products
in Journal of Creative Behavior, 1981, Vol. 15, No. 3, p. 165

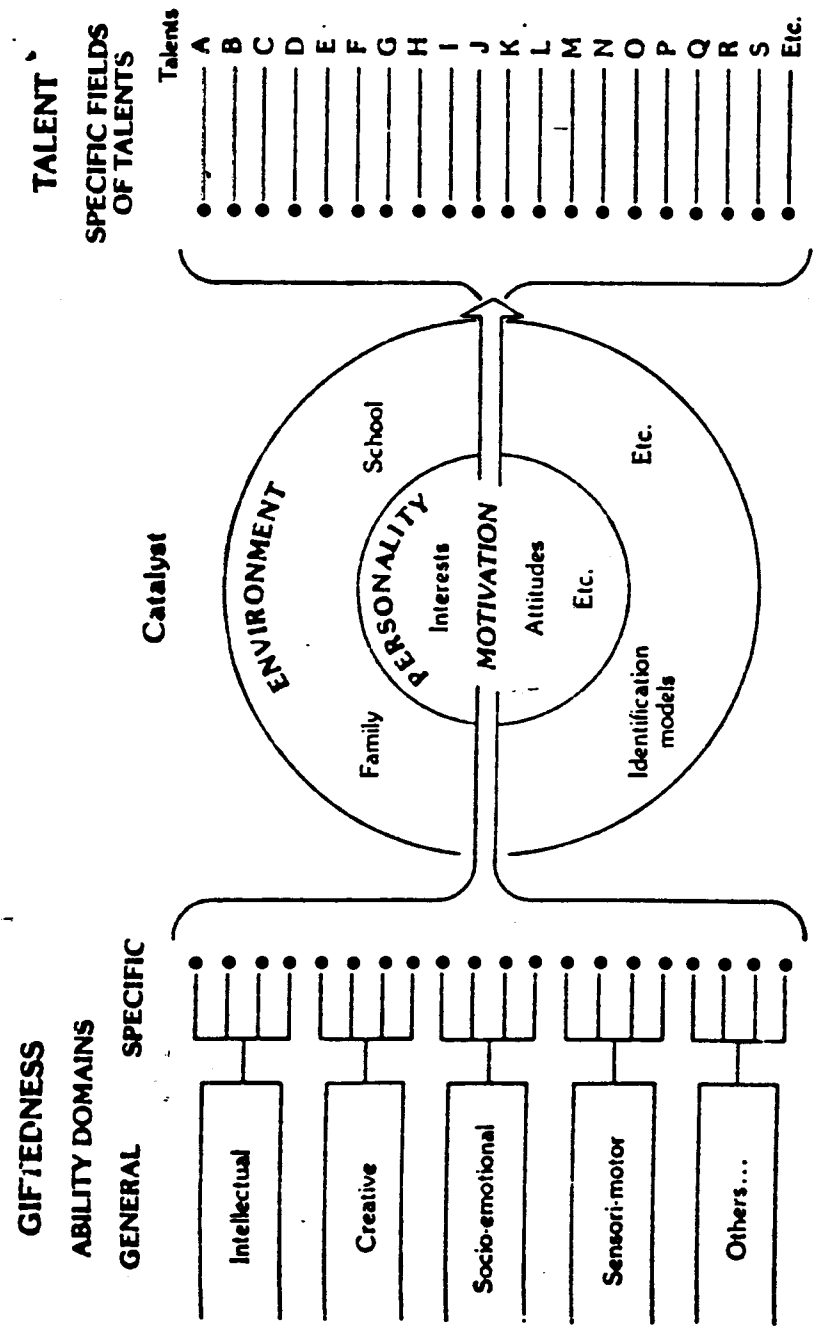


APPENDIX D
Bloom's Taxonomy
in Schooling the Gifted, Coleman, 1985, p. 323

Taxonomic domains[23]

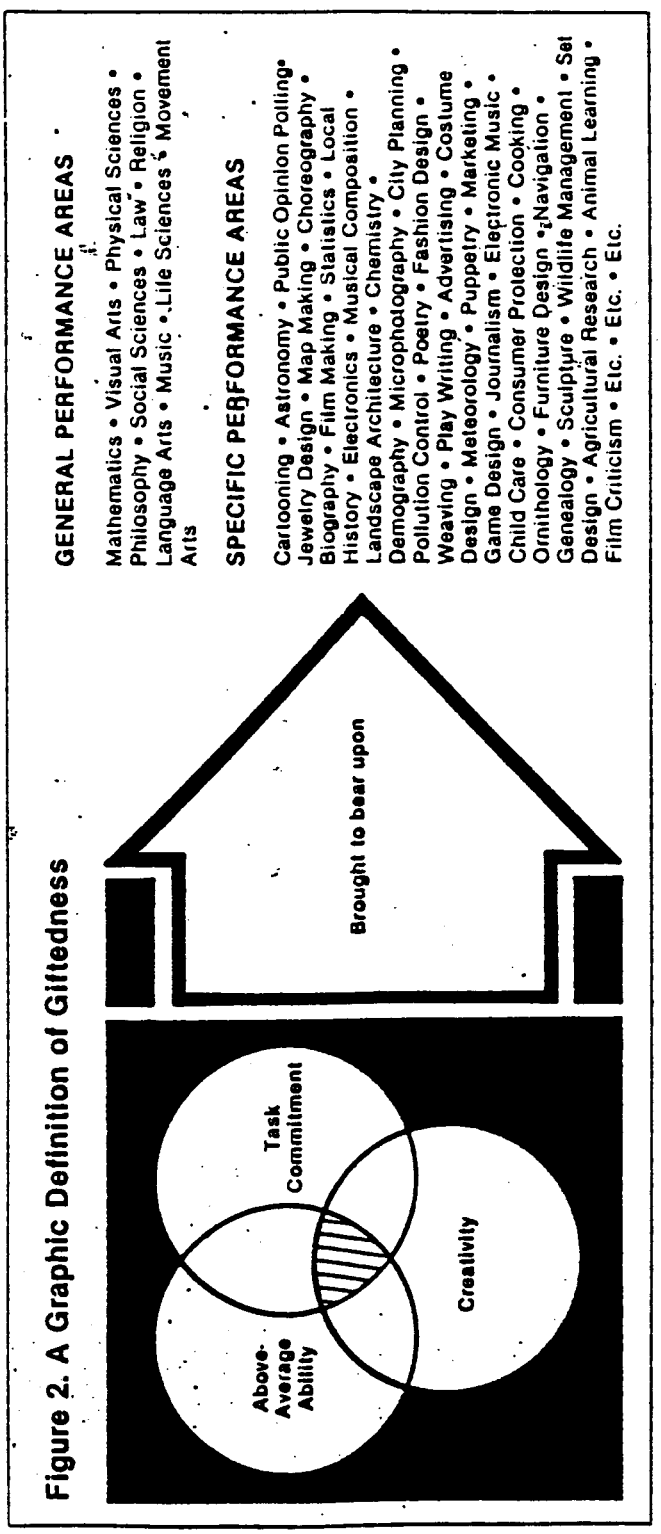


APPENDIX E
F. Gagné's Model
in Gifted Child Quarterly, 1985, Vol. 29, No. 3, p. 109



APPENDIX F

Renzulli's General and Specific Performance Areas in Phi Delta Kappan, Nov. 1978, p. 184



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