A SECONDARY ANALYSIS OF RESEARCH USING THE OVEREXCITABILITY QUESTIONNAIRE

A Dissertation

by

CHERYL MAXINE ACKERMAN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 1997

Major Subject: Educational Psychology

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Approved as to style and content by:

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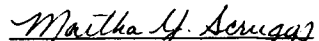

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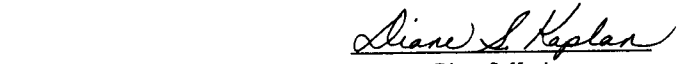

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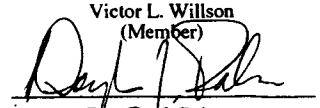

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ABSTRACT

A Secondary Analysis of Research Using the
Overexcitability Questionnaire. (August 1997)
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Chair of Advisory Committee: Dr. Stephanie L. Knight

This study is a secondary analysis of 13 studies that used the Overexcitability Questionnaire (OEQ) and is based on Dabrowski's Theory of Positive Disintegration. The purpose of this study was to examine, methodologically and substantively, the OEQ. Of interest were test characteristics and how scores are affected by personological and study characteristics. Whether and to what degree OEQ scores can discriminate between gifted and non-identified individuals was also of primary interest.

Cronbach's Alpha was used to measure the internal consistency for each overexcitability scale (Psychomotor, Sensual, Imaginational, Intellectual, and Emotional) and was calculated for the total sample and subsamples by classification, gender, and age. Coefficients met research standards with some exceptions for younger groups.

Three MANOVAs were performed and results showed: (a) significant main effects for classification, age group, and gender and interactions between classification and age group, and age group and gender; significant main effects for classification and race but no interaction between them; and (c) a significant main effect for method of gifted identification. In general, the gifted, older, and female samples show higher OE scores. OE scores were higher for the Caucasian sample and for the gifted group identified using objective methods only.

Predictive Discriminant Function Analyses (PDA) indicated whether OEs can discriminate between gifted and non-identified groups; and were used on the total sample and the sample separated by age group, gender, race, and method of identification. OEs discriminated for all groups except the male and African-American samples. Imaginational and

Intellectual OEs most consistently made meaningful contributions to the discriminant function equation. Psychomotor and Emotional OEs appear in some analyses and Sensual appears only once. Classificatory Analyses showed that the non-identified groups were classified correctly with more accuracy than the gifted group.

The main conclusions from this study are that there are a variety of personological influences on OE scores and that some of them interact in complex ways. Additionally, the OEQ appears able to discriminate between gifted and non-identified individuals. Implications for theory, research and practice are discussed, with particular emphasis on the needs of the gifted.

DEDICATION

To Robert, my brother, my friend, my kindred spirit. For your energy and perseverance and for going the extra distance as a personal challenge because they said you couldn't do it. You have been an inspiration. For your strength and support. For the wise cracks that made me laugh. For letting me think and for thinking with me. Because you, the life you led, and the person you were becoming, pushed me to ask questions and pursue the field and continue to find meaningful and personally fulfilling.

This work is dedicated to you and to all others whose experience of life is exceptional. Who are more than they appear to be. Whose reality appears to others as they want them to see it, letting very few really know who they are. Our relationship was very special for many years. We shared our strengths with each other through the joyous times and the difficult ones.

I wish you could be here to read this, or more likely have me explain it to you since reading was never your passion. I wish you could be here to laugh and smile and give me a big hug as I celebrate this accomplishment. You were meant to be part of my life's work, and while you will not be with me in body, you will forever be an essential part of me and my journey.

ACKNOWLEDGEMENTS

It is with deep appreciation that I thank the following individuals. Without them, this work would not have been possible.

To my family, for each of you has played a significant role in this long process. Mom, thank you for your unending support through the difficult times and for being there with me with as much enthusiasm for my work as I have had. Dad, you have made it possible for me to pursue my passion and have been ever present, albeit in the background most of the time as you prefer, encouraging me to "just get it done" and move ahead. To my brother Adam, you have been an ever encouraging voice; you have asked and listened and supported me. You have made a difference. Judith, my sister, your enthusiasm, assertiveness, and hard work for what is important to you are qualities in you that I continually strive for. To my entire family, you are an inspiration and I am thankful that you are part of my life so that I may learn from each of you.

To Dr. Stephanie L.Knight for being just the right combination of mother, friend, mentor, and task master and, most importantly, knowing when to play each role. I thank you for your endless support, insight, and dedication.

To the members of my committee, Dr. Patricia A. Haensly, Dr. Diane S. Kaplan, Dr. Martha Y. Scruggs, and Dr. Victor L. Willson, I am grateful for your suggestions, revisions, and for being positive forces in this seemingly endless endeavor. I am very fortunate to have had the opportunity to work with and learn from each of you.

To the members of the Dabrowski Family. So many of you have been with me from the very beginning when I came, with proposal in hand, to my first Dabrowski workshop. You have provided a forum for discussion and debate that has allowed me to hone my research and communication skills. I greatly appreciate the encouragement you have given me, assuring me that my research is important and will be of use to those interested in Dabrowski's theory and its application. I offer special thanks to Dr. R. Frank Falk and Dr. Nancy B. Miller for always being there to help me with methodological and statistical questions.

Many thanks to the numerous researchers who contributed their data to this project. Without you, this type of research, and my dissertation would not be possible.

Finally, I am deeply grateful to my dear friends, Sharon Lind, Aaron Bielish, Pam Baker, Sue Jackson, Heather Gert, Jon Neidy, and Josh Utay. While not necessarily being down in the research trenches with me, you have been essential for my emotional well-being and my sanity during times when I was most in need. Each of you has played a unique role in my life and I am thankful that I can call you friends.

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CHAPTER I

INTRODUCTION

In the delivery of educational services, one emphasis is on providing for the gifted and talented in the system. This portion of the student body, while generally fairly small, has the potential to make great contributions to society. The role that identification of these individuals plays in education is an important one as it determines whether or not these students will receive the appropriate services needed to foster their development.

Several studies have investigated the process of identification of gifted individuals (see e.g. Baum, Owen, & Oreck, 1996; Dirks & Quarforth, 1981; Mills & Tissot, 1995). Results indicate that a large number of procedures, which vary greatly in their complexity, are implemented by schools to identify gifted students. Nevertheless, some systems rely solely on intelligence test scores, a process that is not congruent with the definitions of giftedness they propose to use (Hoge, 1988). According to Hoge (1988), "official definitions of giftedness often incorporate...motivation, creativity, and, perhaps, leadership" (p. 13) which are characteristics that are not assessed through intelligence testing. Other procedures include varying combinations of IQ test scores; achievement test scores; creativity test scores; parent, teacher, and peer recommendations; academic grades; extracurricular activity participation; and portfolio contents. Despite the variety of possible components that can be used in identifying the gifted, such complex systems are rarely used (Hoge, 1988, Richert, 1991). Additionally, while research has shown that distinctive personality characteristics are often found among the gifted (Freeman, 1983; Lovecky, 1992; Roedell, 1984; Roeper, 1982), these personality characteristics are not usually considered when identifying students for gifted programs (Richert, 1991). Therefore, the problem to be addressed in this study is whether personality characteristics can provide an additional, perhaps more appropriate method of identifying gifted individuals.

This dissertation follows the style and format of Gifted Child Quarterly.

Need for the Study

Over the past 20 years, several studies have used Dabrowski's Theory of Positive Disintegration, a developmental personality theory which differentiates five personality dimensions (Dabrowski, 1964), as a theoretical framework to guide research (e.g. Ackerman, 1993; Ammirato, 1987; Breard, 1994; Piechowski, Silverman, & Falk, 1985; Schiever, 1985). The five dimensions, labeled overexcitabilities (OEs), are characterized by intense responses to specific stimuli and serve as information filters. The dimensions include Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs. Previous studies have investigated the relationship between Dabrowski's five overexcitabilities and giftedness (Ackerman, 1993; Domroese, 1994; Miller, Silverman, & Falk, 1994; Piechowski & Colangelo, 1984), and creativity (Calic, 1995; Gallagher, 1986; Ely, 1995, Manzanero, 1985; Piechowski & Cunningham, 1985; Schiever, 1985). Research studies using Dabrowski's theory range from qualitative phenomenological studies exemplified by Jackson (1995) to quantitative exploratory methods as seen in Ackerman (1993) and Breard (1994). The samples in these studies vary greatly on several variables, including sample size, age, ethnicity, regional location, and method of gifted identification, among others. Results indicate that the Overexcitability Questionnaire (OEQ) appears able to differentiate between groups of gifted and non-identified children, adolescents, and adults (e.g. Ackerman, 1993; Buerschen, 1995; Piechowski & Colangelo, 1984; Silverman & Ellsworth, 1981). However, the specific OEs that most strongly differentiate either have not been identified or have not been consistent across studies. Reconsideration and reanalysis of the entire body of data may yield information or patterns not readily obtained from the single studies. Since the results are varied, investigating the overexcitability profile differences may help determine the feasibility of the OEQ as a means of identification of gifted individuals.

Theoretical Framework

Dabrowski's (1964) Theory of Positive Disintegration (TPD) is a developmental personality theory that offers a different approach to viewing giftedness when compared with traditional ideas that concentrate on the results of intelligence tests. Dabrowski's theory

focuses on the critical role that intensity of human experience plays in development and specifically emphasizes the role emotions play in the development potential. According to this theory, an individual's development is determined by his or her *developmental potential*, which is innate and unchanging (Piechowski, 1975), and by his or her interaction with the environment. TPD is not a theory of giftedness, but does provide a framework that can be used as a foundation for characterizing giftedness and developing a method of identification.

Dabrowski based his theory on clinical and biographical studies of psychiatric patients, artists, writers, members of religious orders, and gifted children and adolescents (Kawczak, 1970). He noted unique developmental patterns in many "talented" members of society (Miller & Silverman, 1987) and became interested in "the intensity and richness of thought and feeling, vividness of imagination, moral and emotional sensitivity" evident in these individuals (Piechowski & Cunningham, 1985, p. 154).

Dabrowski introduced the concept of psychic overexcitability which he characterized as consistent overreaction to external and internal stimuli that appeared limited to certain areas of expression (Piechowski, 1975). He used the term *over*excitability to emphasize the intensification of mental activity as well as the differential type of responding, experiencing, and acting distinguishable as expressions above and beyond the norm (Piechowski, 1986). He identified five forms of overexcitability (OE): Psychomotor, Sensual, Imaginational, Intellectual, and Emotional (Dabrowski & Piechowski, 1977a). Dabrowski hypothesized that these very intense response patterns were innate, and that increased intensity, frequency, and duration of these OEs was indicative of a greater developmental potential (Miller & Silverman, 1987) and therefore of giftedness. Furthermore, Dabrowski (1972) stressed the importance of Emotional, Imaginational, and Intellectual OEs above Psychomotor and Sensual.

The Overexcitability Questionnaire (OEQ), which has 21 open-ended questions, was developed by Lysy and Piechowski (1983) in order to measure the five OEs. Since then, a number of studies have shown that there are different OE profiles for gifted subjects as compared to non-gifted subjects (Gallagher, 1985; Miller, Silverman, & Falk, 1991; Piechowski & Colangelo, 1984; Piechowski & Cunningham, 1985). In these cases, gifted

subjects had higher overexcitability scores than their comparison groups. Elevated scores for Emotional, Intellectual, and Imaginational OEs are frequently noted. Although these studies did not investigate the possibility of using the OEQ as an identification method for giftedness, they provide support for such a possibility.

While previous studies suggest a relationship between giftedness and intensity of OEs that points to significantly higher scores on Imaginational, Intellectual, and Emotional OEs for gifted individuals (Gallagher, 1986; Piechowski & Colangelo, 1984; Piechowski & Cunningham, 1985; Piechowski et al., 1985; Silverman & Ellsworth, 1981), it is not clear whether OE profiles can reliably distinguish between groups of gifted and non-identified individuals. Therefore, it is crucial to determine an OE profile capable of distinguishing between the gifted and non-identified and to explore the influences of gender, culture, and language on OE scores in order to investigate their usefulness in gifted identification.

The literature also indicates some problems that may exist if the OEQ, in its current form, is used for gifted identification. These difficulties include use with children under 12 years old (Piechowski & Miller, 1994), use with individuals whose semantic abilities in English are not high (Gallagher, 1985), and possibly with individuals for whom extraordinary representational competence lies not with linguistic symbols, but with symbols from other domains (Sigel, 1991).

Therefore, in order for the OEQ to become a significant component of gifted identification procedures, further investigation is needed. Before the OEQ can be used to identify gifted individuals with confidence, research must show that the OEQ can reliably differentiate between gifted and non-identified individuals. To warrant its use as a supplementary instrument, research must also show that the OEQ provides a unique contribution to the methods presently in use. Finally, the limitations of the OEQ must be determined, so that the questionnaire can be used appropriately.

Purpose of the Study

The purpose of this study is to combine and reanalyze the data that have already been obtained in selected studies using the Overexcitability Questionnaire. Secondary analyses of the aggregated data that require greater statistical power can then be conducted. In addition, variations in sample characteristics can be examined in relation to the OE profiles of the gifted and talented. In the past, research studies have generally limited their scope to small sample sizes (with a few exceptions) or a very specific focus in sample characteristics, such as cultural origin, talent domain, or age. In order to obtain results that may have statistical strength and practical value, the combined data can be looked at in different ways. Ultimately, the results from this research study will be applicable especially to individuals interested in expanding identification of the gifted and talented population.

Most broadly stated, the primary purpose of this research study is to investigate which overexcitabilities *best* differentiate between gifted and non-identified individuals. In addition, demographic and individual characteristics such as gender and cultural group membership, and developmental level, will be examined in relation to differences in the OE profiles of the gifted and non-identified subjects. Finally, this study will investigate OEQ test characteristics as well as the survey and design characteristics that may affect practical use of the OEQ in identification of the gifted.

Significance

This study contributes to research and practice in two ways. First it contributes significantly to the body of research related to Dabrowski's theory. While many independent studies have explored the Overexcitability Questionnaire in a limited fashion, aggregating data from various studies to investigate trends in a larger, combined sample contributes scope and power to interpretation of the data obtained. Aggregating the data also allows the researcher to examine differences and similarities among studies and influences on OEQ scores that could not otherwise be addressed in each individual study.

The second major contribution is to the broader area of gifted and talented identification. This research could provide a more meaningful method of identifying gifted students, one that extends beyond traditional measures of IQ or of current academic performance. A qualitatively different definition of giftedness requires a method that will identify a broadened variety of individuals. By investigating the OEQ, the researcher is working toward developing methods of identification that go beyond the traditional methods to incorporate personality characteristics.

Research Design

This study employs a secondary analysis of data aggregated from several studies that used the Overexcitability Questionnaire. Secondary analysis is used to reanalyze previously collected data that has already been analyzed (Cordray & Orwin, 1983). The two main uses of secondary analysis are: (a) to use different or more advanced statistical analyses to answer the original research questions and (b) to answer newly developed research questions (Glass, 1976). This study employs both uses of secondary analysis by addressing questions asked in past studies, as well as questions specific to the current study. The aggregated data come from several studies using the OEQ that were selected based on very specific criteria for inclusion. The criteria ensured comparability of quantitative data obtained according to procedural guidelines for the OEQ and eliminated those studies with more unique objectives or procedures. Several analyses were conducted using the data either as a whole, or in parts, as specified by each research question.

Research Objectives

The study focuses on two main objectives. The first objective examines the effects a study's methodology has on OEQ scores (i.e. whether design characteristics or test reliability affects OE scores). In particular, the study investigates whether method of gifted identification or demographic characteristics affect differentiation of the two groups. The second objective focuses on whether OEQ scores can differentiate between gifted and non-identified individuals.

Limitations

The limitations of this study fall into two general categories, theoretical and methodological. The methodological limitations are broken into the following areas; sample, analysis, and instrument. One limitation of this study is that the relationship between giftedness and overexcitabilities is not clearly defined. According to Dabrowski's theory, the gifted should show higher Imaginational, Intellectual, and Emotional OE scores than the non-identified. This is also consistent with what is suggested by numerous conceptions of giftedness proposed by contemporary experts in the field (e.g., Sternberg & Davidson, 1985).

However, while this profile has been seen in several studies, it does not explain those non-identified individuals with a similar elevated profile or those identified gifted individuals without such a profile.

Systematic bias in identifying studies for this investigation is another potential problem of this type of research. However, every attempt to locate and obtain data from published and unpublished studies using the OEQ was made. Therefore, this investigation contains a sample of studies using the OEQ that vary by age, gender, and race, and includes several published and unpublished studies. Nevertheless, undetected systematic bias among the studies located may also be a limitation which is beyond the control of the researcher.

Another set of limitations stems from the individual studies to be used in this investigation. Small sample sizes and low reliability can contribute to weak statistical analyses. However, since these are known limitations, they can be compensated for in subsequent synthetic analyses. Additionally, the instructions and method of OEQ administration are not standardized, therefore, they may differ across samples. This is a relatively minor problem because, with the exception of two studies (Breard, 1995; Domroese, 1994) all administered the entire OEQ at once. The two studies that did not follow this format involved subjects of a young age. For this reason, the OEQ was administered in four parts, in order to ensure that the subjects kept their focus. The most important factor, ample writing time to respond, was upheld in all studies included regardless of method of administration.

The study may also be limited by the weaknesses inherent in aggregation of data from different studies. Combining results from studies with major differences can result in findings that make little sense (Slavin, 1984). This is commonly referred to as the problem of combining apples and oranges. However, this is not a significant limitation in this study since the studies are similar and the current study addressed the most basic component of each, the OEQ scores.

There are also limitations of the OEQ itself and the method of content analysis. The OEQ has been shown to be less effective with individuals under 12 years of age (Piechowski & Miller, 1994) because it requires extended written responses. Also, the

number of questions on the OEQ that directly tie to each overexcitability is different for each OE. Intellectual OE has many related questions, while Sensual OE has only one directly related. This problem is somewhat mitigated by the fact that regardless of a question's focus, it has been found that respondents answer according to their OE strengths and multiple OEs can be coded for each question regardless of focus. The content analysis used to code responses has been revised twice over the past ten years, therefore, some limited differences exist among the studies. Finally, while the coding is standardized, some OEs are more fully described in the coding manual. Therefore a broad range of manifestations can be accurately coded for some OEs, but others are less fully delineated. Nevertheless, since these limitations on coding have applied across all studies, the relative contribution of any single OE to a profile will be comparable across studies.

Definition of Terms

The following definitions of terms will be used in this study:

Gifted: "Giftedness is asynchronous development in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awarenesses that are qualitatively different from the norm. This asynchrony increases with higher intellectual capacity. The uniqueness of the gifted renders them particularly vulnerable and requires modifications in parenting, teaching, and counseling in order for them to develop optimally" (Columbus Group, 1991, p. 1). In this study, gifted will be operationally defined for each study by objective and subjective measures of the previously described constructs.

Developmental potential: Developmental potential is the original endowment which determines the level of development a person may reach if the physical and environmental conditions are optimal (Piechowski, 1974). It "may be defined as a combination of overexcitabilities, supporting special talents, and abilities....[such that] the richer and more complex their expression, the stronger the potential for development" (Piechowski & Cunningham, 1985, p. 156).

Overexcitabilities (OE): Consistent extreme reactions to internal and external stimuli that can be expressed in five different forms: psychomotor, sensual, imaginational, intellectual, and emotional (Piechowski, 1975). These response patterns are believed to be innate; and increased intensity, duration, and frequency are considered to be indicative of greater developmental potential (Miller & Silverman, 1987).

Psychomotor overexcitability: Psychomotor OE is characterized by an organic excess of energy which manifests itself as a love of movement, rapid speech, increased capacity to be active, impulsiveness, pressure for action, and restlessness.

Sensual overexcitability: Sensual OE is experienced as heightened sensory pleasure and is expressed as desires for comfort and luxury, being admired and in the limelight, and as the appreciation of beautiful objects (e.g. gems, furniture), writing styles, and words. Other manifestations include simple sensory pleasures such as touching, tasting, and smelling.

Imaginational overexcitability: Imaginational OE in its purest form is expressed through vividness of imagery, rich association, use of metaphor in verbal expression, strong and sharp visualization (real or imaginary), and inventiveness. Other forms are vivid and detailed dreams or nightmares, fear of the unknown, predilection with fantasy and magic tales, and poetic creativity.

Intellectual overexcitability: Intellectual OE, should not to be equated with intelligence. For example, intelligence is expressed in the ability to solve math problems, intellectual OE is expressed in the *love* of solving them. Persistence in asking probing questions, avidity for knowledge, discovery, and theoretical analysis and synthesis, a sharp sense of observation, independence of thought (often expressed in criticism), symbolic thinking, and a capacity to search for knowledge and truth are all manifestations of intellectual OE.

Emotional overexcitability: Emotional OE is a function of the way relationships are experienced, and can be expressed as attachments to people, things, or places, or, one's relationship with oneself. Characteristic expressions include deep relationships, strong affective memory, concern with death, feelings of compassion and responsibility, depression, need for security, self-evaluation, shyness, and concern for others (Falk & Piechowski, 1991; Piechowski, 1975, 1986; Piechowski & Colangelo, 1984; Piechowski & Cunningham, 1985).

Objective measure: An objective measure is one where the items are evaluated in a

straightforward manner and are generally not open to interpretation. The correct answers are unambiguous and predetermined such that different individuals will score the items in the same way (Rothenstein, 1990). Objective measures use true-false, multiple-choice, completion, and matching items. Measures such as standardized achievement and ability tests are objective.

Subjective measure: Subjective measures are subject to interpretation and are less well-defined than objective measures. Information gathered from subjective measures is also more elaborate (Rothenstein, 1990). Such measures might include open-ended questionnaires, essay tests, recommendations/ratings by teachers and parents, and self-evaluation forms.

CHAPTER II

REVIEW OF THEORY AND RESEARCH

The identification of gifted individuals is an extremely difficult task. A primary reason for this is that finding appropriate measures that are reliable and valid for this purpose poses some formidable problems. One of the most critical problems in gifted identification stems from disagreement in the field about what giftedness is and how it should be defined. Throughout the history of gifted education many definitions of giftedness have been proposed. In the early days Terman defined giftedness according to a single criterion, intelligence, as measured by standardized tests (Tannenbaum, 1991). Such measures tended to focus on intellectual and academic abilities and were intended directly, as well as indirectly, to predict ability to succeed in traditional academic settings.

After the 1920's, more complex definitions of giftedness were developed. A turning point for the gifted movement was Marland's (1972) definition of giftedness because it was the first to broaden the definition of giftedness. Along with the usual general intellectual ability, Marland included several areas not included previously, such as specific academic aptitude, creative or productive thinking, leadership ability, visual and performing arts, and psychomotor ability. Renzulli (1978), incorporating these areas in which giftedness might be expressed, presented a different multidimensional definition that proposed three trait clusters deemed necessary to be considered gifted (i.e. above average ability, above average creativity, and task commitment) that could be applied to any culturally valuable domain.

Later, multidimensional definitions focused on different aspects of intelligent functioning (Sternberg, 1985), or the expression of diverse abilities (Gardner, 1983), while others were more holistic focused on personal characteristics and their interactions with ability (Betts & Neihart, 1988). Gardner (1983) proposed a multifaceted approach to giftedness presenting seven possible areas of giftedness which included linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, *inter*personal, and *intra*personal ability, each of which was associated neurobiologically with a specific area of the brain. Gardner

asserts that they are autonomous, each with its own memory, mechanisms of learning, and development. Sternberg's (1985) approach to giftedness is based on his Triarchic Theory of Intelligence and deals with three forms of intellectual giftedness; analytic, synthetic, and practical. An individual can be gifted in one or more, although he proposes that development of potential proceeds more favorably when instruction and performance are allied to whichever form is the most competent area for the individual.

Roeper (1982) and Betts and Neihart (1988) presented a holistic approach to defining giftedness. Both hold an integrated view of the gifted individual; that is, physical development, intellectual awareness, and emotions were considered together, not as separate entities within an individual. Roeper (1982) and Betts and Neihart (1988) also proposed that there was significant differentiation within the gifted population.

These varying definitions pave the way for diverse identification methods. Some of these definitions have specific identification procedures, for example standardized intelligence tests, cognitive processes assessment, and creative product assessment. Each of these methods identifies a certain portion of the gifted population, but, leaves some unidentified.

One aspect of gifted individuals that has received little attention in the identification process is personality characteristics. Incorporating these aspects of the gifted individual into the identification process might help identify those remaining unidentified. A method that might help the identification of gifted individuals become more complete through the examination of personality characteristics is based on Dabrowski's (1964) Theory of Positive Disintegration.

This chapter reviews the literature in three areas. First, theories related to the definition of giftedness will be reviewed. Then, Dabrowski's Theory of Positive Disintegration will be described. Finally, research using the Overexcitability Questionnaire, which is based on Dabrowskian concepts, will be reviewed.

Definitions of Giftedness

Terman (1926), upon launching into his well known longitudinal studies on eminence, was interested in characteristics of gifted individuals such as personality characteristics, physical attributes, and family characteristics and believed that hereditary factors played a supreme role in intelligence (cited in Tannenbaum, 1991). Wells (1982) described Terman's gifted identification procedures as unidimensional and standardized measurement of general intellectual ability. Terman defined gifted individuals as *intellectually superior* and used their IQ scores as the criterion for identification. His subjects were in the top one per cent in general intelligence based on scores on the Stanford-Binet and the Terman Group Test (Terman & Oden, 1951). One of Terman's (1926) hypotheses was that the only individuals with the potential for genius were high-IQ children (cited in Tannenbaum, 1991).

Leta Hollingworth worked on similar research during this time and also emphasized the importance of intelligence in giftedness; however, her definition had a slightly different focus. Hollingworth (1931) proposed that the main difference between average and gifted children was in their degree of educability: Gifted children were considerably more educable than the majority of children. She emphasized that this educability could be in different areas, such as the arts, music, mechanical ability, and an ability to abstract (cited in Pritchard, 1951). Hollingworth believed that gifted meant well above average on standard scales of measurement for both intelligence and special talents, but discussed only intelligence because there was insufficient information available on the other forms of talent (Hollingworth, 1926).

In her studies, Hollingworth used individuals in the top 1% in general intelligence to comprise her gifted sample, but realized that this percentage was arbitrarily chosen and could be changed (Pritchard, 1951). Hollingworth used a minimum criterion of 130 IQ on the Stanford-Binet in the initial selection, but in the final process she also considered other factors, thereby excluding some children with adequate IQ scores (Pritchard, 1951). She defined general intelligence as the "power to achieve literacy and to deal with its abstract knowledge and symbols" (Pritchard, 1951, p. 49). Hollingworth asserted that intelligence tests were the only reliable and valid measure for identifying gifted children and that no other measure could replace them (cited in Pritchard, 1951).

In response to the prevalent use and accompanied dissatisfaction with intelligence definitions of giftedness, such as those used by Terman and Hollingworth, Sidney Mar-

land, Jr. (1972) as Commissioner of Education to the United States presented a conceptually and practically different definition of giftedness. Marland identified six areas of demonstrated performance or potential ability that could be categorized as gifted: general intellectual ability, specific academic aptitude, creative or productive thinking, leadership ability, the visual and performing arts, and psychomotor ability. Psychomotor ability was eventually removed from the list when the 1978 revision was presented (Wells, 1978). Along with the necessity to identify students capable of high performance in a variety of areas, he also focused on the importance of differentiating the educational programming for these students in order that they achieve their potential and make valuable contributions to society.

Marland's (1972) definition was revolutionary in its impact on the educational system; it broadened the conceptualization of giftedness drastically. It included intellectual ability and specific academic aptitude, while putting equal weight on a number of more diverse areas of ability that had not previously been included. Yet it also addressed the condition under which schools must deliver educational services particularly targeted toward gifted students who would need a more complex curriculum to meet their needs and rights to learn.

Witty (1958), in response to definitions based on IQ, had "recommended that the definition of giftedness be expanded and that we consider any child gifted whose performance, in a potentially valuable line of human activity, is consistently remarkable" (cited in Passow, 1981, p. 7). Twenty years later Renzulli (1978) elaborated on this idea in his Triad Model of Giftedness. Renzulli stressed the importance of three clusters of traits in giftedness: (a) above average intelligence, (b) above average creativity, and (c) task commitment. He stated that gifted and talented children are those who either have, or are capable of developing this set of traits and applying them to any potentially valuable area of human performance.

Renzulli (1986) defined *well above-average ability* in terms of either general or specific ability where general ability consists of processing information, integrating experiences, and abstract thinking, while specific abilities refer to knowledge, skills, or the abilities related to more specialized activities. Well above-average ability refers to the top 15-20%

in performance or potential performance in any area, general or specific (Renzulli, 1986). *Task commitment* is a non-intellective cluster of traits, as compared to the other two clusters, that Renzulli (1978) describes as a "...refined or focused form of motivation....[that] represents energy brought to bear on a particular problem (task) or specific performance area" (p. 182). The third cluster of traits that characterizes gifted persons, according to Renzulli (1986), consists of factors under the general heading of creativity. He also explains that creativity is more than just divergent thinking (Renzulli, 1977, 1986) and that creative *accomplishments* are the important factor for giftedness (Renzulli, 1978, 1986).

Above-average ability, above-average creativity, and task commitment are interlocking clusters of traits and each cluster is considered to be an equal contributor to giftedness (Renzulli, 1978). Renzulli (1978) asserts that it is the interaction among the three clusters that research has shown to be the necessary ingredient for creative/productive accomplishments. Allowing for the top 15-20% of students to be included in any identification plan makes it possible for a greater number to be involved in a program designed to nurture high potential as compared to some of the narrow definitions that include only the students in the top 5%. Additionally, this type of definition increases the size of the talent pool from which individuals can move in and out of gifted performance; when a student is lacking in task commitment he or she is "out," and when an acute interest is taken in a project, he or she is "in" (Renzulli, Rimm, & Smith, 1981).

Although definitions based on intelligence cannot help but have a heavy loading of cognitive functions, either implicitly or explicitly, some frameworks were derived primarily from theories of cognition. For example, Sternberg (1991, 1997) essentially discussed giftedness in the intellectual realm and based this discussion on his Triarchic Theory of Human Intelligence (Sternberg, 1985). He put forth three main types of giftedness; analytic, synthetic, and practical, which he considered general categories for potential superiority (Sternberg, 1991, 1997). Analytic giftedness, the type best measured by intelligence tests, is expressed in the ability to dissect problems and understand their parts. Synthetic giftedness describes individuals who are insightful, intuitive, and creative and often solve problems in novel ways. Individuals with such abilities will not always perform well on conventional IQ tests; they may not see things the way most others do. Prac-

tical giftedness describes people who specialize in the *use* of abilities that they possess. They can go into a setting, determine what is necessary to succeed in that environment, and then do it.

Sternberg discussed the components of information processing that contribute to the three kinds of giftedness. There are three groups of components: metacomponents, performance components, and knowledge acquisition components. Metacomponents, of which Sternberg has named eight, are "executive processes used to plan, monitor, and evaluate problem solving and decision making" (1991, p. 46). Integration among the metacomponents is as important to giftedness as adeptness at each of them individually. Performance components are the processes that actually *do* the problem solving once the metacomponents determine which are necessary. There are numerous performance components that vary according to the type of problem being solved. Knowledge acquisition components are used to learn new information. Sternberg suggests that gifted individuals are particularly effective at using these components because they are often proficient at learning new information.

Two other issues that Sternberg found relevant to giftedness were the roles of experience and contextual functions. Every task an individual encounters can be classified as more or less novel or familiar. Where a task falls on this continuum has implications for which components are used, as well as the components' execution speed. For example, task familiarity can lead to automatization of intellectual processes which frees processing resources, it also breeds inflexible thinking that can impede problem solving (Sternberg, 1991). In everyday experiences, the components of intelligence serve three contextual functions. The three functions Sternberg referred to were: (a) *adaptation* of oneself to a new environment so that the best fit possible can be established, (b) *selection* of whether to adapt and conform to the new environment or to leave it because it is not suitable, and (c) *shaping* of a new environment to more closely align it with one's ideal situation. Sternberg stated that being able to shape one's environment would be the pinnacle of practical intelligence.

In his comments about the Triarchic Theory of Human Intelligence, Sternberg (1991) emphasized the considerable degree of variation found in the loci of giftedness and that to

sum up an individual's intellectual giftedness in a single number, an IQ score, is naive. Even with the differentiation among the intellectually gifted, he asserted "that there is one thing that people who are intellectually gifted throughout their lives have in common: They are people who know what they are good at, know what they are not good at, and are able to capitalize on their strengths and compensate for their weaknesses" (p. 51). Intellectually gifted individuals excel in some areas, but, not necessarily in all, or even many.

Howard Gardner also developed a cognitive theory applicable to giftedness which broadened previous notions of giftedness and connected abilities to specific areas of brain development. He first proposed his Theory of Multiple Intelligences when he wrote Frames of Mind (1983) and used this theory as a basis for viewing giftedness. He stated that "we define *intelligences* as an ability or set of abilities that permit an individual to solve problems or fashion products that are of consequence in a particular cultural setting" (Ramos-Ford & Gardner, 1991, p. 56). The exact number of intelligences has not been established, neither has the specific nature and breadth of each been precisely determined (Gardner, 1983). Drawing from information on extremely diverse populations, for example, prodigies, gifted individuals, brain-damaged patients, *idiot savants*, normal children and adults, experts in different lines of work, and individuals from diverse cultures, Gardner (1983) formulated a set of criteria used to determine the set of intelligences. These criteria include the extent that it can be found in relative isolation in special populations; the extent that it may become highly developed in specific individuals; and the extent that professionals and experts in particular disciplines can posit core abilities that define the specific intelligence.

Thus far seven intelligences have been defined; linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal. Linguistic intelligence includes abilities in syntax, semantics, and pragmatics as well as written and oral understanding and expression. Logical-mathematical intelligence consists of inductive and deductive reasoning and computation abilities. Traditional intelligence tests generally tap these two intelligences (Ramos-Ford & Gardner, 1991). Spatial intelligence is described by the capacity to represent and manipulate spatial configurations. The ability to use all or part of one's body to perform a task or fashion a product defines bodily-kinesthetic intel-

ligence. Musical intelligence has many components; pitch discrimination, sensitivity to rhythm, texture and timbre, as well as music performance and composition. Finally, the two person-oriented intelligences are interpersonal, the ability to understand the actions and motivations of people and to act on this information, and intrapersonal, which "refers to a person's understanding of self....[and] includes knowledge and understanding of one's own cognitive strengths,...as well as one's feelings and emotions" (p. 58).

These intelligences are considered to be autonomous; they function and develop relatively independently of one another. Each one of these intellectual realms has its own specific memory, its own mechanisms of learning and its own developmental history (Shaughnessy, 1985). "Especially suggestive [of this autonomy] are studies of tasks that interfere (or fail to interfere) with one another; tasks that transfer (and those that do not) across different contexts; and the identification of forms of memory, attention, or perception that may be peculiar to one kind of input" (Gardner, 1983, p. 65). Ramos-Ford and Gardner (1991) believe that this autonomy has significant implications for the gifted and talented community. They cite several examples of individuals who possess superior ability in one area while having average or even below average ability in several others.

Annemarie Roeper suggested that a holistic approach was necessary to understand the gifted. She believed that a child must be viewed as a total entity; "emotions cannot be treated separately from intellectual awareness or physical development; all intertwine and influence each other" (Roeper, 1982, p. 21). She believed that a gifted child's intellect and emotions were *different* from those of other same-age children, and not merely ahead or advanced. She emphasized that intellect and emotions can only be understood when they are examined together (Roeper, 1982). Roeper proposed the following definition of giftedness: "giftedness is a greater awareness, a greater sensitivity, and a greater ability to understand and to transform perceptions into intellectual and emotional experiences" (1982, p. 21).

Roeper (1982) proposed that the many categories giftedness is often divided into (e.g. intellectual, creative, or musical) be viewed as parts of a whole that influence each other, where some are more strongly manifest in some individuals than others. Diversity among the gifted population can be explained, at least in some aspects, by Roeper's approach.

Drawing from her observations, Roeper proposed six types of gifted children based on how they choose to cope with their emotions: the perfectionist, the child/adult, the winner of the competition, the exception, the self critic, and the well-integrated child. She considered these types to be generalizations that may not describe any given child with complete accuracy. While Roeper (1982) acknowledged that giftedness is usually defined by one aspect of the personality which is most apparent, she is reluctant to separate that one aspect for fear of not considering the total person and the possible influence one aspect has on another. She nevertheless admits that it is helpful to be aware of the particular aspect which is most apparent when attempting to understand a child.

Betts and Neihart (1988) also ascribe to a holistic approach to giftedness that is based on several years of observations, interviews, and reviews of literature. In their view "giftedness should not be defined by separate categories; every aspect of personality and development influences and interacts with every other aspect" (p. 248). They not only suggest that the gifted are different in their behavior, feelings, and needs from non-gifted individuals, but, that these characteristics also differentiate among individuals within the gifted population; they propose that the gifted population can not be viewed as a homogeneous group (Betts & Neihart, 1988).

Betts and Neihart (1988) attempt to create a theoretical framework for the gifted and talented that differentiates gifted individuals on the basis of behavior, feelings and needs. They present six different profiles of gifted and talented students: successful, challenging, underground, dropout, double labeled, and autonomous. They identified each profile discussing an individual's feelings and attitudes, behaviors, and needs, plus adult and peer perceptions of the individual, identification suggestions, and suggestions for home and school support. They emphasize that "it is important to remember that this [profile system] is a theoretical concept that can provide insights for facilitating the growth of the gifted and talented, not a diagnostic classification model" (p. 248).

The Theory of Positive Disintegration

In the early 1980s a line of research began based on Dabrowski's (1964) Theory of Positive Disintegration (TPD). TPD is a developmental personality theory which posits

five levels of development, and three factors influencing development: (a) constitution or heredity, (b) environment or society, and (c) autonomous or self-determined. The first factor, heredity, includes a set of five personality characteristics that are considered innate. These five characteristics are termed "overexcitabilities" and are named Psychomotor, Sensual, Imaginational, Intellectual, and Emotional. They represent ways of experiencing stimuli more intensely, for longer periods of time, and with greater frequency. Overexcitabilities (OEs) can be described as filters through which people take in information, filters which can be closed completely, somewhat open, or wide open (Piechowski, 1975). The presence of OEs is an indication of a person's developmental potential, that is, their potential for personality development. Dabrowski's research indicated that eminent and creative adults, as well as gifted students, had a greater abundance of OEs (Dabrowski, Kawczak, & Piechowski, 1970).

This approach to giftedness, to be discussed in greater detail than those already presented, is the basis for the alternative identification approach explored in this study. Dabrowski's (1964) Theory of Positive Disintegration is a developmental personality theory and offers a different perspective for viewing giftedness. Dabrowski based his theory on over two decades of clinical and biographical studies of patients, artists, writers, members of religious orders, and gifted children and adolescents (Kawczak, 1970). He noted unique developmental patterns in many "talented" members of society (Miller & Silverman, 1987). Dabrowski became interested in the intensity and richness of thought and feeling, vividness of imagination, moral and emotional sensitivity of certain members of society whose enhanced interactions with the world appeared to be beyond the common and average in intensity, duration and frequency of occurrence (Piechowski & Cunningham, 1985). Dabrowski (1972) emphasized the importance of emotions in development. He believed that "we need a general theory of human development...where emotional factors are not considered merely as unruly subordinates of reason but can acquire the dominant role of shaper of development" (p. 6).

The Theory of Positive Disintegration is based on a multilevel, developmental principle. It does not deal with the specific contents of human growth or basic human needs, as some other theories do. It directly addresses the nature of the developmental process

(Piechowski, 1974); and positive disintegration is the name for this developmental process in which the structure of a higher level replaces the structure of a lower one (Piechowski, 1975). During development, the personality loosens its cohesiveness allowing for potential reconstruction at a higher level (Dabrowski, 1964). This approach to personality development was considerably different from those that described it as co-occurring with physical maturation and therefore more or less automatic, as well as those with a pathological view of this type of disintegrative process on personality. Dabrowski (1964) felt that many unstable conditions, such as depression, anxiety, nervous breakdowns, and personality disorders, generally thought to have only adverse effects of people, were more often gateways to higher levels of personality development and should be viewed in a more positive light.

Feelings toward values: self-serving ➡ stereotypical ➡ individual ➡ universal ➡ transcendent

Feelings toward self: egocentricity ➡ ambivalence ➡ inner conflict ➡ self-direction ➡ peace & harmony

Feelings toward others: superficial ➡ adaptive ➡ interdependent ➡ democratic ➡ communionistic

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Figure 1: Three Areas of Feeling at Each Developmental Level

There are five levels of personality development in Dabrowski's (1964) theory. Miller and Silverman (1987) characterized each developmental level according to three areas of personal feelings: (a) feelings toward values, (b) feelings toward self, and (c) feelings toward others. Figure 1 outlines the progression of the three areas of feeling through the five developmental levels from level 1 to level 5and was developed by Miller (1985). Personality development is seen "as a nonontogenetic evolutionary pattern of individual growth" (Dabrowski, 1972, p. 11). In other words, progression through the five levels of development is not automatic; one's age is not necessarily an indication of one's developmental level. Development is a function of other conditions. It is influenced by three

groups of factors: (a) constitutional or hereditary, (b) environmental or social, and (c) autonomous or self-determined (Miller & Silverman, 1987). The level of development that can be reached by any individual is determined by his or her original innate endowment which Dabrowski referred to as developmental potential. One's developmental potential can only be achieved under ideal environmental and internal circumstances (Piechowski, 1975). It is important to add that this view of developmental potential is that potential itself does not change throughout life; it remains constant (Piechowski, 1975).

Dabrowski also introduced the concept of psychic overexcitability. Dabrowski noticed that many children, adolescents, and also adults, consistently reacted with extreme intensity to external and internal (i.e., intrapsychic) stimuli. The important aspect of his observation was that while the stimuli were different, the reactions appeared limited to certain dimensions (Piechowski, 1975). He referred to this tendency to respond intensely as "psychic overexcitability" and named five different forms: Psychomotor, Sensual, Imaginational, Intellectual, and Emotional (Dabrowski & Piechowski, 1977a; Piechowski, 1975). The term overexcitability (OE) "is a translation of the Polish word 'nadpobudliwosc' meaning 'superstimulatability,' the intended sense is of robust surplus and int[illegible] (Piechowski, Silverman, & Falk, 1985, p. 540). Dabrowski hypothesized that these very intense response patterns were innate, and that such increased intensity, frequency, and duration of overexcitable responses were indicative of a greater developmental potential than the norm (Miller & Silverman, 1987). He used the term *over*excitability to emphasize the intensification of mental activity as well as the differential type of responding, experiencing, and acting distinguishable as characteristic forms of expression above and beyond the norm (Piechowski, 1986; Piechowski & Colangelo, 1984).

The five forms of OE can be thought of as dimensions of mental functioning (Piechowski, 1979). They are the basic components of developmental potential; special talents and abilities also contribute to one's developmental potential (Dabrowski, 1972; Dabrowski & Piechowski, 1977b). The five independent modes of functioning or experiencing are Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OE (Piechowski, 1974; Piechowski & Colangelo, 1984) and are present in every individual, at least in rudimentary form (Piechowski, 1975). The following are descriptions of the five

OEs:

Psychomotor overexcitability is characterized by an organic excess of energy which manifests itself as a love of movement, rapid speech, and increased capacity to be active. Impulsiveness, pressure for action, and restlessness are also manifestations of Psychomotor OE.

Sensual overexcitability is experienced as heightened sensory pleasure and is expressed as desires for comfort and luxury, being admired and in the limelight, and as the appreciation of refined beauty. Other manifestations include simple sensory pleasures derived from such things as touching objects (e.g., fabric, tree bark, skin), the taste of food, and the smell of anything from gasoline to an apple orchard in full bloom. Also, appreciation of beautiful objects (e.g. gems, furniture), writing styles, and words are considered Sensual OE.

Intellectual overexcitability must first be distinguished from intelligence. For example, intelligence is expressed in the *ability* to solve math problems, while Intellectual OE is expressed in the *love* of doing math problems. Persistence in asking probing questions, avidity for knowledge, discovery, and theoretical analysis are manifestations of Intellectual OE. "Other expressions include: a sharp sense of observation, independence of thought (often expressed in criticism), symbolic thinking, development of new concepts, striving for synthesis of knowledge; a capacity to search for knowledge and truth" (Piechowski & Colangelo, 1984, p. 82).

Imaginational overexcitability in its purest form is expressed through vividness of imagery, rich association, use of metaphor in verbal expression, strong and sharp visualization, and inventiveness. Other forms are vivid and detailed dreams or nightmares, fear of the unknown, predilection with fantasy and magic tales, and poetic creativity.

Emotional overexcitability is a function of the way relationships are experienced, and can be expressed as attachments to people, things, or places, as well as, one's relationship with oneself. Piechowski (1975) explained an important aspect of Emotional OE: Intensity and display of emotions are not sufficient to be considered a developmentally significant expression, the relationship feelings must be present. Characteristic expressions include deep relationships, strong affective memory, concern with death, and feelings of compas-

sion and responsibility. Depression, need for security, self-evaluation, shyness, and concern for others are also characteristic expressions of Emotional OE (Piechowski, 1975, 1986; Piechowski & Colangelo, 1984; Piechowski & Cunningham, 1985).

Piechowski (1979) suggested that these five forms of OE could be thought of as the main channels of perception. They have frequently been likened to color filters through which all stimuli, external and internal, reach a person (Piechowski, 1974, 1979; Piechowski & Cunningham, 1985). Each filter can be widely open, partially open, or almost closed; the size of the opening determines the quality and quantity of the information flow. Examples of different intensities of Emotional OE are, low, "I feel really high when I play football with my friends [boy, age 13]" and high, "When I feel really happy I feel like nothing can go wrong for the rest of my life....When I am really happy it is more so than other people I know. When I am quite happy I am so high that it seems like nothing could ever get me into a bad mood [boy, age 13]" (Falk, Piechowski, & Lind, 1994, p.7).

Also, these filters determine which stimuli an individual is capable of responding to, and in what way. An individual who shows signs of OE will normally have a dominant form accompanied by varying strengths of other forms (Dabrowski & Piechowski, 1977a). With this in mind, the wide variety of stimuli a person is exposed to will often be converted to the most reactive form, the dominant OE. "If more than one, or all five channels have fairly wide apertures, then the abundance and diversity of information (that is, simultaneous experiencing in different modes) will inevitably lead to dissonance, conflict, and tension" (Dabrowski & Piechowski, 1977a, p. 32). However, there is agreement in the literature that such dissonance, conflict, and tension are the substrates of the developmental process and enrich one's mental development (Dabrowski, 1972; Dabrowski & Piechowski, 1977a, 1977b; Piechowski, 1979).

The literature suggests that although all OEs contribute to one's development, they do not do so equally. Emotional, Intellectual, and Imaginational OE appears to be more developmentally significant than Sensual and Psychomotor, and give rise to psychic richness (Dabrowski, 1972; Dabrowski & Piechowski, 1977a). Additionally, Emotional OE is essential to reach the highest developmental level (Piechowski, 1975). "Great strength of psychomotor and sensual forms limit development to the lowest levels only" (Piechowski,

1975, p. 258). These two forms cannot by themselves lead to an increase in psychic processes (Dabrowski & Piechowski, 1977a), however, their possibilities for positive development are enhanced when combined with the richer forms of OE (Dabrowski, 1972).

The only time excitability can make a significant contribution to development is when expressions are above and beyond what can be considered common or average (Piechowski, 1979). Dabrowski and Piechowski (1977b) point out that development is most accelerated when all five OEs are present in their most intense form. Piechowski (1979) offers additional clarification about what types of expression are considered to be developmentally significant:

> And it is this criterion—contribution to a higher level of development—that guides the selection of expressions of *over*excitability apart from the expressions that are not developmentally significant. Thus, for instance, one may readily consider violent and explosive temper as a sign of emotional overexcitability. But, this is insufficient. Violent emotions which are uncontrolled, not reflected upon, and which do not occur in the context of a true and deeply felt personal relationship, do not count as emotional overexcitability in the sense of the term as used here. This is because intense, even violent, feelings cannot go unchecked in the context of a personal relationship out of consideration for the other person. (Piechowski, 1979, p. 28)

Because these enhanced modes of experiencing contribute to an individual's psychological development, their strength is considered a measure of developmental potential (Dabrowski & Piechowski, 1977a; Piechowski, 1975, 1986).

Dabrowski (1972) suggested that reality is seen in a stronger and more multisided manner by those possessing either one or several forms of OE; and that "reality for such an individual ceases to be indifferent but affects [him] deeply and leaves long lasting impressions" (p. 7). Schiever (1985) noted that OEs affect an individual by making concrete stimuli more complex, enhancing emotional content, and amplifying every experience. Because OEs are taken to be a measure of developmental potential, they are seen as a measure of one's giftedness (Piechowski, 1979), and, when combined with one's environment and drive to excel, form what is recognized as a gifted person (Gallagher, 1986).

The Overexcitability Questionnaire

In order to measure the presence of OEs, the Overexcitability Questionnaire (OEQ) was developed. The OEQ was designed to measure the presence and magnitude of OEs in an individual. According to the theory, the five forms of OE are independent and innate. As innate characteristics, they are either present or absent; their existence is not based on physical maturation in any way. An individual can posses all five forms of OE, a few forms, or none at all. "Because the five forms of OE represent an overabundance of activity, sensation, imagination, thought, and feeling, the individual experiences the world in richer and more complex ways. Thus it is seen as the potential for higher level emotional development" (Miller, 1995, p. 1).

The OEQ has 21 open-ended questions that require written responses. Individuals completing the OEQ are instructed to answer the questions completely and to their satisfaction feeling free to return to previous responses to make changes. Generally, unlimited time is give for completion. In most instances the full 21-question OEQ is given; however, in some cases the questions are given in smaller groups of four or five and on different days.

Content analysis (Falk & Piechowski, 1991; Falk, Piechowski, & Lind, 1994) is used to score the OEQ. Each response is rated for the five areas of OE; that is each response can reflect any or all forms of OE. The intensity of each OE is rated from 0, no overexcitability, to 3, a rich and intense expression. The maximum score for each OE is 63, that is, 3 points x 21 questions. All protocols are rated by two individuals trained in the scoring methodology for purposes of interrater reliability. This instrument has been used in research involving gifted adults (Miller et al., 1994; Piechowski & Colangelo, 1984; Piechowski, et al., 1985), gifted children (Ackerman, 1993; Breard, 1994; Buerschen, 1995; Domroese, 1993; Ely, 1995; Gallagher, 1986; Jackson, 1995; Piechowski & Miller, 1995; Schiever, 1985), artists (Manzanero, 1985; Piechowski & Cunningham, 1985; Piechowski et al., 1985; Piirto, Cassone, Ackerman, & Fraas, 1996), college students (Ammirato, 1987; Calic, 1994; Hazell, 1984; Lysy & Piechowski, 1983), and other samples of the population (Beach, 1981; Silverman & Ellsworth, 1981). The following review of research using this instrument focuses initially on the development and nature of the OEQ, and then on the various studies that used the instrument. Those research studies involving samples of gifted individuals will be emphasized and discussed in more detail than those whose focus was on other populations.

Review of the Research Using the Overexcitability Questionnaire

The following sections contain summaries of the research studies using the Overexcitability Questionnaire with gifted and non-identified populations. The first set focuses on those studies using adult samples and the second section focuses on studies with children and adolescents. The order of presentation is primarily chronological for each section. The mean scores for each OE by study can be found in Appendix A.

Research with Gifted and Non-Identified Adult Samples

Lysy and Piechowski

Lysy and Piechowski (1983) examined the relationship between Dabrowskian measures and Jungian measures in their monograph. For this literature review, those portions of the study not directly related to OEQ scores are beyond the scope of this paper and will not be discussed. The following research questions were addressed: Will the ontogenetic nature of Dabrowski's theory be upheld through evidence that there are no age differences in OE scores? The second research question investigated whether the assertion that Imaginational, Intellectual, and Emotional OEs are most important for developmental potential and developmental level? The third question asked if Psychomotor and Sensual OEs are a strong presence, will they decrease developmental potential and developmental level?

The sample consisted of 42 individuals, 20 in the counselor group (16 females and 4 males) between the ages of 22 and 50 and 22 in the noncounselor group (14 females and 8 males) between the ages of 22 and 35. All subjects lived in or near a large Midwestern city.

The instruments used by Lysy and Piechowski were the Myers-Briggs Type Indicator (MBTI), the OEQ, and the Definition Response Instrument (DRI). The original 42-question OEQ was used and was scored according to the original conservative method of 0

- no OE present or 1 - OE present[1]. The DRI measures current level of development using Dabrowski's theory as a framework.

The mean OE scores for the two groups range from a low of 2.7 on Intellectual OE for the non-counselor group to a high of 5.3 on Emotional OE for the counselor group. Because the actual means of the two groups were obtained from scoring using the original method of content analysis, the scores are considerably lower than those of subsequent studies. Counselors received significantly higher Sensual OE scores than the noncounselors and significantly lower Intellectual OE scores. The only significant gender difference was that males were higher than females in Psychomotor OE. There were no significant age related correlations.

The results relating performance on the MBTI and OEQ show some significant yet weak relationships. Sensual OE correlates with the Thinking-Feeling function such that individuals who score higher in Sensual OE are more likely to be Feeling types. Imaginational OE correlated with both the Thinking-Feeling function and the Judging-Perceiving function. Therefore, the subjects in this sample who were high on Imaginational OE were more likely to be Feeling and Perceiving types. There were no significant relationships for Psychomotor, Intellectual, and Emotional OEs or for the MBTI Introversion-Extroversion and Sensing-Intuition functions. However, there was a significant and moderate correlation between developmental level, as measured by another instrument, and the Sensing-Intuition function. Subjects who were Intuitive types had higher developmental levels.

Correlational analyses for OE scores and developmental level indicated that all forms of OE significantly correlate with level of development. Lysy and Piechowski also found that the combination of Imaginational + Intellectual + Emotional was correlated to a very high degree with developmental level and that removing Imaginational OE from the formula made almost no difference in the correlation leading the authors to question the importance of Imaginational OE in multilevel development. While Dabrowski's theory indicates that Psychomotor and Sensual OEs retard development, the data lead to the following assertion: "What does preclude development is apparently not the strength of [Psychomotor and Sensual] as such but the weakness or absence of [Emotional and Intellectual OE]. Development is accelerated or retarded... solely as a function of the strength or weakness of [Emotional and Intellectual], independently of [Psychomotor and Sensual OE]" (p. 294).

[1] When this data was used in subsequent studies, only scores for the current 21-question OEQ were used and they were rescored using the revised method.

Hazell

Hazell (1984) examined experienced levels of emptiness and existential concern and their relationship to values, developmental level and OE profile. He posited four hypotheses, only one of which was related to OE profiles: Measures of emptiness and existential concern will correlate directly with measures of Imaginational, Intellectual and Emotional OE and will correlate inversely with Sensual and Psychomotor OE. The remaining three hypotheses focused on values and developmental level and will not be addressed in this summary.

The sample for this study included 24 subjects, 7 men, 17 women, with an age range of 17 to 55. The majority of subjects were students working on degrees in social services at universities located in or near a large Midwestern city. They were found through psychology and philosophy classes and through private practice lists.

Hazell (1984) used four instruments in his study: (a) a measure of experienced levels of emptiness and existential concern (Hazell, 1984), (b) the Study of Values (Allport, Vernon, & Lindzey, 1960), (c) the Definition Response Instrument (DRI) to measure level of emotional development (Gage, Morse, & Piechowski, 1981), and d) the OEQ (Lysy and Piechowski, 1983). Interrater reliability on the scores for the DRI and OEQ averaged .79 using Pearson Product Moment Correlations (PPMC).

Statistical analysis included PPMC for pairs of variables and stepwise multiple regression analyses were used as a confirmatory technique to determine which measures of level of development, OE, and values contributed most to the variance of experienced levels of emptiness and existential concern. Two analyses were run, one for existential concern and one for experienced levels of emptiness.

The mean OE scores range from a low of 5.1 for Sensual OE to a high of 13.8 for Emotional OE. There were no significant or meaningful correlations between any forms of OE and any other variables in the study. Regression analysis results indicated that OEs made no significant contribution to the variance of existential concern. However, the var-

iance in emptiness is explained, in part, by Sensual OE: Together, theoretical interest, emotional development, and Sensual OE accounted for 54% of the variance in experienced emptiness ($p < .05$). Emptiness was shown to be a direct function of theoretical interest and an inverse function of economic interest and Sensual OE.

Thus, Hazell's hypotheses of specific relationships between OEs and existential concern were not supported. Additionally, the hypothesized relationships between emptiness and OEs were only marginally supported with Sensual OE being the only OE to contribute to the regression equation.

The results of the multiple regression analyses must be viewed in light of their failure to meet the minimal requirement for the ratio of cases to independent variables. Tabachnick and Fidell (1989) suggest that when there are too few cases per independent variable, the solution is "perfect — and meaningless" (p. 128). Hazell had 24 subjects in his sample and used 12 independent variables in his multiple regression analyses. This ratio of two cases per independent variable falls notably short of the minimal requirement of five subjects per independent variable (Tabachnick & Fidell, 1989).

Beach

Beach (1981), in an investigation of self-identified lesbian and nonlesbian women, found that the lesbian women had significantly higher OE scores for all OEs except Emotional OE. Beach found several relationships between chronological age and OE scores. (It should be noted that there was a statistically significant difference in the mean age for the two groups in this study where the nonlesbian group was higher, 26.3 years compared to 47.4 years.) Statistically significant negative correlations were found between chronological age and Psychomotor, Sensual, and Imaginational OEs for the total sample. For the lesbian group, Imaginational and Intellectual OEs were negatively correlated with age. Positive correlations were found for the nonlesbian group between chronological age and Intellectual and Emotional OEs.

Beach also investigated the relationship between years of schooling and OE scores. For the total sample statistically significant negative correlations were found for Psychomotor OE. There were no statistically significant correlations for the lesbian group, and the nonlesbian group showed a significant negative correlation with Psychomotor OE and a positive correlation with Imaginational OE.

The results of Beach's study revealed that the lesbian subjects had higher OE scores for four OEs compared to the nonlesbian subjects. This may have influenced the correlation between OEs and age because the lesbian sample had a significantly lower mean age than the nonlesbians. Additionally, there were differences in the relationships between age and OEs for the two groups: For the lesbian group, as age increases scores on Imaginational and Intellectual OEs decrease. For the nonlesbian group, as age increases, Intellectual and Emotional OEs increase.

Silverman and Ellsworth

Silverman and Ellsworth (1981) explored the relationship between OE scores and giftedness for a group of 31 adults who were either members of MENSA or had other indications of intellectual giftedness. The OEQ was used and scored using the original method of either 0 or 1. The mean OE scores ranged from a low of 3.0 for several OEs for both groups to a high of 7.0 on Intellectual and Emotional OEs for the gifted group. These scores were derived from a diagram in the original document (p. 186) and not specifically detailed in the report. Silverman and Ellsworth reported that the gifted sample showed high levels of OEs. They also noted that the gifted sample mean OE scores were higher than would be expected in the general population and were substantially higher than the graduate student sample on Intellectual, Imaginational, and Emotional OEs and slightly higher on Sensual. All comparisons in this study were based on simple examination of mean OE scores for the two samples; no statistical analyses were performed.

Miller, Silverman, and Falk

Miller, Silverman, and Falk (1994) were interested in investigating the relationship between developmental potential and actual developmental level in terms of Dabrowski's theory. They investigated five research questions, only three of which will be addressed here because the others dealt specifically with developmental level and not OEs. First, are the OEs for the intellectually gifted group higher than the graduate student comparison group? Second, does one gender show higher OE scores than the other? Finally, does developmental potential, as measured by OEs, predict developmental level?

The subjects were 41 intellectually gifted adults (11M, 30F, age range of 19 -54) and

42 graduate students (12M, 30F, age range of 22 - 50). The graduate students were taken from Lysy and Piechowski's (1983) study. The intellectually gifted adult group was made up of MENSA members.

The OEQ was used and the interrater reliability averaged .66 for the intellectually gifted sample and .69 for the graduate student sample. Cronbach's alpha for scales on the OEQ for the gifted group ranged from .66 for Psychomotor to .86 for Emotional. Internal consistency was not reported for the graduate student sample.

The mean OE scores ranged from a low of 5.1 on Psychomotor for the graduate student group to a high of 13.7 on Emotional OE for the Intellectually gifted group. Using a Multivariate Analysis of Variance the authors found that there were significant effects for group and gender, but no significant interaction effect. Therefore, group differences were not affected by gender and gender differences were not affected by group.

Using a hierarchical regression analysis to determine the impact of the main effects on the dependent variables, the OEs were entered in the following order: Emotional, Intellectual, Imaginational, Sensual, and Psychomotor. After the first step, all previous variables entered were treated as covariates. The stepdown analysis showed that Emotional OE made a unique contribution to predicting differences between the gifted and graduate student groups, and so did Intellectual OE. Univariate comparisons showed significant differences between the two groups in favor of the Intellectually gifted group for Imaginational, Sensual, and Psychomotor. However, Miller et al. (1994) indicated that these differences were already accounted for by Emotional and Intellectual OEs in the stepdown analysis. Analysis of gender showed that Emotional OE made a unique contribution to the distinction between males and females, as did Intellectual OE. Females were higher in Emotional OE and males were higher in Intellectual OE.

Univariate t-tests indicated that there was no significant difference in level of emotional development between the gifted and graduate groups, but there was a significant difference between males and females, with females scoring higher. To determine which OEs had the most predictive value for the intellectually gifted group, a Regression Analysis was performed; the first group of OEs entered included Emotional, Intellectual, and Imaginational, and the second set entered was Sensual and Psychomotor. The variance accounted

for after the first set of variables was entered was only slightly lower than after the second set was added accounting for 26% and 27% of the variance, respectively. Imaginational and Emotional OEs had the most predictive value for the gifted sample. Lysy and Piechowski (1983) reported that Intellectual and Emotional OEs were the most significant for the graduate student sample, accounting for 48% of the variance. The main point brought out in this study was that there is an unfortunate discrepancy between the developmental potential of the gifted subjects, as indicated by OE scores, and their actual level of emotional development.

Jackson

While the previously described studies were quantitative, Jackson's (1995) research was qualitative in nature and used a phenomenological methodological approach. Jackson was interested in providing a systematic description of the depressive state in a group of depressed gifted adolescents and in deepening the understanding of the gifted adolescent's experience of depression. Jackson was also interested in determining whether the material collected from the co-researchers (subjects) would reflect Dabrowski's (1964) description of positive disintegration.

Jackson used purposeful sampling and selected adolescents "who demonstrated both heightened cognitive proficiency (intellectual giftedness) and emotional sensitivity" (p. 12). All co-researchers were self-referred as having experience with the depressive state and were free of coexisting psychological and physiological conditions. There were 10 co-researchers, four males and six females, between the ages of 17 and 19. They were all living in or near a large city in the Canadian province of British Columbia and the ethnic background of the group was varied.

The co-researchers were identified as gifted in one of two ways: Two were identified by peers, teachers, and parents as the "brightest" in their class and no formal testing was done. However, both won full scholarships to college by being in the top 2% of the populace in their grade in British Columbia. The remaining co-researchers were registered in an International Baccalaureate program which requires a minimum score of 125 on two of the three sections of the Canadian Cognitive Achievement Test (verbal, nonverbal, and quantitative).

The Myers-Briggs Type Indicator (MBTI), the OEQ, and the DSM IV depressive criteria assessment were the measures used. Each co-researcher participated in an initial 30 minute introductory interview, the MBTI and the DSM IV assessment were given and the OEQ was given to each co-researcher to take home and return at the next meeting. In-depth interviews were performed and each co-researcher responded to the following prompt: "Please describe for me, as completely as possible, your experience with the less than positive emotional state commonly known as depression"(p. 111).

Jackson does not provide interrater reliability information and reports only three of the five OE scores, Imaginational, Intellectual, and Emotional, which were most important to her study. However, the author of this study was able to calculate Psychomotor and Sensual OE mean scores from the original data.

The mean scores for Jackson's sample ranged from a low of 4.5 on Sensual OE to a high of 18.4 on Emotional OE. Those co-researchers with the most extreme depressive experiences had the highest OE profiles, with the exception of one identified as having "Masked Depression." Those co-researchers with minor depressive experiences showed higher Psychomotor and considerably lower Imaginational and Emotional OE scores. The results of the MBTI were, 70% intuitive-feeling types and 30% were intuitive-thinking types; no elaboration of MBTI scores in relation to OE scores was detailed by Jackson.

Jackson discussed, in detail, the information gathered from the interviews. She identified six central constituents of the depressed state as it was experienced by the gifted adolescent and described three phases of the depressive experience (precursors and beginnings, the depressive state itself, and the impact of the experience). These points will not be elaborated upon as it goes beyond the scope of this paper. The reader is referred to the original manuscript.

Piechowski, Silverman, and Falk

Piechowski, Silverman, and Falk (1985) compared OE profiles of three groups of adults; a) artists, b) intellectually gifted adults, and c) graduate students. Specific research questions were not clearly outlined, however, Piechowski et al. (1985) state that, "one of our objectives was to test the usefulness of the Overexcitability Questionnaire for the study of different forms of talent" (p. 540).

The subjects included 23 artists, 37 intellectually gifted, and 42 graduate students taken from a study by Lysy and Piechowski (1983). The intellectually gifted adults were identified by their membership in MENSA. The artists included writers, fine artists, dancers, poets, and others involved at an avocational level. The OEQ was the only measurement instrument used and the interrater reliability for the five dimensions ranged from .60 to .95.

The mean OE scores ranged from a low of 4.0 of Psychomotor OE for the graduate students to a high of 14.1 on Emotional OE for the artists. The two-way ANOVA results showed that there was a significant interaction effect for group by OE. Of the 15 Scheffe pairwise comparisons, 10 were significant. The results were that the artists had significantly higher scores than the graduate students on all five OEs. The artists were also significantly higher than the intellectually gifted on Emotional and Imaginational OEs. The intellectually gifted subjects had significantly higher Emotional, Intellectual, and Imaginational OE scores than the graduate students.

Piechowski et al. (1985) also noted that 14 of the 42 graduate students had an OE profile similar to that of the intellectually gifted group. The results suggest that the OEQ is useful in examining different forms of talent and individual differences.

Calic

Calic (1994) investigated OEs as indicators of creative potential in the visual and performing arts. She was interested in determining whether OEs can differentiate and discriminate between more and less creative people as well as people in the visual or performing arts. Her sample included university students majoring in either education, performing art, or visual art. Calic made two *a priori* assumptions about the subjects: 1) all three groups are above average intellectually based on enrollment criteria for college and graduate school; and 2) the visual and performing arts groups are more creative than the education students based on selection criteria for the different areas of study. Assumption two is somewhat problematic because Calic does not define what is meant by "creative".

The OEQ response protocols were scored by the researcher only. The scoring was "supervised and monitored by experts to assure the quality of scoring remained at the level reached during training" (p. 58).

Preliminary ANOVA results showed significant differences among education, visual art, and performing arts students for three OEs: Psychomotor, Sensual, and Imaginational. educators were significantly lower than both groups of artists on Psychomotor OE and significantly lower than visual artists on Sensual and Imaginational OEs. There were no significant difference found between the two groups of artists, and as a result, the two groups were collapsed into one group for further analysis. The ANOVA results for the two groups (educators and artists) showed significant differences on four forms of OE: Psychomotor, Sensual, Imaginational, and Emotional .

The MANOVA for the two groups showed a significant main effect for measures (i.e. each form of OE) and an interaction effect between measures and groups. These findings indicate that "there were significant differences between educators and artists with regard to the measures of heightened sensitivities.... [and] that the differences between groups varied across measures" (p. 78).

Calic found that all five forms of OE contribute to differentiating between educators and artists. For all forms of OE the artists' scores were higher than those of the educators. These results suggest that OE scores, as measured by the OEQ, can differentiate between more and less creative people, but not between different kinds of artists.

Ammirato

Ammirato (1987) investigated the test-retest reliability of the OEQ as well as the relationship between the original OEQ and two other versions he created. Ammirato created an alternative open-ended form of the OEQ and a self-rating questionnaire. His intent was to improve upon the already existing instrument. The hypotheses proposed that there would be no difference between any forms of the OEQ and that there would be no differences in performance based on age, gender, and level of education. The sample consisted of 60 adults, 30 between the ages of 18 and 25 and 30 above age 30.

The inter-rater reliability was calculated for both forms of the OEQ used in this study. Ammirato correlated the independent ratings to the consensus rating and the results were as follows: Correlations for the original OEQ for rater 1 ranged from a low of .77 for Emotional OE to a high of .95 for Sensual OE (mean = .87) and those for rater 2 ranged from a low of .30 for Intellectual OE to a high of .90 for Sensual OE (mean = .70). Correlations

for the revised OEQ for rater 2 ranged from a low of .89 for Intellectual to a high of .93 for Sensual and Emotional OEs (mean = .91) and those for rater 2 ranged from a low of .87 for Emotional OE to a high of .94 for Psychomotor OE (mean = .90).

The results of a correlational analysis indicated that the original and revised OEQs were moderately correlated across all five areas of OE. A MANOVA indicated that there was a statistically significant difference among the forms of the OEQ in this study. To determine where the difference existed, examination of the means was done; no post hoc analysis was performed. Ammirato proposed that the actual difference was between the self-rating questionnaire and the two open-ended forms.

Two problems exist with this analysis. The first is that Ammirato averaged the five OE scores to get a single OE total score which is not sound either theoretically or practically; the five OE forms are independent. Additionally, to compare mean scores for two instruments, each of which has 21 items, with an instrument having 92 items, does not make sense. It would have been more appropriate to standardize the scores and then compare them, since the means were greatly affected by the number of items. However, correlational analysis does not support an equivalence relationship between the self-rating form and the others; the correlation coefficients are .40 and .35 for the original and revised OEQ, respectively.

Examination of relationships between OE scores and age, gender, and level of education were done using correlations and a MANOVA. Correlational analysis indicated that the three instruments similarly related OEs to age, gender, and education. For all three instruments, the following relationships existed: weak negative correlations between age and both Psychomotor and Imaginational OEs; weak positive correlations between education and Intellectual OE; and weak to moderate correlations between gender and Emotional OE.

The MANOVA results indicated that there were no significant interactions among the independent variables and that gender was the only one significant main effect. Examination of mean scores showed that females were higher on Emotional OE for all forms of the OEQ supporting the correlation results. Ammirato (1987) also comments that males are higher than females on Intellectual OE. These differences are not nearly the same magni-

tude as for Emotional OE, and the correlational analysis did not indicate such a relationship.

Therefore, the results indicate that the revised OEQ is moderately related to the original form, and Ammirato (1987) proposes that there is no significant difference between them. However, such correlations do not appear to be strong enough to say there is reasonable test-retest equivalence. The results also show that the only significant relationship for the various OEQ forms and gender, age, and level of education is for gender. Females score higher on Emotional OE.

Research with Gifted and Non-Identified Child and Adolescent Samples

Ackerman

Ackerman (1993) examined the possibility of using OEs as a method of identifying gifted adolescents. She was interested in which OEs best distinguish between gifted and non-identified adolescents in order to determine a gifted-profile to be used as an identification procedure. There were three research questions investigated. The first addressed whether OE profiles could be used to discriminate between gifted and non-gifted students, and whether there are any gender effects. The second question investigated whether any unidentified students had an OE profile similar to that of the gifted students, and whether there were any gender effects. The last research question focused on the possibility of linguistic and cultural biases of the OEQ. Specifically: (a) is there a relationship between speaking more than one language fluently and OEQ responses? (b) is there a relationship between word count (i.e. the total number of words in response to the OEQ) and OE scores, and (c) is there a relationship between cultural influence and OE scores?

The subjects were 79 tenth and eleventh grade students from two senior high schools in the Roman Catholic Separate School System in Calgary, Alberta. Forty-two students were identified for the gifted program using a multi-criteria approach based on Renzulli's (1977) model that assessed academic achievement and intellectual ability, creativity, and task commitment. A minimum standardized IQ score of 120 was required for placement. Thirty-seven students were not identified for the gifted program. The subjects ranged from 14 - 18 years of age. There were 10 males and 32 females in the gifted group and 20 males and 17 females in the general sample. The ethnic backgrounds of the subjects were extremely diverse.

To determine which OEs had the greatest discriminating power between gifted and non-gifted students three stepwise Discriminant Function Analyses (DFA) were performed for the total, male, and female samples. The dependent variable was classification as gifted or non-identified and the independent variables were the five OE scores. Classificatory analyses followed each DFA to ascertain the number of students in the non-identified group with similar OE profiles to those in the gifted group. Additionally, Spearman's Rho ranked order correlations were performed between OEs and lingualism (the number of languages spoken fluently), cultural influence (number of generations the family has been in Canada), and word count (total number of words in the response protocol).

The mean OE scores range from a low of 2.1 on Sensual OE for the non-identified group to a high of 11.9 on Emotional OE for the gifted group. Some trends among mean OE scores for the gifted and non-identified groups are as follows: The means for Emotional OE scores are the highest of the five OEs and Sensual OE scores are extremely low. Gifted and non-identified females had higher Emotional OE scores than the males, and the scores for the gifted subjects are higher than for the non-identified subjects, except in one instance (gifted males had lower Emotional OE scores than non-identified males).

For the total sample, the DFA indicates that Psychomotor, Emotional, and Intellectual OEs discriminate between the two groups in order of their contribution to the discriminant function. In the analysis of females only, the OEs identified as discriminating between the gifted and non-identified groups were Psychomotor, Emotional, and Intellectual in order of their contribution to the discriminant function. In the male analysis, four OEs were identified; Psychomotor, Intellectual, Emotional, and Imaginational, in order of their discriminating contribution. The most important finding is that all three DFA indicated that Psychomotor OE discriminates best between the gifted and non-identified subjects. For all three analyses, the gifted samples' scores were higher than those for the non-identified groups.

The subsequent classificatory analyses determined group membership based on the discriminant function coefficients applied to the subjects' OE scores. The analysis for the total sample resulted in 13 of the 37 (35.1%) non-gifted subjects being classified as gifted and 10 of the 42 (23.8%) gifted subjects being classified as non-gifted. The results of the classification analyses for subjects separated by gender were similar to those for the total

sample with the biggest difference being that for males 25.0% of the non-identified boys were classified as gifted. Of significance to the researcher was that 35% of the non-identified subjects had similar OE profiles to the gifted, yet were not identified as gifted through traditional means.

Spearman's Rho ranked order correlations were performed between the five OEs and lingualism, cultural influence, and word count, for the total sample, the gifted and non-identified subsamples. In the total sample, the following correlations were significant: lingualism and Emotional OE; culture and Emotional OE. Word count, when correlated with the OEs was significant for all five OEs.

For the non-identified group, only four OEs significantly correlated with word count: Psychomotor, Imaginational, Intellectual, and Emotional. For the the gifted subjects three correlations were statistically significant for lingualism and cultural influence: lingualism and Intellectual OE; lingualism and Emotional OE; and culture and Emotional OE. The correlations between word count and the OEs for the gifted subjects resulted in three that were statistically significant: Imaginational, Intellectual, and Emotional.

These findings suggest that the OEQ can differentiate between students identified as gifted and those not identified. Additionally, it is possible that the OEQ may be able to serve as a method of identifying students as gifted who would not normally be identified by traditional methods. The results also provide support for a relationship between OE scores and cultural influence, lingualism, and word count. These relationships were different for the gifted and non-identified samples, again differentiating between the two groups.

Piirto, Cassone, Ackerman, and Fraas

Piirto, Cassone, Ackerman, and Fraas (1996) were interested in examining the differences in OEQ scores for academically and artistically talented students and non-gifted students. Their sample included both the gifted and non-identified subjects from Ackerman (1993) and added a group of artistically talented students (N = 28) identified using the Ohio Rule for School Foundation Units. Many scored in the 97th percentile on a group intelligence test or the 95th percentile on a specific achievement test, necessary for classification as academically talented. They were also identified as artistically talented using portfolios or auditions. These students were participating in a summer Governor's Institute in Ohio

which offered courses in theater, visual arts, creative writing, humanities, social sciences, and science.

There were no research questions or hypotheses specified for this study. Measures used were the OEQ, the High School Personality Questionnaire (HSPQ), and the Myers-Briggs Type Indicator (MBTI). Interrater reliability was not reported for the OEQ.

The mean OE scores ranged from a low of 2.1 on Sensual OE for the comparison group to a high of 12.8 on Emotional OE for the artistically talented group. Results of a MANOVA showed no significant interaction between gender and group, but the main effect for gender was significant, as was the main group effect. Of the univariate F tests on gender differences for OE scores, only Emotional OE was significantly different for males and females. Females had higher Emotional OE scores than males.

The results of univariate F tests and Tukey-Kramer tests on mean OE score differences for the three groups are as follows: Psychomotor OE showed significant differences among the three groups. The academically talented group had a significantly higher mean Psychomotor OE score than both the artistically talented and the comparison groups, and there was no significant difference between the artistically talented and comparison groups.

The results for Sensual OE show significant differences among the three groups. The artistically talented group had significantly higher scores than the other two groups, and there was no significant difference between the academically talented and comparison groups.

The three groups were significantly different on Imaginational OE. Both the academically talented and artistically talented groups had significantly higher mean OE scores than the comparison group, and the artistically talented group was significantly higher than the academically talented group.

Intellectual OE scores showed significant differences among the three groups. The difference between the artistically talented and academically talented groups was not statistically significant, but they were both higher than the comparison group.

There were also significant differences among the three groups on Emotional OE scores. The only significant difference was that the artistically talented group was higher than the comparison group.

This suggests that the artistically talented group has a consistently elevated OE profile compared to the comparison group. In addition, the artistically talented group is either equal to, or greater than the academically talented group across all areas of OE. The single exception to the trend is that the academically talented group had a significantly higher mean Psychomotor OE score than the artistically talented group.

Domroese

In a similar study by Domroese (1993), three groups of fifth grade students were compared: gifted, near-gifted, and non-gifted. All subjects were chosen at random from the same school district in a suburb of a large Midwestern city. Subjects were placed into one of the three groups based on their performance on the following tests: The Ravens Progressive Matrices, The Cognitive Abilities Test, and the Iowa Test of Basic Skills. The non-gifted students (N=30), were those whose scores fell at or below 79th percentile. The near-gifted group (N=27) was composed of students whose scores fell between the 80th and 89th percentile. The gifted group (N=25) was made up of students whose scores fell between the 90th and 100th percentile. These cutoffs for the identification of gifted students is consistent with a more liberal approach and is also seen in the Breard (1994) study.

The two main research hypotheses were that the OEQ will identify the same gifted fifth grade population (top 10%) determined by procedures used during the 1991-1992 school year, and that the OEQ will identify a broader range of additional individuals than did the identification procedures utilized in the 1991-1992 school year.

The OEQ was administered in four sections of 6-5-5-5 questions. Subjective observation indicated that those students in the gifted group, the top 10%, wrote longer responses than those in other groups. While a linguistic analysis was not performed, results from the Ackerman (1993) study suggest that there is a relationship between length of response and OE score such that longer responses receive higher scores.

Correlational analysis was used to determine whether there were significant relationships between the OEs for the total sample as well as the three groups. Correlations were also used to examine the relationships between OE scores and scores on the other assessment measures. ANOVAs were used to investigate mean differences among the three groups on the five OEs and the other measures. Of the 82 subjects, 20 had only one set of

ratings. The analyses were carried out with all subjects included in spite of this.

The mean OE scores ranged from a low of 1.4 on Sensual OE for the near-gifted group to a high of 7.5 on Intellectual OE for the gifted group. For the total sample, Imaginational and Intellectual OEs were significantly correlated, Imaginational and Emotional OEs, and Intellectual with Emotional OEs. No level of significance for these correlations was reported by Domroese (1993). For the non-gifted group, Imaginational and Emotional OE were significantly correlated as were Sensual and Imaginational OEs. There was only one significant correlation for the near-gifted group, Imaginational with Intellectual OE . For the gifted group, there were three significant correlations among OE scores: Psychomotor with Emotional, Sensual with Emotional, and Intellectual with Emotional. The following were significant correlations between OEs and the other measures: Psychomotor with the total assessment battery, Sensual with cognitive-verbal, Imaginational with aptitude.

ANOVA results showed no significant differences among the three groups for OE scores. However, significant differences were found among the groups on the achievement and aptitude measures: Aptitude test, California Achievement Test - reading, math, and total battery, Ravens Progressive Matrices, CoGat - verbal, quantitative, and nonverbal, ITBS - reading comprehension, math applications, and math problem solving. The Ravens and the aptitude test discriminated only between the non-gifted group and the other two, but not between the near-gifted and gifted groups. One possible reason for the lack of differentiation between the near-gifted and gifted groups, according to Domroese (1993), is that the ceiling on the tests was not sufficiently high to allow this distinction.

Breard

The emphasis in Breard's (1994) study was on the identification of gifted African American students in the fourth and fifth grades. She posed three research questions. The first focused on whether OEs, as measured by the OEQ can predict group membership for gifted, near-gifted, and non-gifted students. The second question asked whether the OEQ would identify more African American students as gifted than the traditional identification methods. The third research question investigated how OE profiles discriminate between/among several groups of subjects based on ethnicity, classification, gender, SES,

and others.

The sample consisted of 117 fourth and fifth graders in four school districts in South Carolina. The following are the demographic characteristics of the total sample: the age range was 9 - 12 years; the ethnicity breakdown was 72 African Americans and 45 Caucasians; there were 69 female and 48 male students. Additionally, there were 53 students who came from advantaged environments and 64 who came from disadvantaged environments; this status was determined by the subject's socioeconomic status. There were three groups in Breard's study, gifted, near-gifted, and non-gifted. Identification as gifted was based on a weighted profile of 100 points, where 90% of the profile is based on standardized achievement and aptitude tests and 10% is based on other factors at the discretion of the district. The cutoffs for this study were: gifted - 89.5 - 100 points, near-gifted - 80 - 89.5 points. As in the Domroese (1993) study, there were minor wording changes made to the OEQ and the administration was done in four sections of four or five questions.

The mean OE scores ranged from a low of 2.3 on Sensual OE for the near-gifted group to a high of 10.96 on Emotional OE for the same group. Some noteworthy findings include the elevated OE scores for the gifted group on all five forms compared to the the near- and non-gifted groups. Emotional OE was the highest score for all groups and Sensual OE scores were the lowest. Other findings were that females scored higher on all OEs except Psychomotor. African Americans scored higher on Sensual, Imaginational, and Intellectual, while Caucasians scored higher on Psychomotor and Emotional. Disadvantaged students, on average, had higher Intellectual and Emotional OEs and the advantaged students had higher Psychomotor and Imaginational scores. It should be noted that 61 of the 64 students from disadvantaged environments were African-American.

Correlations between the five OEs were performed for the total sample, and four were significant: Sensual and Imaginational; Imaginational and Intellectual; Imaginational and Emotional; Intellectual and Emotional. Other significant correlations between variables indicated that gifted students were more likely to have higher Emotional OE scores and come from an advantaged background. Other correlations indicated that African American students had higher scores on Imaginational and Intellectual OEs compared to Caucasian students, and that they were also more likely to be disadvantaged. There were also several

significant correlations between forms of OE and word count for the various subsamples. Imaginational, Intellectual, and Emotional OEs correlated with the total, gifted, African-American, Caucasian, male and female samples with an average correlation of $r = .45$ and a range of .35 - .55. Additional significant weak to moderate correlations for word count were: male – Sensual; Near-gifted – Intellectual; Non-gifted – Emotional. There were no significant correlations between word count and Psychomotor OE.

To investigate the discriminating power of the OEs, both stepwise and direct Discriminant Function Analyses were performed using the five OEs as independent variables and classification as the dependent variable. Both analyses showed that Intellectual and Emotional OEs best discriminated among the three groups. The two discriminant functions created included only those OEs; the only difference is that they were reversed. Based on the classificatory analysis, approximately 41% of the subjects were classified correctly based on their OE scores.

Using the five OEs and sex, age, SES, grade, and ethnicity as independent variables, both discriminant functions contained Emotional and Intellectual OEs, SES, and sex. The classification results show that 56% of the subjects were classified into their original group. The main difference for this analysis was the increase in the number of near-gifted subjects classified correctly from four to 15 out of 30.

To investigate whether the OEQ would identify more African American students as gifted than the traditional methods, Discriminant Analysis again was used. Using stepwise methodology 40.9% of the subjects were correctly classified using only the five OEs as predictor variables. Using the five OEs and all other variables to predict group membership, 55.4% of the subjects were correctly classified. Examination of the classification results showed that many more African American students are predicted to be in the gifted group who were not previously identified as gifted, which was not the case for the Caucasian students. It is also noteworthy that all of the additional Caucasian students gained in the analyses were female.

How OE profiles are different for different subsets of the total sample was examined through the use of graphs. Caucasians were higher on Psychomotor and Emotional OEs while African Americans were higher on Sensual, Imaginational, and Intellectual. Gifted

students were higher on all five OEs compared with the other two groups. Non-gifted students had higher means on Sensual and Imaginational OEs compared to the near-gifted students. Surprisingly, disadvantaged students outperformed advantaged students on all OEs except Psychomotor. Gender differences for the total sample showed that females have higher OE scores than males on all but Psychomotor OE. The gender differences for African American students only were that males had higher Psychomotor and Emotional OEs and females had slightly higher Sensual and Intellectual OEs. Mean OE score differences for the gifted group based on method of identification (traditional vs. OE) were those identified as gifted based on their OE scores showed higher scores on Sensual, Imaginational, Intellectual, and Emotional OEs. Psychomotor scores for the two groups were almost equal.

In line with the proposed research questions, the results of Breard's (1994) study indicate that the OEs, as measured by the OEQ, can predict group membership for gifted, near-gifted, and non-gifted students to a level above chance. In addition, the results show that this instrument does identify more African-American students as gifted than the traditional methodology. Finally, it is clear that OE profiles can discriminate between a variety of groups of subjects separated by characteristics such as classification, gender, ethnicity, and others.

Piechowski and Miller

Piechowski and Miller (1995) compared OE scores on both written and oral forms of the OEQ in a group of gifted adolescents. They formulated three hypotheses: The first predicted that subjects will have higher OE scores on the interview form than on the written form. The second investigated age differences in OE scores, and the third looked at gender differences in OE scores.

The sample consisted of 46 students (25 boys and 21 girls) in the University for Youth summer program at the University of Denver. The sample was divided into two groups by age: ages 9-11 and ages 12-14. The acceptance requirement for the university program was achievement scores two grade-levels above the child's actual placement in school.

The OEQ was administered in both oral and written forms to all subjects. The subjects were randomly assigned which form would be done first. Group A answered the questionnaire first and was interviewed two weeks later. Group B was interviewed first and responded in written form afterward. After both forms had been completed, the subjects were asked which form they preferred and whether they required help writing their answers to the questionnaire. On the oral form "the interviewer [was] free to probe for elaboration if the child [did] not understand the question, or if the answer [was] too brief, or when the child [needed] encouragement to continue" (p. 178). The mean interrater reliability before consensus was .72.

The mean OE scores ranged from a low of 2.0 on Sensual OE for Group A to a high of 13.8 on Emotional OE for the same group. T-tests were used to investigate significant differences between the two forms. When using the results of the first form taken to avoid practice effects, only one significant difference was found; the Emotional OE score for Group A was higher, that is, those who took the written form first had higher scores. When comparing the subjects on the second form taken, Psychomotor scores were higher for the interview group. Correlations between scores on the two test forms were small to moderate. Therefore, Piechowski and Miller (1995) remark that the two forms should not be considered interchangeable.

The two groups were combined for age and gender analyses. Multivariate Analysis of Variance was used to examine each form of the questionnaire and the results were the same for both forms. There were three significant differences in OE scores based on age; the older group showed higher Imaginational, Intellectual, and Emotional OE scores compared to the younger group. There were no gender differences found for OE scores, nor were there gender/age interaction effects for either format. Almost all of the younger group and two-thirds of the older group preferred the interview format and more than 70% of the younger group needed help writing their answers to the questionnaire. Piechowski and Miller recommend that while the written form can be used with subjects at least 12 years-old, the interview format is preferred for younger students because younger individuals have a great deal of difficulty responding in written form.

Buerschen

Buerschen (1995) also conducted a study to investigate whether OEs might be a better

method of identifying giftedness than traditional measures. Her hypotheses focused on whether OE scores would be different for a group of identified gifted students (N = 23) and a group of students not identified as gifted (N = 23). Along with quantitative analysis of the OEQ scores, Buerschen provided two case studies with rich interview material.

As in the Breard (1994) and Domroese (1994) studies, the OEQ required minor modifications. Additionally, two experimental questions were added in an attempt to elicit further OE responses. An ANOVA showed that the gifted group had significantly higher scores on Intellectual and Psychomotor OEs. It should be noted that there was one subject with an elevated OE profile and when her scores were removed, the results of the ANOVA indicated that the only significant difference was in Intellectual OE scores.

Piechowski and Colangelo

Piechowski and Colangelo (1984) investigated giftedness by examining five forms of mental functioning, that is the five OEs. Additionally, they examined OEs for different age subjects.

Their sample was made up of three groups of subjects taken from three different studies: gifted adolescents (Piechowski, Colangelo, & Kelly, 1982), intellectually gifted adults (Silverman and Ellsworth, 1981), and graduate students (Lysy and Piechowski, 1983).

The OEQ was used and interrater reliability ranged from .60 to .95. Analysis of group means showed that the gifted adults were significantly higher than the gifted adolescents on Sensual and Intellectual OEs and significantly higher than the graduate students on Intellectual and Emotional OEs. Gifted adolescents are significantly higher than graduate students on Imaginational, Intellectual, and Emotional OEs, and significantly lower on Sensual OE. Psychomotor OE was not significantly different for the three groups.

Since the gifted adolescent and graduate students samples both showed bimodally distributed Intellectual OE scores with a split between four and five, further analyses were run for subjects separated into Intellectual OE ≤ 4 and Intellectual OE ≥ 5. When the adolescents and graduate students scoring ≥ 5 on Intellectual OE were compared with the adult gifted sample, the only OE showing a difference was Sensual with the gifted adolescents being significantly lower than both adult groups. There were no differences for the two adult groups. The graduate students and the gifted adolescents were then compared to

those subjects with Intellectual OE scores ≤ 4. There were significant differences between these two groups for all OEs except Psychomotor. Also, OE score distributions for the high and low scoring adolescents and graduate students on Intellectual OE were compared and, as expected, there were significant differences for Intellectual OE for both groups. However, the two groups of graduate students were also significantly different on Emotional OE.

Since Imaginational, Intellectual, and Emotional seem to cluster together frequently, a correlational analysis was done for all three samples to determine whether they were independent. Of the nine analyses run, there were five below .20, two between .30 and .50, and two above .50. According to Piechowski and Colangelo (1984), the results suggest that the three OEs are independent.

Overall, the results of this study suggest that there are three dimensions of mental life that are characteristic of giftedness for individuals of various ages: Imaginational, Intellectual, and Emotional OEs. Piechowski and Colangelo (1984) propose that these three OEs are essential to the creative productivity of gifted people.

Schiever

Schiever (1985) examined OE profiles of the gifted as well as the relationship between OE profiles and creative personality characteristics. She proposed two research questions: One examined whether there are differences in levels of OE within the gifted population and the second looked at the relationship between OE profiles and creative personality characteristics.

The subjects were 21 seventh and eighth grade students (13M, 8F, mean age = 12.8) who were enrolled in a resource program for gifted students in the southwestern United States. While the subjects' IQ scores ranged from 127-142, with a mean of 132.9, this information was simply presented and not indicated as the criteria for inclusion in the gifted program or the study.

The instruments used were the Something About Myself part of the Khatena Torrance Creative Perception Inventory (SAM) and the OEQ. Some of the items of the OEQ were modified to make understanding easier for the subjects of this age group. Schiever reported the most common interrater reliability coefficient for the five OE scales which was

.75.

The mean OE scores ranged from a low of 1.9 on Sensual OE for the low creative group to a high of 13.0 on Intellectual OE for the high creative group. Using a series of five t-tests, the high creative group was found to have significantly higher scores for three OEs; Imaginational, Intellectual, and Emotional.

The main finding was that Imaginational, Intellectual, and Emotional OEs were significantly higher in the high creative group as compared to the low creative group of Schiever's gifted sample. Also worth noting is the OE profile of the low creative group since all of Schiever's subjects were gifted; the top three overexcitabilities were Intellectual, Imaginational, and *Psychomotor*, which is different than the three reported as significant in most other studies. The only other reported exception to the Emotional, Intellectual, Imaginational OE rule is found in Gallagher's (1985) study. In a group of gifted and non-gifted sixth graders, the profile for the non-gifted group was the same as the one for Schiever's (1985) less creative group, Intellectual, Imaginational, and Psychomotor. There is also evidence of Psychomotor OE being one of the highest three mean scores for other total and partial samples in other studies (Ackerman, 1993; Breard, 1994; Calic, 1994; Ely, 1995; Piirto et al., 1996). The major conclusion of Schiever's (1985) study was that Imaginational, Intellectual, and Emotional OEs appeared to be related to the creative personality.

Ely

Ely (1995) investigated OEs using the OEQ to identify what she termed creatively gifted junior high school students. She investigated two research questions. The first looked at whether the OEQ offers a meaningful relationship between Emotional OE and giftedness, and thereby would offer a new dimension in discriminating the creatively gifted population. The second looked at the relationship between the OEQ and a measure of creativity: specifically, will there be a positive correlation between Emotional OE, as measured by the OEQ, and the standardized "What Makes Me Run" emotional (affective) measure of giftedness?

The sample consisted of 76 subjects, 42 identified as creatively gifted and 34 identified as intellectually gifted. Creatively gifted students were identified as such by scoring one standard deviation above the norm on a Torrance test of creativity. The intellectually

gifted students were in the school's intellectually gifted program which used IQ tests as their major identification procedure. It should be noted, however, that 21 of the 34 intellectually gifted students also met the criteria for creative giftedness. Additionally, using a cutoff of one standard deviation above the norm for creative giftedness is extremely liberal (the usual cutoff for standardized measures used in identification is two standard deviations above the norm).

The two instruments used in this study were the OEQ and the What Makes Me Run (WMMR) questionnaire. The WMMR questionnaire is the high school form of the Creative Motivation Scale (Torrance, 1958). Ely (1995) indicates that it was designed to assess internal motivation in an effort to predict creative achievement.

Statistical analysis included a series of five t-tests to look at group differences in OE scores for the creatively and intellectually gifted groups, and a stepwise Discriminant Function Analysis (DFA) is used to determine which OEs differentiate between the two groups. This was followed by a Classification Analysis. Additionally, a second sample, randomly selected from a different school district, was used for cross-validation purposes. This second sample was used to "determine the classification efficiency of the discriminant function equation derived from the groups used in this study" (Ely, 1995, p. 66). A point-biserial correlation for Emotional OE and the WMMR score was calculated for the cross-validation sample.

The mean OE scores ranged from a low of 2.7 on Sensual OE for the intellectual gifted group to a high of 12.8 on Emotional OE for the creatively gifted group. Despite the range, the t-tests indicated that there were no significant differences between the OE scores for the two groups. The only gender difference noted was that the female subjects were significantly higher on Intellectual OE. No other gender differences were reported. This is an interesting finding because the research usually indicates that females are higher on Emotional OE (Ackerman, 1993; Breard, 1994; Piechowski & Miller, 1995).

The DFA results showed that Intellectual and Emotional OEs discriminated best between the two groups and were also the best at predicting group membership for this sample. Based on the discriminant function equation, 71.4% of the creatively gifted students and 61.8% of the intellectually gifted students were correctly classified. As in Ackerman

(1993) and Breard (1994), "correctly classified" means that based on their OE scores, students were classified into the same group for which they had already been identified, e.g. a creatively gifted student was classified as a creatively gifted student and not as an intellectually gifted student.

Ely (1995) performed a cross-validation study to check the effectiveness of the original discriminant function equation, and make to the results more generalizable. The sample consisted of 22 seventh graders from another school district. The same procedure was used for this sample: 16 were creatively gifted and six were intellectually gifted. Using the discriminant function equation from the classificatory analysis of the original sample, 62.5% of the creatively gifted and 50.0% of the intellectually gifted students were correctly classified in the cross-validation sample. This cross-validation procedure is questionable with such a small sample, especially when the purpose was to increase the generalizability of the findings (Tabachnick & Fidell, 1989). It was also particularly unsuccessful in that correct classification prediction for the intellectually gifted group was equal to chance (Tabachnick & Fidell, 1989).

A point-biserial correlation coefficient was used to measure the relationship between the Emotional OE scores and the WMMR scores because the OE scores are interval and group membership was an artificial dichotomy. The results indicated a significant, yet small correlation between the two measures.

The results of this study do not appear to support the initial direction of the research questions and may be due to the methods which were not sufficiently rigorous to produce reliable results. The intellectually gifted group and the creatively gifted group did not show significantly different mean OE scores. The method of identifying the creatively gifted subjects brings into question all results focused on the characteristics of this group.

Gallagher

In Gallagher's (1986) study, she compared the concept of OEs with measures of creativity and school achievement for groups of gifted and non-identified sixth-grade students. She compared scores from the Torrance Tests of Creative Thinking (TTCT) Verbal form A and Figural form A, the California Achievement Test (CAT) in all three content areas, and the OEQ in its *oral* form. There were some procedural differences in administering the oral form of the OEQ. It was given in a random order determined by the examiner; a copy of the instrument was given to the subjects the day before the interview so they could become familiar with the questions; and, follow-up questions were used in the interview process when responses were unclear or indicated a lack of understanding of the question. The interviews were audio taped and then transcribed.

This study is methodologically different than most others because the Mann-Whitney nonparametric two-sample rank test was used to compare groups of students instead of parametric analyses. The high creative group had significantly higher Imaginational OE scores compared to the low creative group. A comparison of the high versus low scorers on the Figural subtest revealed a significant difference in Psychomotor OE scores ($p = .05$) in favor of the high group. Comparisons of subjects with high and low CAT subtest scores are as follows: (a) Reading subtest – high scorers were significantly higher in Intellectual OE scores than low scorers, (b) Grammar subtest – high scorers were significantly higher in Intellectual OE scores than low scorers, and (c) Math subtest – high scorers were significantly higher in Intellectual and Imaginational OEs. Other comparisons revealed that gifted subjects were significantly higher on Intellectual, Imaginational, and Emotional OEs than non-gifted subjects. While there were no significant differences in OE scores between gifted males and females, the girls in the random sample had significantly higher Emotional OE scores than the boys.

Summary

Subject Characteristics

The body of research using the OEQ can be summarized in several ways. Overall, the research samples consist of gifted adults, gifted school-age subjects, non-gifted individuals of various ages, and creative individuals. There is only one study (Beach, 1981) that examined groups that do not fall into these categories. Her subjects consisted of a two groups of adult women, one lesbian and one nonlesbian.

There is a great deal of diversity among the samples with respect to age. There are several samples for each of the following age-groups: young adolescents, older adolescents, college age students, and middle age adults. The lower bound on subject age is

determined by the response format of the OEQ. There have been no studies performed using older adult subjects. It is also notable that the majority of studies done recently used gifted and non-gifted school-age subjects. Additionally, there is little ethnic diversity for the majority of samples, and those that are ethnically diverse are exclusively school-age subjects. Findings by age group suggest that older subjects generally score higher on OEs.

Hypotheses and Research Questions

The hypotheses and research questions found in the literature can be grouped into six areas: four address a variety of group comparisons, and two are related to testing. Several studies fall into more than one category. Research investigating differences between gifted and non-identified groups is the most prevalent with nine studies asking such research questions. Investigating differences between creative individuals and other groups forms the second area of research. Four studies fall into this category. The third area of investigation, comparisons based on demographic characteristics, can be divided into three subcategories: age, gender, and ethnicity. There are several studies that address either age or gender differences or both, seven and five respectively. However, only two investigate differences based on ethnicity. Also, of the several studies that look at age differences, few examine a broad range of age. The fourth area is comprised of various areas of comparison and description that do not fall into the other three categories. There are three studies in this category: Jackson (1995) focuses on the relationship of OE profiles and the depressive experience of gifted adolescents; Breard (1994) addresses differences based on socioeconomic status; and Beach (1981) compares lesbian and nonlesbian adult women.

The remaining two categories of investigation relate to measurement issues. The fifth area of inquiry deals with comparing the OEQ with measures of other constructs. The group of studies falls into two areas of research: studies comparing the OEQ with a Dabrowskian measure of developmental level, and studies comparing the OEQ to various other constructs. Three studies examined the relationship between the OEQ and the Definition-Response-Instrument (Gage, Morse, & Piechowski, 1981), a measure of level of development. A total of five studies investigated the relationship between the OEQ and other measures assessing creativity, achievement, or personality.

The last area of inquiry focuses on questions related to aspects of the OEQ itself. Five

studies fall into this category; and they address such issues as oral versus written presentation format of the OEQ, alternative question wording, additional items, and bias related to the word count of responses. The results of these studies indicate that there are significant differences in OE scores when items are worded differently or when the instrument is presented in oral format. Additionally, there appears to be a significant relationship between the length of response and OE scores such that the longer the response, the higher the score.

In addition to the need for more research on ethnicity as it relates to the OEQ and other demographic characteristics such as SES, research comparing the OEQ to other instruments is needed to provide information about how the OEQ fits within the existing framework of assessment. The distinct lack of research addressing test characteristics of the OEQ is also notable. Addressing issues of reliability and validity is nearly absent from the research.

Methodology

The research methodology employed in studies using the OEQ is varied. Sample size, test administration, statistical analysis, and reliability issues are different among the studies. The majority of sample sizes are less than 50 subjects, three of which have fewer than 25 subjects. To date, only four studies have had samples larger than 100.

The administration of the OEQ is fairly consistent across studies. Subjects are given as much time as they need to respond to the items, which is essential for this type of instrument. In almost all studies, the OEQ was given in its complete form at one time. In two studies (Breard, 1994; Domroese, 1993), however, the test was divided into four sections. Both of these studies used younger subjects who generally have a shorter attention span. Also, in all but two studies the OEQ is given in written form, Gallagher (1986) used only an oral administration and Piechowski & Miller (1995) administered the OEQ in written and oral form.

The analyses performed in the research fall into three categories: descriptive, univariate, and multivariate. The majority of the studies use descriptive and univariate analyses examining, means, standard deviations, correlation coefficients, and the results of t-test and Analyses of Variance. Very few use multivariate statistical procedures such as Multivariate Analysis of Variance, Discriminant Function Analysis, Regression Analysis, or Path Anal-

ysis. In most instances this is acceptable because sample sizes are so small that complex analyses are inappropriate.

Except for two studies (Ely, 1995; Hazell, 1984), the analyses used may be considered appropriate. Ely (1995) performed a cross-validation study applying a Discriminant Function equation to a second sample for the purposes of providing evidence for the generalizability of her initial results. However, Ely's cross-validation sample was too small to provide legitimate support to generalize, regardless of the results. Hazell (1984) performed a Regression Analysis using 12 independent variables for his sample of 24 subjects. Tabachnick and Fidell (1989) indicate that the minimal ratio requirement of subjects to independent variables is five subjects per independent variable; Hazell falls considerably short of this. Unfortunately, the combination of small sample sizes and a lack of multivariate analysis techniques has not allowed for the investigation of interactions among several variables.

Another area that is lacking in the analyses is information on the reliability of the instrument and the rating procedure used. Most studies do not report the internal consistency of the OEQ for use with their sample. In some cases, researchers report the internal consistency found in other studies. Since most of the samples are relatively small, the internal consistency measures would likely not be very high, therefore, larger samples would be helpful in addressing this issue. Additionally, many studies do not report the inter-rater reliability for their sample. If the results are to be trusted, this psychometric information must be obtained and reported. Finally, only one study has attempted to investigate test-retest reliability (Ammirato, 1987) and and the results were not favorable.

Results

The results of this body of research can be examined from several perspectives looking at both total samples as well as the subsamples they investigated. One such perspective is a simple description of the mean OE scores (see Appendix A for mean scores). The range for OE scores across all studies is as follows: Psychomotor OE ranges from a low of 3.0 for Manzanero's (1985) Venezuelan artists to a high of 14.4 for Ammirato's (1987) subjects. Sensual OE ranges from a low of 1.2 for Buerschen's (1995) non-identified subjects to a high of 12.2 for Ammirato's (1987) subjects. Imaginational OE ranges from 3.7

for Buerschen's (1995) non-identified subjects to a high of 17.3 for Piechowski et al.'s (1985) American artists. Intellectual OE ranges from a low of 5.0 for Ely's (1995) creative subjects to a high of 18.4 for Jackson's (1995) subjects. Finally, Emotional OE ranges from a low of 4.7 for Schiever's (1985) low-creative subjects to a high of 20.5 for Piechowski et al.'s (1985) American artists. There are some groups that tend to have higher OE scores including older subjects, creative subjects, and gifted subjects.

The OE scores can also be looked at in terms of their relative rank for each sample. All but one sample have either Emotional or Intellectual OE as the highest mean score. Of all of the samples, only 9 do not have a combination of Imaginational, Intellectual, and Emotional OEs in the top two slots. Six of them are school-age samples, one of which places Sensual OE second highest. The remaining seven samples have Psychomotor in one of the first two slots. Another way to state this is that the majority of the samples have Psychomotor and Sensual OE ranked fourth and fifth.

A number of notable trends can be identified in the research. One such trend is that the highest OE profiles are found in the artistic and gifted samples. Another trend is that Sensual OE scores are usually very low among school-age samples and only increase in adulthood. A third trend is that females tend to have higher Emotional OE scores while males have higher Intellectual OE scores.

The analyses investigating differences among various samples show rather clearly that the OEQ can differentiate among them. For example, the OEQ has shown significant differences between gifted and non-identified subjects, more- and less-creative individuals, male and female individuals, and older and younger subjects. Not all samples show significant differences for all OEs, however.

Because of the limited research performed using multivariate analyses, it is difficult to make any generalizations about the research on this issue. What can be said is that there is a strong need to perform such analyses to gain a more accurate idea of how individuals, with their varying personological characteristics perform on the OEQ.

CHAPTER III

METHODOLOGY

Research Design

Secondary analysis reanalyzes data gathered in primary research studies (Cordray & Orwin, 1983). Glass (1976) describes two different purposes of secondary analysis, both of which are relevant to this research project: It can be used to reanalyze data to answer the research questions posed in the original study with better statistical techniques, and also to answer new research questions using the original data. Secondary analysis is employed in this study in order to analyze data aggregated from several studies that used the Overexcitability Questionnaire (OEQ) using multivariate statistical analyses. Some research questions are similar to those of the original studies, while others have been newly formulated to answer questions unique to this study.

Research Questions

The research questions for this study fall into two categories: Questions related to methodology associated with the OEQ and questions related to the use of the OEQ to differentiate between gifted and non-identified individuals. The following research questions will be addressed:

Methodological Research Questions

1. What are the internal test characteristics of the Overexcitability Questionnaire?
2. Are there differences in OE profiles based on personological characteristics; i.e. age, gender, and race?
3. What is the influence of design characteristics of the individual studies on OEQ scores; i.e. is there a difference in OE profile based on method of gifted identification?

Substantive Research Questions

1. Which OEs best differentiate between gifted and non-identified individuals?
2. Do differences in age, gender, and race affect which OEs best discriminate gifted and non-identified individuals?

3. Does method of gifted identification affect which OEs best discriminate between gifted and non-identified individuals?

Sample

Studies were selected for inclusion in this research based on several essential criteria: (a) reporting of quantitative data, (b) use of the OEQ in *written* form, (c) use of standardized procedures for scoring OEQ data as prescribed in the coding manual (Falk & Piechowski, 1991; Falk Piechowski, & Lind, 1994), (d) reporting of interrater reliability or availability of interrater reliability through reanalysis of the original data, (e) provision of classification information, i.e. gifted, non-identified, creative, and (f) availability of OE scores for individual subjects. In one study (Domroese, 1994) part of the data set was not used since only one rater scored several protocols. Therefore, protocols scored by a single rater were omitted. An additional criterion used to omit total samples or portions of samples was classification as creative by an acceptable criteria, either by performance or test scores. Twice classified subjects, those classified creative as well as gifted, were not included. Subsequent analyses to determine if creative individuals and gifted samples were from the same population indicated that significant differences exist, therefore, subjects classified as creative or creative and gifted were not included.

In addition to these essential criteria, some additional characteristics that were preferred included gender and age. The researchers of those studies that met all criteria were contacted and all gave permission for their data to be used. From an initial sample of 23, 13 studies had subjects that met the criteria for inclusion in this study and were made available by the authors.

The studies were conducted from 1985 to 1995 at various locations in North America. The sample sizes range from 10 to 117 and the age range for the subjects is from nine years to over 50. The majority of subjects are Caucasian with the exception of the Breard study (1994) which includes 62% African Americans. However, ethnic diversity is evident in other studies (e.g. Ackerman, 1993; Domroese, 1994)). While all but one study has both genders represented, some studies do not have an even distribution. Four of the studies used both gifted and non-identified subjects, while the rest used one or the other.

In addition to the several studies reported in journals and at conferences, three samples of OEQ data have been located, all of which were collected during the early 1980s. Falk gathered OEQ data at the University of Denver. His sample includes 23 individuals ranging in age from 18 to 34 with a mean age of 22.9 years. There are 13 females and 10 males in this sample. The majority of the subjects were enrolled in university at the time of the assessment. Felder collected OEQ data from a group of chemical engineering students at the University of North Carolina at Chapel Hill. There were 15 individuals in his sample and the majority of them were graduate students. The age range of his subjects was from 23 to 36 and there were two females in the sample. It should be noted that there were two subjects without gender information. Silverman and Sorrell collected OEQ data from a group of adult women in Florida. There were 27 women in their sample. No other information on these subjects is available.

Table 1

Demographic Characteristics for the Total, Gifted, and Non-identified Samples*

	Total (N=571)		Gifted (N=253)		Nonident. (N=318)	
Variable	N	%	N	%	N	%
Male	223	39.1	108	18.9	115	20.1
Female	322	56.4	145	25.4	177	31.0
Caucasian	101	17.7	50	8.8	51	8.9
African American	83	14.5	27	4.7	56	9.8
Asian	17	3.0	10	1.8	7	1.2
Hispanic	3	0.5	0	0.0	3	0.5
Middle Eastern	48	8.4	21	3.7	27	4.7
Age 8-12	197	34.5	91	15.9	106	18.6
Age 13-18	193	33.8	113	19.8	80	14.0
Age 19+	181	31.7	49	8.6	132	23.1

* the percentages do not always add up to the total because of missing information

The demographic characteristics for the total sample are found in Table 1 and the characteristics of each primary study are found in Table 2. While data on subject ethnicity is detailed in Table 1, only Caucasian and African-American subjects will be part of the analyses because of the extent of missing data for the other groups.

Instrumentation

The Overexcitability Questionnaire (OEQ)

The OEQ consists of 21 open-ended questions to be answered in written form. The items were designed to measure the presence and magnitude of OEs in an individual. The original form of the OEQ included 46 items based on examples of OEs from autobiographical material and was developed at the Research and Guidance Laboratory for Superior Students at the University of Wisconsin, Madison in 1973 (Piechowski, 1979). The instrument was revised by Lysy and Piechowski (1983) in a study of a group of 42 graduate students and the OEQ was shortened to 21 items (see also Lysy, 1979). Items were retained on the basis of three criteria: (1) the question evokes several forms of OE, (2) responses varied among subjects, and (3) there were differences between overexcitabilities (heightened expressions) and excitabilities (average responses) (Manzanero, 1985; Piechowski, personal communication February 18, 1996). Items were also eliminated based on three criteria: (1) measured only one overexcitability, (2) showed no variability between individuals, or (3) failed to elicit any overexcitability at all (Manzanero, 1985). Responses may include expressions of different OEs on the same question for different individuals, as well as multiple OE expressions for the same individual on a single question.

The original scoring procedure indicated whether a response showed an expression of each OE or not and a simple 0 or 1 was given based on the presence or absence of an OE. Each response is scored for all five forms of OE. The highest possible score for each OE was 21. This scoring method was revised to indicate intensity of response as well as its presence. Using this method, the form of OE is identified and then an intensity rating of 0, 1, 2, or 3 is assigned depending on the strength of the response.

In general, individuals completing the OEQ are instructed to answer the questions

Table 2

Sample Characteristics of the Studies to Be Included in the Secondary Analysis

	Author	Year	Gifted	Non-Ident.	Age	Place	Ident
1	Ackerman	1993	F32/M10 42	F17/M20 37	14-18	Canada	Obj./Subj.
2	Breard	1994	F30/M18 48	F39/M30 69	9-12	U.S. Southeast	Obj./Subj.
3	Domroese	1993	F6/M10 16	F21/M18 39	≈ 11yr	U.S. Midwest	Obj.
4	Ely	1995	F14/M20 34	F29/M13 42	13	U.S. Midwest	Obj./Subj.
5	Falk	1983		F13/M10 23	college	U.S. West	NA
6	Felder	1983		F1/M12/?2 15	college	U.S.	NA
7	Hazell	1984		F17/M7 24	17-34	U.S. Midwest	NA
8	Jackson	1995	F6/M4 10		16-19	Canada	Obj. or Subj.
9	Lysy & Piechowski	1983		F30/M12 42	22-50	U.S. Midwest	NA
10	Miller, Silverman, & Falk	1994	F30/M11 41		19-54	U.S. West	Obj.
11	Piechowski & Miller	1995	F21/M25 46		9-14	U.S. West	Obj.
12	Schiever	1985	F7/M14 16		12-14	U.S. Southwest	Obj.
13	Silverman & Sorrell	1981		F27 27	adults	U.S. West	NA
	Total Subjects		**Gifted** **253**	**Non-Ident.** **318**	**Total Sample** **571**		

completely and to their satisfaction feeling free to return to previous responses to make changes. Generally, unlimited time is given for completion. Some individuals require less than an hour while others require several hours, which varies depending on the characteristics of the individual. In most instances, the entire 21-question OEQ is given, however, in some cases the questions are put in groups of five or six and given on different days. In this study, only the Domroese (1994) and Breard (1994), which both had samples of younger children unable to focus for long periods of time, administered the OEQ in segments on different days.

Content analysis (Falk & Piechowski, 1991; Falk, Piechowski, & Lind, 1994) is used to score the OEQ. Each response is rated for the five areas of OE; that is, each response can reflect any or all forms of OE. The intensity of each OE is rated from 0, no overexcitability, to 3, a rich and intense expression. Therefore, the maximum score for each OE is 63, that is, 3 points x 21 questions.

The coding manual details the specific criteria for content analysis. If there is no mention whatsoever of any of the criteria listed, then a response is scored a zero. A response is scored a one if there is a *definite mention* of at least one criteria which indicates a possibility of an OE but it lacks sufficient information. A score of one is used when a response has no elaboration or adjectives and appears to be *uncharacteristic* of the person's behavior. An example of a response scored one for Intellectual OE is: "During tests I think about how and what's going on inside my head" (male, age 11) (Falk et al., 1994).

A response is scored two if it appears to be *characteristic* of the person's behavior and is accompanied by elaboration *or* scope (breadth of topics in the specific category) *or* modifiers (e.g. adjectives, adverbs, exclamations). Typographical accents such as underlining, exclamation marks, bold letters, and capitalization also meet the criteria of a score of two. An example of a response scored two for Intellectual OE is: "I think about my thoughts being different from other people's thoughts and I wonder what they think and how they 'word' it" (male, age 13) (Falk et al., 1994).

For a response to receive a score of three it must be *close to a perfect example* of an OE. It must be *very elaborate* indicating that the OE is manifested in several areas. There must be *frequent use of modifiers* and strong verbs or phrases. A score of three for Intel-

lectual OE would be given to a response like this: "I think I'm the only kid who loves to ask questions. I mean...that's my life! Questions, questions, and when I finally get all those answered, it's put together, and it's like a puzzle and all the pieces have been put together and it looks decent" (female, age 13) (Falk et al., 1994).

An example of a response rated for more than one OE is: "I am like a tiny tiny grain of sand! I am alone. Sometimes i drift and sometimes i attach on to other things and sometimes i have to let go. I'm just being stepped on by giants or brushed aside. Thats who i am!!" (gifted female, age 15.3) (Falk et al., 1994). This response was scored three for Imaginational OE and two for Emotional OE. The Imaginational OE score of three was given because of the extreme use of individualistic imagery and metaphor throughout the response. The Emotional OE score of two was given because of the focus on feelings, specifically towards self. The breadth of these feelings indicate that they are characteristic of the individual, but, there was insufficient elaboration to receive a score of three. Psychomotor, Sensual, and Intellectual received scores of zero because there was no expression of these forms in her response.

All protocols are rated by two individuals trained in the scoring methodology. Interrater reliability ranges from r = .56 to r = .92 depending on the specific OE and the study (Ackerman, 1993; Gallagher, 1986; Piechowski & Colangelo, 1984; Piechowski & Cunningham, 1986; Piechowski, Silverman, & Falk, 1985; Schiever, 1985). Two methods of calculating interrater reliability were used in the studies. Three studies (Domroese, 1994; Ely, 1995; Piechowski & Miller, 1995) calculated interrater reliability by correlating the total overexcitability scores of one rater with those of the other rater. Therefore, if the total scores for a subject's Psychomotor OE were 3 and 7 for each rater, respectively, then these two numbers would be correlated along with the corresponding scores for the remaining subjects to determine the interrater reliability for Psychomotor OE. This method was used for each form of OE.

The other 10 studies used a more complex method of calculating interrater reliability. The reliability scores for each scale were calculated using Pearson Product Moment Correlations (Allen & Yen, 1979) to determine the correlation between rater 1 and rater 2 for each item across all cases. These correlations were averaged to find the average item interrater reliability for a scale. Finally, this coefficient was adjusted by a factor of 21 using the Spearman-Brown Formula (Allen & Yen, 1979) to determine the interrater reliability of a scale. This procedure was followed for each of the five scales, Psychomotor, Sensual, Imaginational, Intellectual, and Emotional, and performed by the author or the present study.

The interrater reliability for the studies included is generally very good with average coefficients as follows: Psychomotor = .94, range of .90 - .98; Sensual = .95, range of .89 - .99; Imaginational = .95, range of .94 - .99; Intellectual = .93, range of .78 - .99; and Emotional = .95, range of .90 - .99. The internal consistency measures of the five scales, as measured by Cronbach's Alpha, are: Psychomotor = .58, range of .33 - .72; Sensual = .51, range of .30 -.70; Imaginational = .67, range of .48 - .83; Intellectual = .75, range of .59 - .84; and Emotional = .79, range of .60 - .88.

While the internal consistency coefficients are lower than would normally be desired, it is important to remember that the items on the OEQ are not discreet, each item is scored for each of the five scales. Therefore, the internal consistency would be expected to be lower, and remains acceptable.

Only one study (Ammirato, 1987) examined test retest reliability for the OEQ using the original 21-item version and a revised 21-item version. He administered the two forms approximately three weeks apart and found them to have a moderate-high correlation of .65. Based on this result, Ammirato suggested that the two forms should not be considered equivalent.

Several studies provide evidence of construct validity for Intellectual and Imaginational OEs (Gallagher, 1986; Manzanero, 1985; Piechowski et al., 1985; Schiever, 1985). Thus far, construct validity for Sensual, Psychomotor, and Emotional OEs has not been confirmed. However, Silverman (1993) suggests that clinical data collected on gifted individuals offers some preliminary support.

Demographic Information Checklist

Varied demographic data were collected in each of the studies. Demographic characteristics of particular interest to the present study are gender, age, and classification as gifted or non-identified. For the purposes of this investigation, age was separated into

three categories: under 12 years, 12 - 18 years, and over 18 years. Classification indicates whether a subject was identified as gifted or not. To investigate the effects of method of identification of gifted individuals on OE scores, the methods of identification will be divided into two categories, use of only objective measures, such as grades, achievement tests, and intelligence tests, and objective plus subjective measures, such as self-, peer-, parent-, and teacher-nominations and recommendations. Four studies used only objective measures to identify gifted students and four used both objective and subjective measures.

Data Collection and Procedures

A complete search of PsychLit, ERIC, and SocioFile databases was performed for the years 1981 - 1995, to locate studies that use the OEQ as a measure. This time period was chosen because it extends from the year the OEQ was developed to the present. The descriptors used were Dabrowski, gifted, and overexcitability. A total of 10 published articles and an additional 13 unpublished studies presented at national and international conferences related to the gifted and talented were located. Of these, 13 studies were requested and obtained. The remaining studies were not requested because they either did not meet the selection criteria or the samples were redundant; they had been used in previous studies.

In addition to the several studies reported in journals and at conferences, three samples of OEQ data have been located, all of which were collected during the 1980s. These samples were located via consultation with experts in the field.

Data Analysis

Descriptive statistics (means, standard deviations, correlation coefficients) were calculated for all variables. In addition, Factorial Multivariate Analysis of Variance (MANOVA) and One-way Predictive Discriminant Analysis (PDA) were used to investigate the predictive value of the OEQ as a method of identifying gifted individuals. A Factorial MANOVA evaluates differences among group centroids in research designs with multiple dependent variables and multiple independent variables (Tabachnick & Fidell, 1989). In One-way PDA the goal is to predict membership in groups, the dependent variable, from a set of independent variables (Tabachnick & Fidell, 1987). Patterns of OE profiles are described

for the identified gifted groups as well as for the non-identified groups.

A Factorial MANOVA was used to determine whether profile differences exist based on age group and gender differences. Here, the dependent variables were the five OEs and the independent variables were identification as gifted or non-identified, age group, and gender. Two One-way MANOVAs were used to determine whether differences exist in OE profiles based either race or method of identifying giftedness. For both, the dependent variables are the five OEs and the independent variable is method of identification. For all MANOVAs, appropriate post-hoc analyses were performed where necessary.

To determine which OEs have the greatest discriminating power between the gifted and non-gifted subjects, several One-Way Predictive Discriminant Function Analyses (PDA) were performed. These analyses were used to determine whether group membership, the dependent variable, can be reliably predicted based on a series of independent variables (Tabachnick & Fidell, 1989). In these cases, the dependent variable is classification as gifted or non-identified and the independent variables are the five OE scores. A One-Way Predictive Discriminant Function analysis can also indicate the contribution of each independent variable on the prediction of group membership. Subsequent Classificatory Analyses were performed to ascertain the number of subjects in the non-identified groups that have similar OE profiles to those in the gifted groups. The second PDA was run with method of identification as the dependent variable and the five OEs as the independent variable to determine which OEs best differentiate between the groups. Additional PDAs were performed to investigate whether profile differences exist when subjects were separated according to demographic characteristics such as age, gender, and race.

All PDAs were followed by a Classificatory Analysis. For each of these analyses the base rate for comparison of actual classification results to those based on chance was determined by the sample sizes specific to each analysis. For example, in an analysis with 60 gifted subjects and 40 non-identified subjects, instead of 50/100 subjects being classified into each of two groups (gifted and non-identified), chance classification would result in 60 subjects classified as gifted and 40 classified as non-identified which would be the base rate specific to that sample.

CHAPTER IV

RESULTS

The purpose of this study was to examine, methodologically and substantively, the OEQ. Of interest were test characteristics and how scores are affected by personological and study characteristics. In addition, whether and to what degree OEQ scores can discriminate between gifted and non-identified individuals was of primary interest. Which OEs best discriminate between the gifted and non-identified groups was also examined in great detail.

This chapter provides in-depth descriptive and inferential analysis results. First, the OEQ scores are described using means and standard deviations for the total sample and the sample broken down by gender, classification, age group, race, and method of gifted identification. Correlations among OEs are also provided. These are followed by the results of the multivariate analyses used to answer each of the research questions posed in chapter three.

Descriptive Statistics

Descriptive statistics (means, standard deviations, correlation coefficients) were calculated for all variables. The total sample consisted of 571 subjects of which 253 were identified as gifted and 318 were non-identified. There were 223 males in the sample and 318 females with 23 subjects for whom gender was not reported. Of the gifted subjects, 108 were male and 145 were female, while there were 115 males and 177 females in the non-identified sample.

Table 3 presents the means and standard deviations by classification and by gender and Table 4 presents the data broken down by gender for each classification. Means ranged from 2.98 for Sensual OE for the non-identified sample to 11.77 for Emotional OE for the female sample. Mean OE scores for the gifted sample were higher overall than for the non-identified sample with the exception of Sensual OE. Females scored higher than males for all OEs except Psychomotor. In general, standard deviations for all groups

Table 3

Mean Overexcitability Scores for the Total Sample, by Classification, and by Gender

		Total N = 571	Non-Ident N = 318	Gifted N = 253	Male N = 223	Female N = 318
Psychomotor	mean	5.48	5.08	5.98	5.62	5.45
	s.d.	3.16	2.98	3.32	3.13	3.20
Sensual	mean	3.02	3.16	2.85	2.45	3.22
	s.d.	3.04	3.00	3.09	2.48	3.29
Imaginational	mean	6.35	5.55	7.36	5.62	6.98
	s.d.	4.42	3.78	4.94	3.97	4.73
Intellectual	mean	7.40	6.31	8.77	7.15	7.74
	s.d.	5.29	4.79	5.57	5.19	5.42
Emotional	mean	10.23	9.91	10.64	7.69	11.77
	s.d.	6.77	6.80	6.73	2.22	6.98

Table 4

Mean Overexcitability Scores for Gender by Classification

		Male Gifted N = 108	Male Non-Ident N = 115	Female Gifted N = 145	Female Non-Ident N = 177
Psychomotor	mean	5.77	5.48	6.13	4.89
	s.d.	3.22	3.05	3.39	2.94
Sensual	mean	2.37	2.53	3.20	3.24
	s.d.	2.42	2.54	3.47	3.13
Imaginational	mean	6.39	4.89	8.09	6.08
	s.d.	4.69	2.99	5.02	4.29
Intellectual	mean	7.83	6.52	9.47	6.32
	s.d.	5.04	5.28	5.86	4.58
Emotional	mean	8.08	7.32	12.55	11.14
	s.d.	5.57	5.94	6.91	6.99

indicated considerable variability within groups.

The rank order of the five OEs for the total sample, gifted, non-identified, male, and female subsamples is the same: Sensual, Psychomotor, Imaginational, Intellectual, and Emotional in order from lowest to highest mean score. Examination of Table 4, which contains the mean scores for the five OEs for the gifted and non-identified samples broken down by gender, shows that the same ranking pattern holds for each group with the exception of the male non-identified sample. The male non-identified sample had Psychomotor OE ranked above Imaginational OE.

Closer examination of the mean OE scores reveals that the highest mean OEs scores for Psychomotor, Imaginational, Intellectual, and Emotional OEs were found in the female gifted sample while the non-identified females sample had the highest Sensual OE mean score. The lowest mean OEs scores were more scattered. The gifted male sample had the lowest Sensual OE score and the non-identified gifted males were lowest on Imaginational and Emotional OEs. The lowest Intellectual OE score was found in the non-identified female sample.

Gifted females scored higher on all OEs than the gifted males. This pattern did not hold when comparing the non-identified males and females. Among the non-identified subjects, males scored higher than females on Psychomotor and Intellectual OEs, with the remainder higher for females. It is also interesting to note that the standard deviations exhibited similar patterns when comparing the males and females for the gifted and non-identified groups. For almost all comparisons, the females samples had greater dispersion within their groups.

Breaking the total sample down into three age groups revealed 197 subjects under 12 years (age group 1), 193 subjects between 12 - 18 years (age group 2), and 181 over 18 years (age group 3) (see Table 5). The OE patterns for all three groups were the same as for the majority of subsamples; that is, Sensual, Psychomotor, Imaginational, Intellectual, and Emotional.

Mean OE scores and sample sizes for the gifted and non-identified samples by age group are found in Tables 6 and 7. For the non-identified sample, the pattern of OEs was different for age groups 1 and 2. Age group 1 was the same as for the non-identified males

Table 5

Mean Overexcitability Scores for the Total Sample by Age Group*

		Age group 1 N = 197	Age group 2 N = 193	Age group 3 N = 181
Psychomotor	mean	4.95	6.04	5.46
	s.d.	2.59	3.25	3.52
Sensual	mean	1.67	2.54	5.00
	s.d.	1.57	2.38	3.78
Imaginational	mean	5.35	6.47	7.32
	s.d.	3.55	3.83	5.52
Intellectual	mean	5.81	7.46	9.07
	s.d.	3.83	5.17	6.22
Emotional	mean	6.80	11.37	12.76
	s.d.	3.56	6.73	7.91

* Age group 1 < 12 yrs.; Age group 2 >12 & < 18 yrs.; Age group 3 > 18

Table 6

Mean Overexcitability Scores for Non-Identified Subjects by Age Group*

		Age group 1 N = 106	Age group 2 N = 80	Age group 3 N = 132
Psychomotor	mean	4.67	5.65	5.07
	s.d.	2.48	3.11	3.22
Sensual	mean	1.63	2.64	4.69
	s.d.	1.62	2.59	3.34
Imaginational	mean	4.64	5.51	6.31
	s.d.	2.70	3.05	4.67
Intellectual	mean	5.33	5.28	7.72
	s.d.	4.04	3.30	5.70
Emotional	mean	5.91	11.01	12.44
	s.d.	2.92	6.84	7.53

* Age group 1 < 12 yrs.; Age group 2 >12 & < 18 yrs.; Age group 3 > 18

and the gifted group identified by objective and subjective measures. Age group 2 was theonly pattern with Intellectual OE ranked so low and Psychomotor ranked so high (Sensual, Intellectual, Imaginational, Psychomotor, and Emotional).

All three age groups of the gifted sample showed the dominant OE pattern of Sensual, Psychomotor, Imaginational, Intellectual, and Emotional. Examination of the gifted and non-identified mean scores indicates that the mean scores for all five OEs were highest for the gifted subjects in age group 3. The lowest mean scores for four of the five OEs were found in the non-identified age group 1 sample (Psychomotor, Sensual, Imaginational, and Emotional). The non-identified age group 2 sample had the lowest Intellectual OE mean score.

Table 7

Mean Overexcitability Scores for Gifted Subjects by Age Group*

		Age group 1 N = 91	Age group 2 N = 113	Age group 3 N = 49
Psychomotor	mean	5.26	6.32	6.51
	s.d.	2.69	3.34	4.08
Sensual	mean	1.73	2.46	5.83
	s.d.	1.52	2.24	4.72
Imaginational	mean	6.18	7.15	10.06
	s.d.	4.20	4.18	6.65
Intellectual	mean	6.37	9.00	12.71
	s.d.	3.50	5.68	6.14
Emotional	mean	7.84	11.62	13.61
	s.d.	3.96	6.67	8.87

* Age group 1 < 12 yrs.; Age group 2 >12 & < 18 yrs.; Age group 3 > 18

The sample was further broken down by each age group according to gender and classification (see Tables 8, 9, and 10). For age group 1, OE means ranged from a low of 1.31 on Sensual OE for the non-identified male sample to a high of 8.13 on Emotional OE for the female gifted sample. When comparing only the gifted subjects in age group 1, the males had higher scores for all OEs except Emotional. The non-identified subjects showed a different pattern; that is the females had higher scores for Sensual, Imaginational, and Emotional OEs. When comparing the subjects within genders, the male gifted group showed higher scores for all five OEs and the female gifted group had higher scores for all OEs except Sensual.

For age group 2 (see Table 9), OE means ranged from a low of 2.20 on Sensual OE for the gifted male sample to a high of 14.38 on Emotional OE for the female gifted sample. When comparing only the gifted subjects in age group 2, the females had higher scores for all OEs when compared with the males. The non-identified subjects showed a different pattern; that is the males had higher scores for Psychomotor, Sensual, and Intellectual OEs. When comparing the subjects by gender, the male gifted group showed higher scores for Imaginational and Intellectual OEs while the female gifted group had higher scores for all OEs.

Table 8

Mean Overexcitability Scores for Age Group 1, by Gender, and by Classification

		Male Total N = 92	Male Gifted N = 45	Male Non-Ident N = 47	Female Total N = 105	Female Gifted N = 46	Female Non-Ident N = 59
Psychomotor	mean	5.39	5.70	5.10	4.56	4.84	4.34
	s.d.	2.68	2.68	2.69	2.45	2.66	2.27
Sensual	mean	1.54	1.79	1.31	1.79	1.66	1.88
	s.d.	1.35	1.56	1.08	1.75	1.50	1.93
Imaginational	mean	5.35	6.11	4.63	5.35	6.24	4.65
	s.d.	3.47	4.16	2.48	3.63	4.28	2.88
Intellectual	mean	6.18	6.82	5.56	5.48	5.92	5.14
	s.d.	4.47	3.94	4.89	3.15	3.00	3.25
Emotional	mean	6.42	7.53	5.35	7.14	8.13	6.36
	s.d.	3.73	4.08	3.04	3.39	3.86	2.76

Table 9

Mean Overexcitability Scores for Age Group 2, by Gender, and by Classification

		Male	Male	Male	Female	Female	Female
		Total	Gifted	Non-Ident	Total	Gifted	Non-Ident
		N = 82	N = 49	N = 33	N = 111	N = 64	N = 47
Psychomotor	mean	5.55	5.33	5.88	6.41	7.08	5.49
	s.d.	3.22	3.04	3.50	3.24	3.38	2.84
Sensual	mean	2.45	2.20	2.82	2.60	2.66	2.52
	s.d.	2.33	2.21	2.49	2.43	2.25	2.67
Imaginational	mean	5.49	5.88	4.91	7.19	8.13	5.93
	s.d.	3.23	3.38	2.94	4.09	4.49	3.08
Intellectual	mean	6.73	7.68	5.32	8.00	10.01	5.26
	s.d.	4.87	5.46	3.44	5.33	5.68	3.23
Emotional	mean	8.48	8.00	9.20	13.50	14.38	12.29
	s.d.	5.97	4.74	7.47	6.48	6.64	6.12

Table 10

Mean Overexcitability Scores for Age Group 3, by Gender, and by Classification

		Male	Male	Male	Female	Female	Female
		Total	Gifted	Non-Ident	Total	Gifted	Non-Ident
		N = 49	N = 14	N = 35	N = 106	N = 35	N = 71
Psychomotor	mean	6.17	7.54	5.63	5.33	6.10	4.94
	s.d.	3.69	4.76	3.08	3.56	3.78	3.41
Sensual	mean	4.16	4.86	3.89	5.29	6.21	4.84
	s.d.	3.34	3.72	3.19	4.13	5.06	3.53
Imaginational	mean	6.33	9.11	5.21	8.38	10.44	7.37
	s.d.	5.64	8.42	3.65	5.77	5.91	5.45
Intellectual	mean	9.69	11.61	8.93	9.71	13.16	8.01
	s.d.	6.18	5.23	6.42	6.41	6.48	5.68
Emotional	mean	8.74	10.11	8.20	14.56	15.01	14.34
	s.d.	7.86	10.53	6.61	7.81	7.85	7.83

For age group 3 (see Table 10), OE means ranged from a low of 3.89 on Sensual OE for the non-identified male sample to a high of 15.01 on Emotional OE for the female gifted sample. When comparing only the gifted subjects, the females had higher scores for all OEs except Psychomotor. The non-identified females had higher scores for Sensual, Imaginational, and Emotional OEs, which was the same pattern for all three age groups. When comparing the subjects by gender, the male and female gifted groups had higher scores for all five OEs when compared to their non-identified counterparts.

Table 11

Mean Overexcitability Scores by Race/Ethnicity

		Caucasian	African-A	Asian-A	Hispanic	Mid-Eastern
		N = 101	N = 83	N = 17	N = 3	N = 48
Psychomotor	mean	5.84	4.33	6.32	3.33	5.90
	s.d.	2.80	2.44	3.18	1.15	3.32
Sensual	mean	1.91	1.89	2.85	1.00	1.59
	s.d.	1.78	1.74	2.09	1.32	1.58
Imaginational	mean	4.58	4.77	7.18	4.83	6.47
	s.d.	2.83	2.71	4.76	0.76	4.29
Intellectual	mean	5.88	5.90	7.03	3.17	6.17
	s.d.	3.90	3.29	3.69	1.04	5.05
Emotional	mean	8.53	6.46	11.56	13.50	6.26
	s.d.	5.03	2.98	5.81	5.27	3.80

Table 11 includes information on the race/ethnicity breakdown of the sample. Of the 571 subjects included in this study, 252 provided race/ethnicity data. The subjects with this data were categorized into the following groups: 101 Caucasians, 83 African-Americans, 17 Asian-Americans, three Hispanics, and 48 Middle-Easterners. Overexcitability patterns for the various groups were diverse. The African-American group showed the dominant pattern, however, the remaining ethnicities deviated from this pattern. The Caucasian sample's pattern was the second most common pattern and was the same one

found in the non-identified male sample and the gifted sample identified using objective and subjective measures. The Asian-American group showed a reversal of Intellectual and Imaginational OEs compared to the dominant pattern, while the Middle-Eastern sample was the only group where Emotional OE does not have the highest mean score, but had Imaginational OE in its place (Sensual, Psychomotor, Intellectual, Emotional, and Imaginational). However, the Asian-American and Hispanic groups were relatively small.

Table 12

Mean Overexcitability Scores by Classification for Caucasian and African-American Subjects

		Caucasian Gifted	Caucasian Non-Ident	African-A. Gifted	African-A. Non-Ident
		N = 50	N = 51	N = 27	N = 56
Psychomotor	mean	6.38	5.31	4.63	4.19
	s.d.	3.24	2.21	2.48	2.44
Sensual	mean	2.19	1.63	1.96	1.86
	s.d.	1.90	1.63	1.60	1.81
Imaginational	mean	5.42	3.75	4.98	4.67
	s.d.	3.17	2.18	2.87	2.66
Intellectual	mean	6.79	4.98	6.20	5.75
	s.d.	4.28	3.29	2.13	3.38
Emotional	mean	10.15	6.95	6.87	6.27
	s.d.	5.52	3.95	3.31	2.82

Examining the two largest racial groups by classification (see Table 12) indicates that the gifted groups have higher mean OE scores compared to the non-identified groups; there is, however, a difference in degree. A greater difference between the mean scores of the gifted and non-identified groups exists for the Caucasian sample compared to the African-American sample. The gifted and non-identified African-American samples show OE profiles similar to the dominant ranked order; that is, Psychomotor and Sensual are the lowest and Imaginational, Intellectual, and Emotional are the highest. This is not the case for the

Caucasian sample where Psychomotor OE is ranked third for the gifted group and second for the non-identified group.

When the gifted sample was broken down according to method of identification, there were 161 identified using objective measures only and 92 identified with objective and subjective measures (see Table 13). The rank order of the mean OE scores for the group identified using objective measures only was the same one found for the total sample and most subsamples by classification and gender. The gifted subjects identified using both objective and subjective measures showed the same pattern as the non-identified male sample (Sensual, Imaginational, Psychomotor, Intellectual, and Emotional).

Table 13

Mean Overexcitability Scores for the Gifted Sample by Method of Identification

		Objective N = 161	Obj. & Subj. N = 92
Psychomotor	mean	5.90	6.11
	s.d.	3.33	3.30
Sensual	mean	3.19	2.26
	s.d.	3.58	1.84
Imaginational	mean	8.35	5.64
	s.d.	5.37	3.51
Intellectual	mean	9.86	6.88
	s.d.	6.04	4.01
Emotional	mean	11.37	9.37
	s.d.	7.30	5.42

Pearson Product Moment Correlations were calculated for all OEs (see Table 14). As might be expected, correlations among the OEs for the total sample are all statistically significant and the majority of these correlations indicate positive though weak relationships. The correlations between Imaginational OE and Intellectual OE, and Imaginational OE and Emotional OE indicate moderate positive relationships.

Table 14

Correlations Among the Five Overexcitabilities for the Total Sample*

	Sensual	Imaginational	Intellectual	Emotional
Psychomotor	0.19	0.21	0.18	0.19
Sensual		0.37	0.32	0.38
Imaginational			0.54	0.44
Intellectual				0.38

* all correlations are significant at $p < .001$ and $N = 571$

Research Question Results

The research questions for this study fell into two categories: Questions related to methodology associated with the OEQ and questions related to the use of the OEQ to differentiate between gifted and non-identified individuals.

Methodological Research Questions

Methodological Research Question 1

What are the internal test characteristics of the Overexcitability Questionnaire?

Cronbach's Alpha was used as a measure of internal consistency for each scale of the OEQ. The sample used for this analysis included only 10 of the 13 individual samples aggregated in this study (N = 394) because three of the samples did not retain the necessary item data for this analysis. Table 15 shows the Alpha coefficients for the total sample and the sample broken down by classification, gender, and age group. Alpha coefficients of .60 and greater are considered acceptable. With the exception of age group 1, the majority of Alpha coefficients are .60 or greater.

Methodological Research Question 2

Are there differences in OE profiles based on personological characteristics; i.e. age, gender, and race?

A Factorial MANOVA was used to determine whether overexcitability profile differences exist based on age group and gender differences. The dependent variables were the

Table 15

Cronbach's Alpha Internal Consistency for the Total Sample and Subsamples

Sample	N	Psychomotor	Sensual	Imaginational	Intellectual	Emotional
Total	394	0.64	0.68	0.77	0.83	0.85
Gifted	157	0.64	0.71	0.79	0.82	0.83
Non-Ident	237	0.64	0.66	0.73	0.81	0.86
Male	137	0.59	0.72	0.69	0.84	0.79
Female	231	0.68	0.67	0.79	0.82	0.84
Age group 1	116	0.62	0.34	0.52	0.59	0.60
Age group 2	97	0.58	0.44	0.69	0.79	0.80
Age group 3	181	0.67	0.66	0.79	0.84	0.85

Table 16

Multivariate Analysis of Variance Main Effects and Interaction Effects for OEs by Classification, Age Group, & Gender*

Source of Variance	Wilks' Lambda	Hypoth. df	Error df	multivariate F	Sig.
Classification	0.90889	5	529	10.60509	0.000
Age group	0.73744	10	1058	17.40312	0.000
Gender	0.90607	5	529	10.96744	0.000
Classification by Age group	0.96029	10	1058	2.16517	0.018
Age group by Gender	0.94897	10	1058	2.80721	0.002
Classification by Gender	0.99361	5	529	0.67995	0.639
Classification by Age group by Gender	0.97877	10	1058	1.14154	0.327

* The complete analysis can be found in Appendix B

five OEs and the independent variables were classification as gifted or non-identified, age group, and gender. For this analysis the sample size was 545 because 26 cases were rejected due to missing data. Appropriate post-hoc analyses were performed where indicated.

MANOVA results (see Table 16) indicate significant differences for OEs by classification, gender, and age group. The multivariate F-test for age group was significant; F(10, 1058) = .737, p = .000, as it was for classification; F(5, 529) = .909, p = .000 and gender; F(5, 529) = .906, p = .000.

The results of the significant univariate F-tests performed following the multivariate analyses follow and are accompanied by the necessary interaction charts. The interactions were further examined using significance tests for simple main effects (Kirk, 1995). In addition, tetrad contrasts were used to determine whether interactions exist in instances when two out of three pairs of scores are compared; that is, to investigate an interaction effect when a single pair of scores was removed from an analysis that originally had three pairs of scores (Marascuilio & Serlin, 1988). For the latter part of the analysis, critical t was determined by the number of comparisons to be performed. Since nine comparisons were identified, the critical t-value for df = infinity for this set of nine comparisons was t = 3.259, p = .01 (Glass & Hopkins, 1996).

The Wilk's Lambda multivariate F-test for the three-way interaction of classification, gender, and age group, was not significant; F(10, 1058) = .979, p = .327. However, the interaction of classification and age group, was significant (F(10, 1058) = .960, p = .018) as was the interaction of gender and age group, (F(10) = .949, p = .002). The Wilk's Lambda multivariate F-test for gender by classification, was not significant (F(5, 529) = .994, p = .639). In those instances when two-way interactions were significant for an OE, follow-up analyses will focus on reporting and interpretation of interactions rather than the main effects.

Classification main effects and interactions. Of the five forms of OE, four showed significant main effects for classification (see Table 17). All four significant differences were indicative of higher scores for the gifted sample than the non-identified sample.

Table 17

Univariate Main Effects for Classification

	Univariate F	df	sig.
Psychomotor	9.05	1, 533	0.003
Imaginational	31.25	1, 533	0.000
Intellectual	39.15	1, 533	0.000
Emotional	4.97	1, 533	0.026

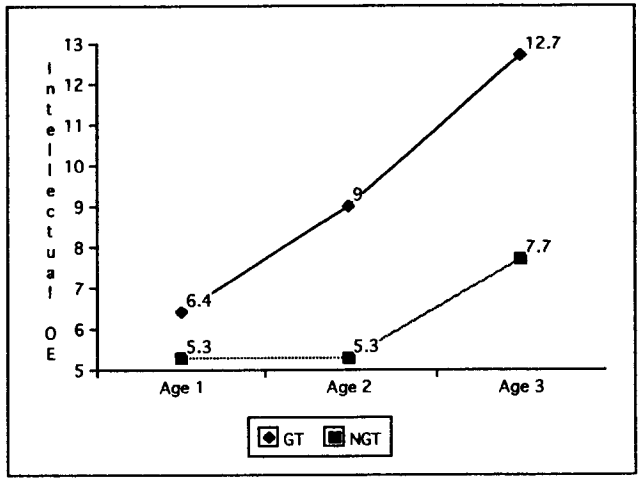

Figure 2: Classification by Age Group Interaction for Intellectual OE

Follow-up univariate tests indicated that the only OE that showed a significant interaction for classification by age group was Intellectual OE, $F(2, 533) = 4.47$, $p = .012$, which is illustrated in Figure 2. Examination of the interaction chart was used to determine which pairs would be analyzed. Since the two groups at age group 1 were very similar, the gifted and non-identified groups were compared for age group 2 and age group 3. Both comparisons indicated statistically significant differences between the gifted and non-identified groups at $p < .01$ level of significance (age group 2, $t = -5.21$; age group 3, $t = -6.15$), and both were in favor of the gifted sample. A tetrad contrast was then performed to determine whether any interaction existed when age group 1 was not considered in the interaction analysis. The results indicated that there was no significant interaction for the gifted and non-identified groups for age groups 2 and 3 ($t = 1.21$). Therefore, the multivariate interaction was indicative of the interaction between classification and age groups 1 and 2 only.

The main effect for classification must be viewed in light of these results. Therefore, the significant differences between the gifted and non-identified groups for Intellectual OE were for age groups 2 and 3 in favor of the gifted subjects.

Age group main effects and interactions. There were significant age group main effects found for all five forms of OE (see Table 18). Additionally, there were two OEs that showed significant interactions for age group by gender: Psychomotor OE ($F(2, 533) = 3.80$, $p = .023$), and Emotional OE ($F(2, 533) = 7.53$, $p = .001$) (see Figures 3 and 4).

Table 18

Univariate Main Effects for Age Group

	Univariate F	df	sig.
Psychomotor	6.06	2, 533	0.002
Sensual	54.35	2, 533	0.000
Imaginational	13.80	2, 533	0.000
Intellectual	31.96	2, 533	0.000
Emotional	34.02	2, 533	0.000

Post hoc analyses using the Scheffe multiple range test showed the following significant differences at $p = .05$ (see Appendix C). For Psychomotor OE, age group 2 was significantly greater than age groups 1 and 3 and there was no significant difference between age groups 1 and 3. Additionally, there was an interaction between age group and gender for Psychomotor OE which will be addressed when interpreting interaction results.

Examination of the interaction graphs (see Figures 3 and 4) was used to determine which pairs would be analyzed. For Psychomotor OE, the male and female groups were compared for all three age groups. None of the three comparisons were statistically significant: age group 1, $t = 1.80$; age group 2, $t = -1.78$; and age group 3, $t = 1.68$. Therefore, the significant interaction was a reflection of the pattern difference between males and females across the three age groups. The male sample showed a slight increase across the three age groups while the female sample showed a higher mean score for age group 2 and lower scores for age groups 1 and 3. In light of this, the main effect for age group essentially reflected differences for the female sample.

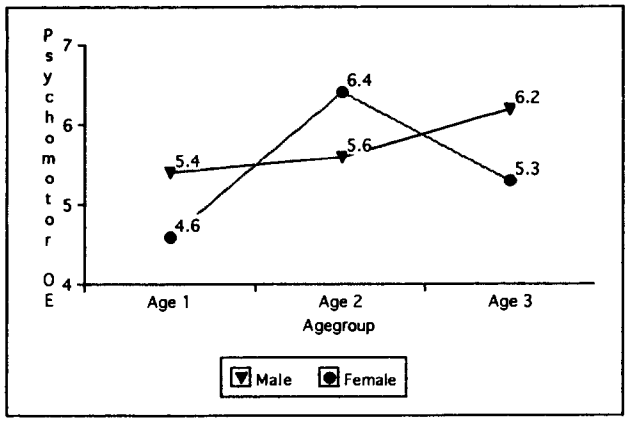

Figure 3: Gender by Age Group Interaction for Psychomotor OE

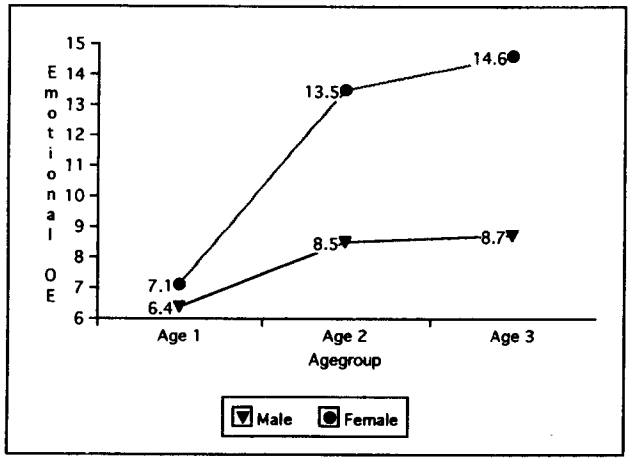

Figure 4: Gender by Age Group Interaction for Emotional OE

Sensual OE showed significant differences among all three age groups: Age group 3 was significantly higher than age group 2 which was significantly higher than age group 1. The pattern for Imaginational OE was a bit different. Age groups 2 and 3 were significantly higher than age group 1.

Intellectual OE showed that age group 3 was significantly higher than age group 2, which was significantly higher than age group 1. Examining this main effect in conjunction with the interaction between age group and classification indicated that the trend was more Descriptive of the gifted sample since the mean scores for the non-identified sample were the same for age groups 1 and 2.

Emotional OE comparisons indicated that age groups 2 and 3 were significantly higher than age group 1. Given the interaction effect for Emotional OE between age group and gender, the main effect results will be used to interpret this finding more thoroughly. To

flesh out the significant differences more completely, the male and female groups were compared for age groups 2 and 3 only because the scores for the two groups for age group 1 were very similar. Both comparisons indicated statistically significant differences between the male and female groups at $p = .01$ level of significance (age group 2, $t = -5.76$; age group 3, $t = -5.73$).

A tetrad contrast was then performed to determine whether any interaction existed when age group 1 was not considered in the analysis. The results indicated that there was no significant interaction for the male and female groups in age groups 2 and 3 ($t = .67$). Therefore, the multivariate interaction indicated an interaction between gender and age groups 1 and 2 only. In light of the interaction between gender and age group, it appears that this trend holds for both genders, but it was more dramatic for the female sample (see figure 4).

Gender main effects. Imaginational and Emotional OEs showed significant main effects for gender and are reported in Table 19. Females had significantly higher scores for Imaginational and Emotional OEs. The main effect for Emotional OE, when considered in light of its interaction with age group, indicated that the most significant differences between the genders were for age groups 2 and 3.

Table 19

Univariate Main Effects for Gender

	Univariate F	df	sig.
Imaginational	8.54	1, 533	0.004
Emotional	44.1	1, 533	0.000

A Factorial MANOVA was used to determine whether OE profile differences exist based on racial differences. The dependent variables were the five OEs and the independent variables were classification as gifted or non-identified and race. Appropriate post-hoc analyses were performed where indicated. Only Caucasians and African-Americans were

included in this analysis as they were the only groups with a sufficiently large sample size. For this analysis, the sample size was 184 since most cases were rejected due to missing data, and others were rejected because they belong to different racial/ethnic group. These subjects were taken from the following studies: Ackerman (1993), Breard (1994), Domroese (1994), and Jackson (1995).

MANOVA results (see Table 20) indicated significant differences for OEs by classification and race. The multivariate F-test for classification, was significant; F(5, 176) = .931, p = .026, as it was for race; F(5, 176) = .852, p = .000. However, there was no significant interaction between classification and race; F(5, 176) = .970, p = .369.

Table 20

Multivariate Analysis of Variance Main Effects and Interaction Effects for OEs by Classification and Race for Caucasian and African-American Subjects*

Source of Variance	Wilks' Lambda	Hypoth. df	Error df	Multivariate F	Sig.
Classification	0.93054	5	176	2.62732	0.026
Race	0.85172	5	176	6.12812	0.000
Classification by Race	0.97005	5	176	1.08663	0.369

* The complete analysis can be found in Appendix D

Classification main effects. Three of the five OEs, Imaginational, Intellectual, and Emotional, were significantly different for the gifted and non-identified samples (see Table 21). The gifted sample was significantly higher on all three OEs.

Race main effects. Psychomotor and Emotional OEs showed significant differences based on race (see Table 22). The Caucasian group had significantly higher scores for both OEs.

Table 21

Univariate Main Effects for Classification

	Univariate F	df	sig.
Imaginational	5.59	1, 180	0.019
Intellectual	4.21	1, 180	0.042
Emotional	9.18	1, 180	0.003

Table 22

Univariate Main Effects for Race

	Univariate F	df	sig.
Psychomotor	12.67	1, 180	0.000
Emotional	9.97	1, 180	0.002

Methodological Research Question 3

What is the influence of design characteristics of the individual studies on OEQ scores; i.e. is there a difference in OE profile based on method of gifted identification?

A One-way MANOVA was used to determine whether differences exist in OE profiles based on different methods of identifying gifted individuals, where the dependent variables were the five OEs and the independent variable was method of identification. Method of identification was categorized in two ways, use of only objective measures and use of objective and subjective measures. For this analysis 253 subjects were used.

The MANOVA results can be found in Table 23 and indicate that the Wilk's Lambda multivariate F-test for method of identification, was significant; F(5) = .901, p = .000. The results of the Univariate F-tests performed following the multivariate analysis indicated that Sensual, Imaginational, Intellectual, and Emotional OE scores were significantly differ-

ent for the two identification methods, while Psychomotor was not. These results indicated that the mean scores for gifted subjects identified with objective measures only were significantly higher than the mean scores for the gifted subjects identified using a combination of objective and subjective measures.

Table 23

Multivariate Analysis of Variance for Method of Gifted Identification*

Source of Variance	Wilks' Lambda	Hypoth. df	Error df	Multivariate F	Sig.
Method of Identification	0.90101	5	247	5.42706	0.000
Variable			df	Univariate F	Sig.
Psychomotor			1, 251	0.24914	0.618
Sensual			1, 251	5.3463	0.022
Imaginational			1, 251	18.78708	0.000
Intellectual			1, 251	17.89701	0.000
Emotional			1, 251	5.25161	0.023

* The complete analysis can be found in Appendix D

Substantive Research Questions

Substantive Research Question 1

Which OEs best differentiate between gifted and non-identified individuals?

To determine which OEs have the greatest discriminating power between the gifted and non-identified subjects, a One-Way Predictive Discriminant Function Analysis (PDA) was performed. This analysis was used to determine whether group membership, the dependent variable, can be reliably predicted based on a series of independent variables (Tabachnick & Fidell, 1989). In this case, the dependent variable was classification and the independent variables were the five OE scores. A PDA can also indicate the contribution of each independent variable to the prediction of group membership. All gifted subjects were included regardless of method of identification.

Table 24

Results of Discriminant Analysis of OE Data for the Total Sample*

Predictor Variable	Correlations of predictor variables with discriminant function 1	Univariate F	Pooled within-group correlations among predictors P	S	M	T	E
Psychomotor	0.42	11.45	-	0.20	0.19	0.15	0.18
Sensual	- 0.15	1.43		-	0.39	0.34	0.39
Imaginational	0.62	24.68			-	0.52	0.43
Intellectual	0.71	32.28				-	0.38
Emotional	0.16	1.66					-
Canonical R	0.32						
Eigenvalue	0.11						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The PDA resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .899, $p < .0001$). The standard cutoff when determining which variables contribute to the discriminant function in a meaningful way is typically .4. Therefore, the results indicated that Intellectual, Imaginational, and Psychomotor OEs contributed meaningfully to discriminating between the gifted and non-identified samples (see Table 24). Gifted individuals had higher scores on these OEs.

The optimal prediction equation based on the standardized discriminant function coefficients was:

$$\text{Function 1} \quad D = .6466z_{\text{Intellectual}} + .5056z_{\text{Imaginational}} + .3782z_{\text{Psychomotor}}$$

A subsequent classificatory analysis was performed to ascertain the number of subjects in the non-identified group that have similar OE profiles to those in the gifted group. The results of this analysis are presented in Table 25. It shows that 79.9% of the non-

Table 25

Classification Table for the Total Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	254*	64	318
	79.9%†	20.1%	
2 (GT)	135	118*	253
	53.4%	46.6%	
Sum	389	182	571

* Students correctly classified and considered hits.
† The base rate for this sample is 55.7% (NGT) and 44.3% (GT)

identified and 46.6% of the gifted sample were correctly classified and a total of 63.3% of the total sample was correctly classified. When compared with the base rate of 55.7% (non-identfied) and 44.3% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects (see Appendix F).

Substantive Research Question 2

Do differences in age, gender, and race affect which OEs best discriminate gifted and non-identified individuals?

Separate PDAs were performed to investigate whether profile differences exist when subjects were separated according to demographic characteristics such as gender, race, and age in conjunction with classification as gifted or non-identified. Therefore, a total of 13 PDAs were performed to answer this question, one for each age group and gender; one for each age group by gender (a total of six); one for the Caucasian sample; and one for the African-American sample.

To determine which OEs have the greatest discriminating power between the gifted and non-gifted subjects of these subsamples, One-Way Predictive Discriminant Function Analyses (PDA) were performed. These analyses were used to determine whether group membership, the dependent variable, can be reliably predicted based on a series of inde-

pendent variables (Tabachnick & Fidell, 1989). For each of these analyses, the dependent variable is classification as gifted or non-identified and the independent variables are the five OE scores. A PDA can also indicate the contribution of each independent variable on the prediction of group membership. Additionally, subsequent Classificatory Analyses were performed for each subsample to ascertain the number of subjects in the non-identified groups that have similar OE profiles to those in the gifted groups. All PDAs included gifted subjects, regardless of method of identification.

Total age group 1 sample. The PDA for the age group 1 sample resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .901, p = .0012). Emotional, Imaginational, and Intellectual OEs all had correlations greater than .4 and therefore discriminate between the gifted and non-identified samples (see Table 26). Gifted individuals in age group 1 have higher scores on these OEs than the non-identified individuals in age group 1.

Table 26

Results of Discriminant Analysis of OE Data for the Age Group 1 Sample*

	Correlations of predictor variables with discriminant		Pooled within-group correlations among predictors				
Predictor Variable	function 1	Univariate F	P	S	M	T	E
Psychomotor	0.35	2.56	-	0.19	0.20	0.11	0.11
Sensual	0.09	0.19		-	0.25	0.26	0.21
Imaginational	0.67	9.57			-	0.50	0.27
Intellectual	0.41	3.68				-	0.31
Emotional	0.84	15.28					-
Canonical R	0.31						
Eigenvalue	0.11						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .7448z_{\text{Emotional}} + .4988z_{\text{Imaginational}} - .0350z_{\text{Intellectual}}$

The results of the Classificatory Analysis are presented in Table 27. It shows that 80.2% of the non-identified and 47.3% of the gifted sample were correctly classified; and a total of 63.8% of the total sample was correctly classified. When compared with the base rate of 53.8% (non-identfied) and 46.2% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 27

Classification Table for the Age Group 1 Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	85*	21	106
	80.2%†	19.8%	
2 (GT)	48	43*	91
	52.7%	47.3%	
Sum	134	63	197

* Students correctly classified and considered hits.
† The base rate for this sample is 53.8% (NGT) and 46.2% (GT).

Total age group 2 sample. The PDA for the age group 2 sample resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .840, $p < .0001$). Since the standard cutoff when determining which variables contribute to the discriminant function in a meaningful way is typically .4, Intellectual and Imaginational OEs do so for age group 2 (see Table 28). For age group 2, gifted individuals have higher scores on both OEs.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .9627z_{\text{Intellectual}} + .2907z_{\text{Imaginational}}$

Table 28

Results of Discriminant Analysis of OE Data for the Age Group 2 Sample*

	Correlations of predictor variables with discriminant		Pooled within-group correlations among predictors				
Predictor Variable	function 1	Univariate F	P	S	M	T	E
Psychomotor	0.23	1.99	-	0.19	0.21	0.12	0.19
Sensual	- .09	0.26		-	0.31	0.20	0.33
Imaginational	0.50	8.98			-	0.54	0.59
Intellectual	0.87	27.64				-	0.47
Emotional	0.10	0.37					-
Canonical R	0.4						
Eigenvalue	0.19						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The results of the Classificatory Analysis are presented in Table 29. It shows that 60.0% of the non-identified and 77.0% of the gifted sample were correctly classified; and a total of 65.0% of the total sample was correctly classified. For this sample, the gifted and non-identified subjects were classified with the same degree of accuracy when compared to the base rate for this analysis.

Table 29

Classification Table for the Age Group 2 Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	48*	32	80
	60.0%†	40.0%	
2 (GT)	26	87*	113
	23.0%	77.0%	
Sum	74	119	193

* Students correctly classified and considered hits.
† The base rate for this sample is 41.5% (NGT) and 58.5% (GT).

Total age group 3 sample. The PDA resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .837, $p < .0001$). Intellectual, Imaginational, and Psychomotor OEs correlate with the discriminant function at .4 or greater, and therefore meaningfully discriminate between the gifted and non-identified samples (see Table 30). Gifted individuals in age group 3 have higher scores on these OEs than the non-identified group.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .6710z_{\text{Intellectual}} + .4623z_{\text{Imaginational}} + .2915z_{\text{Psychomotor}}$

The results of the Classificatory Analysis are presented in Table 31. It shows that 90.9% of the non-identified and 30.6% of the gifted sample were correctly classified; and a total of 60.8% of the total sample was correctly classified. When compared with the base rate of 72.9% (non-identfied) and 27.1% (gifted) again, it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 30

Results of Discriminant Analysis of OE Data for the Age Group 3 Sample*

	Correlations of predictor variables with discriminant		Pooled within-group correlations among predictors				
Predictor Variable	function 1	Univariate F	P	S	M	T	E
Psychomotor	0.42	6.16	-	0.21	0.13	0.15	0.15
Sensual	0.30	3.25		-	0.35	0.25	0.28
Imaginational	0.72	18.08			-	0.43	0.33
Intellectual	0.87	26.35				-	0.21
Emotional	0.15	0.78					-
Canonical R	0.40						
Eigenvalue	0.20						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

Table 31

Classification Table for the Age Group 3 Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	120*	12	132
	90.9%†	9.1%	
2 (GT)	34	15*	49
	69.4%	30.6%	
Sum	154	27	181

* Students correctly classified and considered hits.
† The base rate for this sample is 72.9% (NGT) and 27.1% (GT).

Total male sample. The PDA for the male sample resulted in one discriminant function that did not significantly discriminate between the gifted and non-identified groups: Wilks' Lambda (df = 5) = .952, p = .059. While there is no statistically significant difference, mean OE scores are greater for the gifted males than for the non-identified males for all OEs except Sensual OE.

Male sample by age group. When the male sample was separated by age group, the discriminant function created for each age group was unable to significantly separate the gifted and non-identified subjects. While Wilks' Lambda approached significance for age groups 1 and 2 (Wilks' Lambda (df = 5) = .895, p = .085; Wilks' Lambda (df = 5) = .871, p = .058), but it did not for age group 3 (Wilks' Lambda (df = 5) = .828, p = .134).

Total female sample. The PDA for the female sample resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups: Wilks' Lambda (df = 5) = .871, p < .0001. The standard cutoff when determining which variables contribute to the discriminant function in a meaningful way is typically .4, therefore, Intellectual, Imaginational, and Psychomotor OEs meaningfully discriminate between the gifted and non-identified samples (see Table 32). Gifted females have higher scores on these OEs compared to the non-identified females.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .8576z_{\text{Intellectual}} + .2380z_{\text{Imaginational}} + .4116z_{\text{Psychomotor}}$

The results of the Classificatory Analysis are presented in Table 33. It shows that for the females 76.8% of the non-identified and 52.4% of the gifted sample were correctly classified; and a total of 64.6% of the total sample was correctly classified. When compared with the base rate of 55.0% (non-identfied) and 45.0% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 32

Results of Discriminant Analysis of OE Data for the Total Female Sample*

Predictor Variable	Correlations of predictor variables with discriminant function 1	Univariate F	Pooled within-group correlations among predictors				
			P	S	M	T	E
Psychomotor	0.51	12.44	-	0.16	0.22	0.18	0.16
Sensual	- .01	0.01		-	0.46	0.45	0.38
Imaginational	0.56	14.96			-	0.62	0.46
Intellectual	0.79	29.31				-	0.46
Emotional	0.26	3.31					-
Canonical R	0.36						
Eigenvalue	0.15						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

Table 33

Classification Table for the Total Female Sample

Actual Group	Predicted Group 1 (NGT)	Predicted Group 2 (GT)	Sum
1 (NGT)	136*	41	177
	76.8%†	23.2%	
2 (GT)	69	76*	145
	47.6%	52.4%	
Sum	205	117	322

* Students correctly classified and considered hits:
† The base rate for this sample is 55.0% (NGT) and 45.0% (GT).

Female age group 1 sample. The PDA resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .878, p = .023). Emotional and Imaginational OEs correlate with the discriminant function at .4 or greater, therefore only two OEs meaningfully discriminate between the gifted and non-identified groups (see Table 34). Female gifted individuals in age group 1 have higher scores on these OEs than the female non-identified subjects. Examination of these results in terms of the male age group 1 PDAs and the PDA for the total age group 1 sample, it appears that the female age group 1 sample was the main influence in discriminating for age group 1 since the male samples were not significantly separated by their OE scores.

Table 34

Results of Discriminant Analysis of OE Data for the Female Age Group 1 Sample*

	Correlations of predictor variables with discriminant		Pooled within-group correlations among predictors				
Predictor Variable	function 1	Univariate F	P	S	M	T	E
Psychomotor	0.27	1.07	-	0.27	0.31	0.20	0.07
Sensual	- .17	0.40		-	0.29	0.31	0.16
Imaginational	0.60	5.14			-	0.46	0.15
Intellectual	0.34	1.62				-	0.39
Emotional	0.72	7.46					-
Canonical R	0.35						
Eigenvalue	0.14						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .7402z_{\text{Emotional}} + .6298z_{\text{Imaginational}}$

The results of the Classificatory Analysis are presented in Table 35. It shows that 81.4% of the non-identified and 50.0% of the gifted sample were correctly classified; and a total of 67.6% of the total sample was correctly classified. When compared with the base rate of 56.2% (non-identfied) and 43.8% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 35

Classification Table for the Female Age Group 1 Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	48*	11	59
	81.4%†	18.6%	
2 (GT)	23	23*	46
	50.0%	50.0%	
Sum	71	34	105

* Students correctly classified and considered hits.
† The base rate for this sample is 56.2% (NGT) and 43.8% (GT).

Female age group 2 sample. The PDA for the female age group 2 sample resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .751, p < .0001). Since the standard cutoff when determining which variables contribute to the discriminant function in a meaningful

way is typically .4, Intellectual, Imaginational, and Psychomotor OEs do so for the female age group 2 (see Table 36). For this sample, gifted individuals have higher scores on all three OEs.

Table 36

Results of Discriminant Analysis of OE Data for the Female Age Group 2 Sample*

Predictor Variable	Correlations of predictor variables with discriminant function 1	Univariate F	Pooled within-group correlations among predictors				
			P	S	M	T	E
Psychomotor	0.44	6.85	-	0.07	0.10	0.04	- .08
Sensual	0.05	0.09		-	0.45	0.38	0.41
Imaginational	0.48	8.37			-	0.58	0.49
Intellectual	0.86	26.53				-	0.51
Emotional	0.28	2.88					-
Canonical R	0.50						
Eigenvalue	0.33						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .9669z_{\text{Intellectual}} + .0662z_{\text{Imaginational}} + .4032z_{\text{Psychomotor}}$

The results of the Classificatory Analysis are presented in Table 37. It shows that 68.1% of the non-identified and 71.9% of the gifted sample were correctly classified; and a total of 70.3% of the total sample was correctly classified. When compared with the base rate of 42.3% (non-identfied) and 57.7% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 37

Classification Table for the Female Age Group 2 Sample

Actual Group	Predicted Group 1 (NGT)	Predicted Group 2 (GT)	Sum
1 (NGT)	32*	15	47
	68.1%†	31.9%	
2 (GT)	18	46*	64
	28.1%	71.9%	
Sum	50	61	111

* Students correctly classified and considered hits.
† The base rate for this sample is 42.3% (NGT) and 57.7% (GT).

Female age group 3 sample. The PDA for the female age group 3 sample resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .844, p = .004). Since the standard cutoff when determining which variables contribute to the discriminant function in a meaningful way is typically .4, Intellectual and Imaginational OEs do so for the female age group 3 (see Table 38). For this group, gifted individuals have higher scores on both OEs.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .9233z_{\text{Intellectual}} + .0873z_{\text{Imaginational}}$

The results of the Classificatory Analysis are presented in Table 39. It shows that 93.0% of the non-identified and 40.0% of the gifted sample were correctly classified; and a total of 75.5% of the total sample was correctly classified. When compared with the base rate of 67.0% (non-identfied) and 33.0% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 38

Results of Discriminant Analysis of OE Data for the Female Age Group 3 Sample*

Predictor Variable	Correlations of predictor variables with discriminant function 1	Univariate F	Pooled within-group correlations among predictors				
			P	S	M	T	E
Psychomotor	0.36	2.51	-	0.18	0.21	0.20	0.23
Sensual	0.37	2.65		-	0.40	0.34	0.24
Imaginational	0.61	7.06			-	0.62	0.43
Intellectual	0.95	17.48				-	0.30
Emotional	0.10	0.17					-
Canonical R	0.4						
Eigenvalue	0.19						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

Table 39

Classification Table for the Female Age Group 3 Sample

Actual Group	Predicted Group 1 (NGT)	Predicted Group 2 (GT)	Sum
1 (NGT)	66*	5	71
	93.0%†	7.0%	
2 (GT)	21	14*	35
	60.0%	40.0%	
Sum	87	19	106

* Students correctly classified and considered hits.
† The base rate for this sample is 67.0% (NGT) and 33.0% (GT).

Caucasian sample. The PDA resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .839, p = .0045). Four of the five OEs correlate with the discriminant function at .4 or greater, and therefore meaningfully discriminate between the gifted and non-identified samples (see Table 40); they are Emotional, Imaginational, Intellectual, and Psychomotor. Gifted individuals in the Caucasian sample have higher scores on these OEs than the non-identified group.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .6137z_{\text{Emotional}} + .3417z_{\text{Imaginational}} + .1243z_{\text{Intellectual}} + .3397z_{\text{Psychomotor}}$

Table 40

Results of Discriminant Analysis of OE Data for the Caucasian Sample*

Predictor Variable	Correlations of predictor variables with discriminant function 1	Univariate F	Pooled within-group correlations among predictors				
			P	S	M	T	E
Psychomotor	0.44	3.75	-	0.17	0.24	0.17	- .05
Sensual	0.37	2.55		-	0.13	0.16	0.09
Imaginational	0.71	9.5			-	0.40	0.34
Intellectual	0.55	5.7				-	0.32
Emotional	0.77	11.24					-
Canonical R	0.40						
Eigenvalue	0.19						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The results of the Classificatory Analysis are presented in Table 41. It shows that 70.6% of the non-identified and 54.0% of the gifted sample were correctly classified; and a

total of 62.4% of the total sample was correctly classified. The non-identified subjects are classified accurately 16.6% more often than the gifted subjects when compared with the base rates for the two groups.

Table 41

Classification Table for the Caucasian Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	36*	15	51
	70.6%	29.4%	
2 (GT)	23	27*	50
	46.0%	54.0%	
Sum	59	42	101

* Students correctly classified and considered hits.
† The base rate for this sample is 50.5% (NGT) and 49.5% (GT).

African-American sample. The PDA for the African-American sample produced one discriminant function that did not significantly discriminate between the gifted and non-identified groups: Wilks' Lambda (df = 5) = .987, p = .957. In fact, the groups are so similar in their mean OE scores that there is never more than a .6 difference between the two groups for any OE.

Substantive Research Question 3

Does method of gifted identification affect which OEs best discriminate between gifted and non-identified individuals?

A second set of PDAs were run, one for each method of identification as the dependent variable and the five OEs as the independent variables. They were intended to determine whether different OEs best differentiate between the gifted and non-identified groups of subjects based on the method of gifted identification. They were also followed by a Classificatory Analyses.

Objective method of identification sample. The PDA resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups (Wilks' Lambda (df = 5) = .860, p < .0001). The standard cutoff when determining which variables contribute to the discriminant function in a meaningful way is typically .4. Therefore, Intellectual and Imaginational OEs meaningfully discriminate between the gifted and non-identified samples (see Table 42). Gifted individuals have higher scores on both Intellectual and Imaginational OE scores compared to the non-identified sample.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .6563z_{\text{Intellectual}} + .5980z_{\text{Imaginational}}$

Table 42

Results of Discriminant Analysis of OE Data for the Objective Method of Identification Sample

	Correlations of predictor variables with discriminant		Pooled within-group correlations among predictors				
Predictor Variable	function 1	Univariate F	P*	S	M	T	E
Psychomotor	0.31	7.36	-	0.21	0.18	0.15	0.20
Sensual	0.01	0.01		-	0.37	0.34	0.40
Imaginational	0.75	43.68			-	0.50	0.43
Intellectual	0.79	49.00				-	0.37
Emotional	0.25	4.71					-
Canonical R	0.37						
Eigenvalue	0.16						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The results of the Classificatory Analysis are presented in Table 43. It shows that 92.1% of the non-identified and 34.8% of the gifted sample were correctly classified; and a total of 63.5% of the total sample was correctly classified. When compared with the base rate of 66.4% (non-identfied) and 33.6% (gifted), it appears that the non-identified subjects are classified more accurately than the gifted subjects.

Table 43

Classification Table for the Objective Method of Identification Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	293*	25	318
	92.1%†	7.9%	
2 (GT)	105	56*	161
	65.2%	34.8%	
Sum	398	81	479

* Students correctly classified and considered hits.
† The base rate for this sample is 66.4% (NGT) and 33.6% (GT).

Objective and subjective methods of identification sample. The PDA resulted in one discriminant function that significantly discriminated between the gifted and non-identified groups: Wilks' Lambda (df = 5) = .947, p = .0005. Psychomotor and Sensual OEs most meaningfully discriminate between the gifted and non-identified samples (see Table 44) as they have correlation with the discriminant function greater than the standard .4 cutoff. Gifted individuals have higher scores on Psychomotor OE and lower on Sensual OE scores compared to the non-identified sample.

Table 44

Results of Discriminant Analysis of OE Data for the Objective and Subjective Methods of Identification Sample*

	Correlations of predictor variables with discriminant		Pooled within-group correlations among predictors				
Predictor Variable	function 1	Univariate F	P	S	M	T	E
Psychomotor	0.59	8.13	-	0.23	0.21	0.15	0.15
Sensual	- .57	7.40		-	0.43	0.29	0.45
Imaginational	0.04	0.04			-	0.50	0.47
Intellectual	0.22	1.08				-	0.30
Emotional	- .15	0.49					-
Canonical R	0.23						
Eigenvalue	0.06						

* PSMTE stand for Psychomotor, Sensual, Imaginational, Intellectual, and Emotional OEs, respectively.

The optimal prediction equation based on the standardized discriminant function coefficients is:

Function 1 $D = .7289z_{\text{Psychomotor}} - .8749z_{\text{Sensual}}$

The results of the classificatory analysis are presented in Table 45. It shows that 99.1% of the non-identified and 2.2% of the gifted sample were correctly classified; and a total of 50.7% of the total sample was correctly classified. It appears that the discriminant function equation accurately classified the non-identified subjects with a great deal of accuracy, yet is equally inaccurate when applied to the gifted sample.

Table 45

Classification Table for the Objective and Subjective Methods of Identification Sample

	Predicted Group		
Actual Group	1 (NGT)	2 (GT)	Sum
1 (NGT)	315*	3	318
	99.1%†	0.9%	
2 (GT)	90	2*	92
	97.8%	2.2%	
Sum	405	5	410

* Students correctly classified and considered hits.
† The base rate for this sample is 77.6% (NGT) and 22.4% (GT).

CHAPTER V

SUMMARY AND DISCUSSION

The research questions for this study fell into two categories: Questions related to methodology associated with the OEQ and questions related to the use of the OEQ to differentiate between gifted and non-identified individuals. The following chapter summarizes the statistical analysis results and discusses them in terms of the previous literature. This is followed by theoretical and practical implications of the results.

Summary of Results

Methodological Results

Methodological Research Question 1

What are the internal test characteristics of the Overexcitability Questionnaire?

The literature to date has not adequately explored the internal test characteristics of the OEQ. Few studies have reported reliability statistics of any kind. Those that have reported internal consistency information on the OEQ have done so only for the total sample used in the study; and generally, the samples are not very large. Therefore, using a large sample which can be broken down into subsamples, and still retain reasonable sizes, provides useful information about the internal consistency of the OEQ for various groups of individuals.

For the present study, the Cronbach Alpha internal consistency coefficients generally reach an acceptable level for research purposes (.60 - .80). The patterns of Alpha coefficients for the five OEs for the total sample and the sample broken down by classification, age group and gender indicate that Psychomotor and Sensual OEs usually have the lowest internal consistency coefficients. This pattern is also seen in previous studies. A possible explanation for these results is the nature of the OEQ and the responses it elicits. Prior research, as well as the current study, show that the mean OE scores are usually lowest for Psychomotor and Sensual. Additionally, while all items are scored for all five forms of OE, many of the items appear to be more focused on Imaginational, Intellectual, and Emotional OEs thereby increasing the response rate for these OEs. Therefore, the limited

response rate for Psychomotor and Sensual OEs may have affected the internal consistency measures.

It is also noteworthy that when the sample is broken down into several subsamples, Age groups 1 and 2 are the only ones that have more than one OE below acceptable Alpha. Reasons for this may include that these two groups have the smallest sample sizes and that if there were additional subjects, the internal consistency would be acceptable. Another possible explanation for Age group 1 is that the subjects are too young to provide appropriate responses to an open-ended questionnaire. Piechowski and Miller (1994) found that most of their subjects 12 years old and younger required help answering the questionnaire. Other studies using this age group did not provide help for their subjects which may have affected the results.

It is also noteworthy that inter-rater reliability coefficients reported in previous studies do not follow the same pattern as those for internal consistency. Psychomotor and Sensual OEs do not necessarily have the lowest coefficients (Ackerman, 1993; Domroese, 1994).

The most compelling conclusions that can be drawn from these findings are that the OEQ is less reliable with younger individuals, and that both Psychomotor and Sensual OE scales are in need of further investigation and revision in order to ensure adequate internal consistency of those scales.

Methodological Research Question 2

Are there differences in OE profiles based on personological characteristics; i.e. age, gender, and race?

Examination of subject characteristic influences on OE scores indicated that identification as gifted, age, gender, and race do affect OE scores and that this influence in some cases results from an interaction among these characteristics. While many previous studies examined one or more of these personological characteristics, most did so using univariate statistical procedures, not multivariate analyses as used in this study. Therefore, there is limited prior research to support or refute these findings.

There were significant main effects for all three independent variables in the multivariate analysis: classification, age group, and gender. For classification, Psychomotor, Imaginational, Intellectual, and Emotional OEs were significantly higher for the gifted

group compared to the non-identified group. Similar findings are noted in almost every study comparing gifted and non-identified samples. Those studies that performed significance tests consistently found that scores were higher for the gifted samples. While the same OEs are not always found to be significantly different, several generally are. There are also many studies that did not investigate significant differences, in which the relative strength of the OEs is almost always in favor of the gifted samples. The one exception to this pattern is when gifted groups are compared to identified creative samples. In such cases, the creative groups have OE profiles higher than those of the gifted samples.

In addition to the main effect for classification, an interaction effect with age group was noted in the analysis for Intellectual OE. After parsing out where differences exist for the gifted and non-identified groups for each age group, only age groups 2 and 3 were significantly different for classification in favor of the gifted subjects. Also, since there was no significant difference for age group 1, it is clear that the relationship between the gifted and non-identified groups is different for different age groups. This finding is unique to this study as multivariate analyses for these variables have not been performed in other studies.

As previously mentioned, there was also a main effect for age group. All five OEs were found to be significantly different by age group. The most salient feature here is that age group 3 has consistently higher scores than age group 1 and sometimes age group 2, and that age group 2 is always significantly higher than age group 1. The one OE that does not follow these trends is Psychomotor, where age group 2 is significantly higher than age groups 1 and 3.

The interaction between age group and classification for Intellectual OE has already been discussed, however, there was also a significant interaction between age group and gender for Psychomotor and Emotional OEs. Examination of the male and female groups for each age group indicated that there were no significant differences between the genders for any of the age groups. What appears to be the reason for the interaction is the pattern of means for each gender across the three age groups. Males have a steady but slight increase for Psychomotor OE as age group increases while females peak above males at age group 2 but have lower mean scores for age groups 1 and 3.

The interaction of age group and gender for Emotional OE showed significant differences between males and females for age groups 2 and 3 in favor of the female subjects. Since there was no significant difference for age group 1, it is clear that the relationship between the males and females is different across age groups for Emotional OE. These interactions between age group and gender shed new light on the results of prior research as such interactions have not been previously reported.

Piechowski and Miller (1995) is the only study that examined a similar interaction. They found no gender main effects and found no interaction between age and gender for any of the OEs in their sample. However, they did find a main effect for age group; the older group was significantly higher on Imaginational, Intellectual, and Emotional OEs. Piechowski and Miller's age groups correspond to age groups 1 and 2 in the present study, and therefore are consistent with the findings of this study, with the exception of the interaction between Intellectual OE and gender. They offer an explanation for these age group differences suggesting that the youngest subjects had too much difficulty responding to the OEQ in written form. Another possible explanation is that younger children, even gifted ones, may not have the experience and scope to identify or recognize the type and breadth of responses they themselves have. Therefore, their responses would not be an accurate indication of their actual OEs.

Gender main effects were found for Imaginational and Emotional OEs. Both were significantly higher for females. Ammirato (1987) and Piirto et al. (1996) also found a significant main effect for Emotional OE in favor of females. This finding is similar to that of several research studies (eg. Ackerman, 1993; Breard, 1994). Often Emotional OE is higher for females than males. On the other hand, some studies have found other OEs to be higher for males (eg. Ackerman, 1993; Miller, et al., 1994).

Examining the effects of race and classification on OE scores indicated that there were significant main effects for both race and classification, but no interaction between the two independent variables. In this subsample, the gifted subjects had significantly higher mean scores for Imaginational, Intellectual, and Psychomotor OEs than the non-identifies group. The Caucasian sample showed significantly higher scores on Psychomotor and Emotional OEs compared to the African-American sample.

The only study that investigated OE score differences between African-American and Caucasian individuals was Breard (1994). While she did not use significance tests to explore differences between the two groups, she did report that the Caucasian subjects were higher on Psychomotor and Emotional OEs and the African-American group was higher on Sensual, Imaginational, and Intellectual. These results are somewhat consistent with the present findings, at least for Psychomotor and Emotional OEs. However, even though the present study shows mean scores for Imaginational and Intellectual in favor of the African-American sample, the actual mean differences are less than .5 for both.

In conclusion, there are several differences in OE profiles based on personological characteristics, therefore, these findings suggest that there are implications for interpretation and analysis of past and future studies using the OEQ.

Methodological Research Question 3

What is the influence of design characteristics of the individual studies on OEQ scores; i.e. is there a difference in OE profile based on method of gifted identification?

Method of identification appears to show significant differences for all OEs except Psychomotor. Those gifted subjects identified using objective measures only have higher OE scores than those identified using objective and subjective measures. No other studies have investigated this difference. While a difference between these two groups is not surprising, the trend is.

It seems rather curious that one method of identification should reveal a group with a significantly elevated profile across almost all areas when compared to a group of gifted individuals identified using a different method. However, this may be indicative of the heterogeneity of the individuals identified as gifted.

Substantive Results

Substantive Research Question 1

Which OEs best differentiate between gifted and non-identified individuals?

When looking to see which OEs best differentiate between the gifted and non-identified samples, it was found that for the the total sample, Intellectual, Imaginational, and Psychomotor OEs meaningfully contribute to differentiating between the two groups. Gifted subjects have greater means for all three forms of OE. Using these OEs to classify

79.9% for non-identified subjects, and 46.6% for gifted subjects. When compared to the base rate for this sample, the non-identified group was classified 24.8% better than chance and the gifted group was classified 2.3% better than chance. This pattern of greater classification accuracy for the non-identified sample is also found in the Breard (1994) sample, but not in the Ackerman (1993) sample. Ackerman found both groups to be classified correctly 73% of the time. However, neither Ackerman nor Breard accounted for sample size differences in their classification analyses.

Other studies have found varying combinations of OEs in different orders differentiating between gifted and non-identified groups. Ackerman (1993) found that Psychomotor, Intellectual, and Imaginational differentiated best for a group of high school students and Breard (1994) found that Emotional and Intellectual were the best discriminators for gifted, near-gifted, and non-gifted samples of young adolescents. Ackerman's classification was 23.4% above chance; which is considerably better than for the current aggregated sample. Breard's classification was 10.3% above chance and slightly lower. The most salient conclusion that can be made from these analyses is that OEs appear to significantly differentiate between individuals identified as gifted and those not identified.

Substantive Research Questions 2 and 3

Do differences in age, gender, and race affect which OEs best discriminate gifted and non-identified individuals? Does method of gifted identification affect which OEs best discriminate between gifted and non-identified individuals?

Looking at the sample to determine whether there were differences in the OEs that best discriminated between gifted and non-identified groups based on age, gender, race, and method of gifted identification indicated that there were some differences and some similarities. The first notable finding was that the only subgroups that could not be significantly differentiated using OEs were the total male sample, the male divided by age group, and the African-American sample.

While the PDA for the African-American sample was not significant, Breard (1994) found that OEs could differentiate between the gifted and non-identified subjects in her African-American sample. She also found that several non-identified African-American students exhibited OE profiles similar to those of the gifted subjects.

For all three age groups, the total female sample and the female sample divided by age group, the Caucasian sample, and the two gifted groups identified using different measures, the gifted and non-identified groups were significantly discriminated by some combination of OEs. A closer look at all of the PDA results shows that in all cases, except the combined objective and subjective method of identification and the female age group 2 sample, Intellectual and Imaginational OEs meaningfully contributed to the differentiation of the gifted and non-identified samples. The total, age group 3, female, and female age group 2 samples had the same results: Intellectual, Imaginational, and Psychomotor OEs differentiated in order of their contribution. Age group 2, the female age group 3, and the objective method of identification had only Intellectual and Imaginational OEs contribute to the differentiation of the gifted and non-identified groups. Somewhat differently, age group 1 showed Emotional OE as the most meaningful discriminator followed by Imaginational and Intellectual OEs.

The only PDA with vastly different results was for the gifted identification method using objective and subjective methods combined. The gifted and non-identified groups were significantly discriminated by Psychomotor and Sensual OEs.

There is only one study that examined the discriminating power of the OEs in subsamples according to gender (Ackerman, 1993) and none that examined age or gifted identification method. Ackerman found that both her male and female samples could be significantly differentiated by OE scores. If the same cutoff is used to determine the meaningfully contributing OEs as was used in the present study, which is different than what Ackerman reported, Psychomotor and Intellectual OEs differentiate between the gifted and non-identified groups. The male sample is differentiated by Psychomotor, Intellectual, and Imaginational OEs. It is notable that there is a similarity between the earlier Ackerman (1993) study and the current secondary analysis for the female samples in that both Intellectual and Psychomotor OEs were identified as variables that significantly discriminate between the gifted and non-identified females. Classification results were also better for the Ackerman subgroups than those for the current study. It is important to note that Ackerman's (1993) analyses were run using relatively small samples, especially for the male group.

It is very interesting to note that Emotional OE shows up as a significant discriminator in only three PDAs, the age group 1, female age group 1, and the Caucasian samples. Theoretically, Emotional OE is considered the most important OE in terms of developmental potential and should differentiate between those individuals with higher and lower levels of potential. However, this was not found to be the case in this data set.

Another trend in this set of analyses is the consistently lower classification accuracy for the gifted groups compared to the non-identified groups in all cases. When compared with the base rates for each analysis, the gifted groups are generally classified less than 10.0% above chance with the exception of the age group 2 and female age group 2 samples (18.5% and 14.2% respectively). Classification above the base rates for the non-identified groups was considerably higher. In all cases they were classified at least 18.0% above chance.

Method of identification results indicate that the method of gifted identification seriously influences which OEs differentiate between gifted and non-identified individuals. There was no overlap in OE form for the two methods of identification: Intellectual and Imaginational differentiated when only objective measures were used, versus Psychomotor and Sensual OEs which differentiated when both objective and subjective measures. Additionally, the combined objective and subjective method of identifying gifted individuals is the only PDA that included Sensual OE as a meaningful discriminator. This is a unique result that might be explained by considering that both OEs for the objective and subjective identification group are nonintellective factors unlikely to be captured from standardized objective measures used in identification and more likely to be captured when subjective measures, such as behavioral rating forms and recommendation forms, are used.

Implications

Theoretical Implications

The results from these analyses may have implications for Dabrowski's theory as well as for the procedures used to identify gifted individuals to receive appropriate differentiated instruction. The consistent finding that gifted individuals have higher OE scores than non-identified individuals supports Dabrowski's theory. Another supportive finding is that the

gifted subjects' OE profiles are lower than those reported in the literature for creative individuals. Dabrowski stressed that the creative individuals in the population are those who will have the strongest OEs. Since the sample did not include individuals classified as creative, these lower profiles might be expected.

Two theoretical points that are not supported are the absence of age and gender differences for OE profiles. There were gender differences for two OEs and age group differences for all five OEs. Theoretically, these differences should not exist: Dabrowski suggests that there are no differences in OEs based on gender or age. The age group differences may be an artifact of the instrument since the current OEQ appears to be less reliable for the youngest subjects. While Dabrowski posits that there are no gender differences, such findings are reported in several studies and may have implications for revising the theory. However, these difference may be due to the differentiated response styles for males and females, since males are generally less likely to disclose the kind of information requested on the OEQ.

Also, since previous research has found a relationship between fluency and OE scores (Ackerman, 1993), age and gender differences in verbal ability of subjects may have contributed to these differences. Therefore, it is possible that verbal ability may be influencing OE scores, but be masked by age and gender differences. These issues could be elucidated by examining the relationship between verbal fluency and OE scores. Additionally, the issue of written fluency may argue for a version of the OEQ with a decreased written response, however, versions which elicit oral responses might still result in difficulties related to verbal fluency. Further research is needed to discover the true nature of the relationship between fluency and OE scores and ways in which this effect can be diminished.

In addition to the implications for Dabrowski's theory, this theory also has implications for theories of development by contributing a qualitatively different way of looking at gifted individuals compared to other theories. It may also provide greater insight into the nature of giftedness beyond that which is commonly understood in terms of high IQ and school-achievement conceptions of giftedness.

Research Implications for the OEQ

While this study found the internal consistency of the OEQ to be adequate for most

subsamples, more research is needed to look at other test characteristics. The limited information available on the various forms of validity for the OEQ must be improved upon. For example, research examining the construct validity using convergent and divergent methodology would strengthen the instrument. Additionally, if the OEQ is to be used to identify gifted students, establishing the predictive validity of the OEQ for this purpose is essential.

Since the internal consistency was rather weak for the youngest age group, research investigating alternative administrations of the instrument may provide a means of gathering better data from this group of individuals. Thus far, the only significant reported variation in administration occurred in two studies where the OEQ was given in oral format (Gallagher, 1986; Piechowski & Miller, 1995). The results did not indicate particularly different profiles, however, neither did they provide information on the internal consistency of the OEQ for their samples.

Additionally, the very nature of the OEQ, that is its open-ended response style and length, make it impractical for use in most settings. While the administration time is not excessive, the scoring process is lengthy and requires trained individuals for this purpose. Therefore, a shortened version of the OEQ would be helpful and is currently being explored (Miller & Ackerman, 1997). Another avenue would be to develop an objective version of the OEQ which would remove the need for specialized scoring training, reducing difficulties related to verbal fluency discussed previously, and in the process perhaps adding additional information regarding the response continua. For example, Kwon (1996) has developed a computer analyzed form of the Torrance Tests of Creative Thinking in which not only were response patterns were congruent with those found in written forms, but response patterns and tendencies were made available for analysis. This form of administration could also help those individuals reluctant to reveal personal information.

It will also be important to pursue a line of research investigating what variables may influence OE scores. The results of this study indicate that method of gifted identification significantly influences the OE scores of individuals identified using different kinds of measures. A study examining the relationship between individual identification tools and OE scores would shed some light on this subject. Methods of identification of gifted individuals has been so broadly defined that there is a great need to consider the contribution

different tools or instruments make to the process.

Since it appears that even the highest OE scores for various subsamples in this study are lower than some of the OE scores in studies of creative individuals (eg. Manzanero, 1985), a next step would be to include samples of creative individuals for comparison with gifted samples. Investigation of the interaction of demographic variables, such as age, gender, ethnicity, race, and classification, on the OE scores of both gifted and creative individuals would add much to our understanding of creativity, as well as of the creative component of giftedness.

Since interactions were found among personological characteristics and OEs, it is essential that more research be done to better understand the nature of these interactions as well as the specific main effects of each variable. For example, selecting samples which systematically differ in relation to a specific characteristic, such as age, gender, race, or ethnicity, would allow a more in-depth exploration of these characteristics. Such research could, in turn, better inform us as to the contribution each of the characteristics makes to the psychological development of extraordinariness.

It appears that the OEQ may not be as effective a method of identifying male individuals as it is for females. This is a rather curious finding and perhaps further research in this area would be able to determine why this may be the case and investigate how to improve the usefulness of the OEQ for male individuals. These findings may also simply be a reflection of the original identification process for males; that is, perhaps the identification methods used are not as effective for males and therefore both identified and non-identified groups of males are heterogeneous and undifferentiated. It is very common for unidentified gifted males in school to act out because they are dissatisfied with the system. This often results in referral for conduct problems, but not assessment or consideration for gifted programs. An alternative hypothesis is that males may be less willing to detail personal information, therefore, the results may be indicative of male characteristics in general, not the relationship between gifted and non-identified males.

A less optimistic finding is that the OEQ is less effective at differentiating the gifted and the non-identified in the school-age population where it would be most valuable; and that it is least reliable with students below the age of 12 years. Attempts to determine how

to make this instrument useful for younger individuals is essential because it is preferable to identify gifted individuals at early ages. Again, this may be due to characteristics of the OEQ and further research on the instrument may improve upon this.

Practical Implications

It is clear from the results of this study that the OEQ can differentiate between gifted and non-identified individuals of various ages, albeit to differing degrees. The fact that a large percentage of individuals identified as gifted were not so classified using their OE scores is notable. However, since the critical consideration is with omission of students from gifted programs, the results show that this instrument should be useful in alleviating this problem.

Since method of identification influences OE profile to such a degree that those OEs that best differentiate the gifted and the non-identified for each method appear mutually exclusive, it is important to consider that the types of individuals in each of these groups may be quite different from each other. The use of objective methods alone is clearly insufficient to identify all gifted individuals. This is an important issue for public education. Educators must be aware that their method of identification determines the characteristics of their gifted students, and in turn their educational, social, and emotional needs.

Viewing giftedness through the lens of Dabrowski's theory provides a qualitatively different view of the person, and understanding and using OEs has practical implications for identification and service. Not only can this theory assist in more thoroughly identifying gifted students, but the OEQ and OE profiles can help practitioners understand the personality characteristics of their gifted and non-identified students. This understanding will help them design better programs and provide better services for their students.

Limitations of the Study

The limitations of this study fall into two general categories, theoretical and methodological. The methodological limitations may be divided into the following areas; sample, analysis, and instrument. One limitation of this study is that the relationship between giftedness and OEs is not clearly defined. Theoretically, the gifted should show an overall elevated OE profile, particularly for Imaginational, Intellectual, and Emotional OE scores compared to non-identified individuals. However, while this profile has been seen in several studies, it does not explain those non-identified individuals with a similar elevated profile or those gifted individuals without such a profile.

Systematic bias in identifying studies for this investigation is another potential problem of this type of research. However, every attempt to locate and obtain data from published and unpublished studies using the OEQ was made. Therefore, this investigation contains a sample of studies using the OEQ that vary by age, gender, and race. Nevertheless, undetected systematic bias among the studies may also be a limitation beyond the control of the researcher.

Another set of limitations stems from the individual studies used in this investigation. Small sample sizes and low reliability can contribute to weak statistical analyses. However, some of these limitations diminish when the samples are aggregated. Additionally, the instructions and method of OEQ administration are not standardized, therefore, they differ across samples. This is a relatively minor problem because, with the exception of two studies (Breard, 1995; Domroese, 1994) all administered the entire OEQ at once. The most important factor, ample writing time to respond, was upheld in all studies regardless of method of administration.

The study may also be limited by the weaknesses inherent in aggregation of data from different studies. Combining results from studies with major differences can result in findings that make little sense (Slavin, 1984). However, this is not a significant limitation in this study since the studies are similar and the current study addressed the most basic component of each, the OEQ scores.

Limitations of the OEQ itself exist, along with the method of content analysis used in scoring the responses. The OEQ has been shown to be less effective with individuals under 12 years of age (Piechowski & Miller, 1994) because it requires extended written responses. The number of questions on the OEQ that directly address each OE is different: Intellectual OE has many related questions, while Sensual OE has only one directly related. This problem is somewhat mitigated by the fact that regardless of a question's focus, respondents answer according to their OE strengths. Additionally, there is inherently a difficulty when attempting to measure non-verbal characteristics through written responses.

An individual's inability to express their ideas, feelings, and behaviors in written form can obscure their responses.

The content analysis used to code responses has been revised twice over the past ten years, therefore, some limited differences exist among the studies. Finally, while the coding is standardized, some OEs are more fully described in the coding manual. Therefore a broad range of manifestations can be accurately coded for some OEs, but others are less fully delineated.

Conclusions

Most broadly stated, the primary purpose of this research study was to investigate which OEs best differentiate between gifted and non-identified individuals and to see whether individual characteristics such as gender, race, and age group also influence OE profiles. Different OE profiles for gifted and non-identified individuals do appear to exist when gender, race, and age group are considered. Most importantly, it is clear from the results of this analysis of the students conducted on the OEQ, that OEs can differentiate between gifted and non-identified individuals and that some OEs are more effective discriminators than others.

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APPENDIX A

MEAN OVEREXCITABILITY SCORES FOR INDIVIDUAL STUDIES

Author	Year	Sample	N	P	S	M	T	E
Beach	1981	Lesbian/ Nonlesbian	51	no means reported				
Silverman & Ellsworth	1981	GT Adults	31	no means reported				
Lysy & Piechowski	1983	Counseling	20	3.1	4.1	4.4	2.7	5.3
		Noncounsel	22	2.9	2.7	3.1	4.1	4.3
Hazell	1984	Total	24	5.1	6.2	5.4	5.8	13.8
Falk	1983	Grad. Stud.	23	7.2	4.6	6.1	6.1	13.4
Felder	1983	Grad. Stud.	15	6.8	3.3	4.5	12.1	10.5
Sorrell & Silverman	1981	Women	27	4.4	4.8	8.4	9.4	17.8
Piechowski & Colangelo	1984	GT adults	28	3.6	4.4	5.2	7.5	7.4
		Grad.stud.	42	3.0	3.4	3.7	3.4	4.8
		Gt Adol.	49	2.9	1.8	5.0	4.6	7.3
Piechowski & Cunningham	1985	Artists	13	3.7	5.6	9.1	5.3	10.4
		GT adults	31	3.5	4.4	5.0	7.2	6.8
Manzanero*	1985	V. Artists	27	3.0	6.0	12.0	13.0	19.0
Piechowski, Silverman, & Falk	1985	GT Adults	37	5.9	5.1	10.9	12.2	14.1
		Artists	23	7.8	8.1	17.3	11.2	20.5
		Grad.stud.	42	4.0	4.5	6.3	6.8	9.4
Scheiver	1985	H Creative	7	4.7	2.9	10.1	13.0	9.1
		L Creative	7	4.9	1.9	5.3	7.1	4.7
Gallagher	1986	Gifted	12	7.2	2.3	11.6	15.4	11.3
		Random	12	6.2	2.2	6.7	8.3	5.5
Ammirato	1987	Total	60	14.4	12.2	14.7	14.6	18.4

Author	Year	Sample	N	P	S	M	T	E
Ackerman	1993	Gifted	42	7.9	2.7	6.8	8.4	11.9
		GT males	10	7.9	3.4	5.9	9.3	6.9
		GT females	32	7.9	2.5	7.1	8.1	13.5
		Nonidentified	37	5.1	2.1	4.6	5.8	9.2
		Non males	20	5.3	2.3	4.1	5.9	7.4
		Non females	17	4.8	1.9	5.3	5.6	11.2
Domroese	1993	Gifted	30	6.6	2.0	7.0	7.5	7.1
		Near-GT	27	5.4	1.4	6.3	5.5	5.9
		Non-GT	25	5.2	1.8	5.3	7.3	5.9
Miller, Silverman, & Falk	1994	Gifted	41	6.1	6.5	10.6	12.6	13.7
		Grad.Stud.	42	5.1	5.5	8.4	9.6	11.4
Calic†	1994	Ed. Stud.	25	5.3	4.6	6.0	12.0	6.4
		Visual A.	19	10.9	9.0	11.4	15.0	8.8
		Perf. A.	10	14.4	8.9	9.2	14.1	10.3
		All Art	29	12.1	8.9	10.7	14.7	9.3
Breard	1994	Total	117	6.8	2.5	6.2	7.4	9.9
		Gifted	48	7.0	2.6	6.6	8.1	11.0
		Near-gifted	30	6.8	2.2	6.0	7.8	10.5
		Non-gifted	39	6.6	2.5	6.0	6.3	8.1
		Male	48	7.6	2.3	5.8	7.0	9.0
		Female	69	6.2	2.6	6.5	7.8	10.5
		Caucasian	45	7.7	2.2	5.3	6.2	10.0
		African A.	72	6.3	2.6	6.8	8.2	9.8
		Advantaged	53	7.4	2.6	5.7	6.8	9.8
		Disadvantaged	64	6.4	2.6	6.6	8.0	9.9
Ely	1995	Creative	42	6.1	3.2	6.4	5.0	12.8
		Gifted	34	6.0	2.7	6.0	7.1	11.5

Author	Year	Sample	N	P	S	M	T	E
Buerschen**	1995	Gifted	23	5.8	2.0	5.4	7.1	6.8
		Nongifted	23	4.4	1.2	3.7	3.6	4.7
Jackson	1995	Gifted	10	8.3	4.5	11.5	18.4	15.5
Piechowski & Miller	1995	Written	26	6.0	2.0	9.3	11.1	13.8
		Oral	20	5.4	2.1	1.0	11.6	9.8
		9-11	28	6.0	1.6	8.2	8.3	9.7
		12-14	18	5.1	1.8	10.8	14.0	15.1
		Males	25	5.9	1.5	9.3	10.2	10.0
		Females	21	5.4	1.9	9.1	10.9	13.9
Piirto, Cassone, Ackerman, & Fraas	1996	Creative	28	5.7	4.3	9.9	8.7	12.8
		Gifted	42	7.9	2.7	6.8	8.4	11.9
		Nonident	37	5.1	2.1	4.6	5.8	9.2
Ackerman	1997	Total	654	5.6	3.4	7.3	7.8	11.0
		NonGifted	318	5.1	3.2	5.6	6.3	9.9
		Gifted	253	6.0	2.9	7.4	8.8	10.6
		Creative	83	6.1	5.7	13.4	10.7	16.2
		Males	262	5.6	2.9	6.7	7.5	8.7
		Females	366	5.6	3.6	7.8	8.2	12.5
		Age < 12	197	4.9	1.7	5.4	5.8	6.8
		12 ≤ Age ≥ 18	226	5.7	2.7	6.9	7.6	11.4
		Age > 18	231	6.0	5.4	9.2	9.7	14.1

* Approximate scores based on a graph in the paper. † Scoring done by one rater only.

** Scores include contributions of 2 experimental questions.

APPENDIX B

MANOVA TABLES FOR CLASSIFICATION BY AGE BY GENDER

EFFECT .. CLASS BY AGEGROUP BY SEX

Multivariate Tests of Significance (S = 2, M = 1 , N = 263 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.02134	1.14339	10.00	1060.00	.326
Hotellings	.02159	1.13969	10.00	1056.00	.329
Wilks	.97877	1.14154	10.00	1058.00	.327
Roys	.01305				

Note.. F statistic for WILKS' Lambda is exact.

EFFECT .. CLASS BY AGEGROUP BY SEX (Cont.)

Univariate F-tests with (2,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	45.95789	5102.48960	22.97894	9.57315	2.40035	.092
STOT	13.33785	3827.37937	6.66892	7.18082	.92871	.396
MTOT	19.09297	9523.25384	9.54649	17.86727	.53430	.586
TTOT	61.08356	12573.2559	30.54178	23.58960	1.29471	.275
ETOT	117.81146	18943.3227	58.90573	35.54094	1.65740	.192

EFFECT .. AGEGROUP BY SEX

Multivariate Tests of Significance (S = 2, M = 1 , N = 263 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.05167	2.81090	10.00	1060.00	.002
Hotellings	.05310	2.80351	10.00	1056.00	.002
Wilks	.94897	2.80721	10.00	1058.00	.002
Roys	.03114				

Note.. F statistic for WILKS' Lambda is exact.

EFFECT .. AGEGROUP BY SEX (Cont.)

Univariate F-tests with (2,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	72.79278	5102.48960	36.39639	9.57315	3.80192	.023
STOT	22.08653	3827.37937	11.04327	7.18082	1.53788	.216
MTOT	75.07290	9523.25384	37.53645	17.86727	2.10085	.123
TTOT	76.08433	12573.2559	38.04217	23.58960	1.61267	.200
ETOT	535.29906	18943.3227	267.64953	35.54094	7.53074	.001

EFFECT .. CLASS BY SEX

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 263 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.00639	.67995	5.00	529.00	.639
Hotellings	.00643	.67995	5.00	529.00	.639
Wilks	.99361	.67995	5.00	529.00	.639
Roys	.00639				

Note.. F statistics are exact.

EFFECT .. CLASS BY SEX (Cont.)

Univariate F-tests with (1,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	5.27590	5102.48960	5.27590	9.57315	.55111	.458
STOT	.68615	3827.37937	.68615	7.18082	.09555	.757
MTOT	.85858	9523.25384	.85858	17.86727	.04805	.827
TTOT	61.43846	12573.2559	61.43846	23.58960	2.60447	.107
ETOT	8.66494	18943.3227	8.66494	35.54094	.24380	.622

EFFECT .. CLASS BY AGEGROUP

Multivariate Tests of Significance (S = 2, M = 1 , N = 263 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.04008	2.16746	10.00	1060.00	.018
Hotellings	.04096	2.16287	10.00	1056.00	.018
Wilks	.96029	2.16517	10.00	1058.00	.018
Roys	.02570				

Note.. F statistic for WILKS' Lambda is exact.

EFFECT .. CLASS BY AGEGROUP (Cont.)

Univariate F-tests with (2,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	21.49008	5102.48960	10.74504	9.57315	1.12241	.326
STOT	35.35392	3827.37937	17.67696	7.18082	2.46169	.086
MTOT	80.23825	9523.25384	40.11912	17.86727	2.24540	.107
TTOT	211.03079	12573.2559	105.51539	23.58960	4.47296	.012
ETOT	54.84074	18943.3227	27.42037	35.54094	.77151	.463

EFFECT .. SEX

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 263 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.09393	10.96744	5.00	529.00	.000
Hotellings	.10366	10.96744	5.00	529.00	.000
Wilks	.90607	10.96744	5.00	529.00	.000
Roys	.09393				

Note.. F statistics are exact.

EFFECT .. SEX (Cont.)

Univariate F-tests with (1,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	18.10215	5102.48960	18.10215	9.57315	1.89093	.170
STOT	27.27960	3827.37937	27.27960	7.18082	3.79895	.052
MTOT	152.56872	9523.25384	152.56872	17.86727	8.53901	.004
TTOT	7.89124	12573.2559	7.89124	23.58960	.33452	.563
ETOT	1567.19440	18943.3227	1567.19440	35.54094	44.09546	.000

EFFECT .. AGEGROUP

Multivariate Tests of Significance (S = 2, M = 1 , N = 263 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.27470	16.87708	10.00	1060.00	.000
Hotellings	.33958	17.92959	10.00	1056.00	.000
Wilks	.73744	17.40312	10.00	1058.00	.000
Roys	.21935				

Note.. F statistic for WILKS' Lambda is exact.

EFFECT .. AGEGROUP (Cont.)

Univariate F-tests with (2,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	116.12360	5102.48960	58.06180	9.57315	6.06507	.002
STOT	780.51572	3827.37937	390.25786	7.18082	54.34722	.000
MTOT	493.19793	9523.25384	246.59897	17.86727	13.80172	.000
TTOT	1507.79885	12573.2559	753.89943	23.58960	31.95898	.000
ETOT	2418.45745	18943.3227	1209.22873	35.54094	34.02354	.000

EFFECT .. CLASS

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 263 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.09111	10.60509	5.00	529.00	.000
Hotellings	.10024	10.60509	5.00	529.00	.000
Wilks	.90889	10.60509	5.00	529.00	.000
Roys	.09111				

Note.. F statistics are exact.

EFFECT .. CLASS (Cont.)

Univariate F-tests with (1,533) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	86.61400	5102.48960	86.61400	9.57315	9.04760	.003
STOT	14.63540	3827.37937	14.63540	7.18082	2.03812	.154
MTOT	558.27942	9523.25384	558.27942	17.86727	31.24593	.000
TTOT	923.44352	12573.2559	923.44352	23.58960	39.14622	.000
ETOT	176.69524	18943.3227	176.69524	35.54094	4.97160	.026

APPENDIX C

POST HOC ANALYSES FOR AGE GROUP MAIN EFFECTS

PSYCHOMOTOR TOTAL

Multiple Range Tests: Scheffe test with significance level .05
The difference between two means is significant if
MEAN(J)-MEAN(I) >= 2.2163 * RANGE * SQRT(1/N(I) + 1/N(J))
with the following value(s) for RANGE: 3.47
(*) Indicates significant differences which are shown in the lower triangle

		1	3	2
Mean	AGEGROUP			
4.9467	Grp 1			
5.4586	Grp 3			
6.0415	Grp 2	*		

SENSUAL TOTAL

Multiple Range Tests: Scheffe test with significance level .05
The difference between two means is significant if
MEAN(J)-MEAN(I) >= 1.9112 * RANGE * SQRT(1/N(I) + 1/N(J))
with the following value(s) for RANGE: 3.47
(*) Indicates significant differences which are shown in the lower triangle

		1	2	3
Mean	AGEGROUP			
1.6726	Grp 1			
2.5389	Grp 2	*		
5.0000	Grp 3	*	*	

IMAGINATIONAL TOTAL

Multiple Range Tests: Scheffe test with significance level .05
The difference between two means is significant if
MEAN(J)-MEAN(I) >= 3.0796 * RANGE * SQRT(1/N(I) + 1/N(J))
with the following value(s) for RANGE: 3.47
(*) Indicates significant differences which are shown in the lower triangle

		1	2	3
Mean	AGEGROUP			
5.3503	Grp 1			
6.4689	Grp 2	*		
7.3232	Grp 3	*		

INTELLECTUAL TOTAL

Multiple Range Tests: Scheffe test with significance level .05
The difference between two means is significant if
MEAN(J)-MEAN(I) >= 3.6285 * RANGE * SQRT(1/N(I) + 1/N(J))
with the following value(s) for RANGE: 3.47
(*) Indicates significant differences which are shown in the lower triangle

		1 2 3
Mean	AGEGROUP	
5.8071	Grp 1	
7.4585	Grp 2	*
9.0691	Grp 3	* *

EMOTIONAL TOTAL

Multiple Range Tests: Scheffe test with significance level .05
The difference between two means is significant if
MEAN(J)-MEAN(I) >= 4.4434 * RANGE * SQRT(1/N(I) + 1/N(J))
with the following value(s) for RANGE: 3.47
(*) Indicates significant differences which are shown in the lower triangle

		1 2 3
Mean	AGEGROUP	
6.8020	Grp 1	
11.3653	Grp 2	*
12.7597	Grp 3	*

APPENDIX D

MANOVA TABLES FOR CLASSIFICATION BY RACE FOR CAUCASIAN AND AFRICAN-AMERICAN SUBJECTS

EFFECT .. CLASS BY ETHNIC

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 87)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.02995	1.08663	5.00	176.00	.369
Hotellings	.03087	1.08663	5.00	176.00	.369
Wilks	.97005	1.08663	5.00	176.00	.369
Roys	.02995				

Note.. F statistics are exact.

EFFECT .. CLASS BY ETHNIC (Cont.)

Univariate F-tests with (1,180) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	4.12221	1243.83794	4.12221	6.91021	.59654	.441
STOT	2.20737	556.68667	2.20737	3.09270	.71374	.399
MTOT	19.37854	1331.74541	19.37854	7.39859	2.61922	.107
TTOT	19.45436	2318.65502	19.45436	12.88142	1.51027	.221
ETOT	71.34075	3000.03089	71.34075	16.66684	4.28040	.040

EFFECT .. ETHNIC

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 87)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.14828	6.12812	5.00	176.00	.000
Hotellings	.17409	6.12812	5.00	176.00	.000
Wilks	.85172	6.12812	5.00	176.00	.000
Roys	.14828				

Note.. F statistics are exact.

EFFECT .. ETHNIC (Cont.)

Univariate F-tests with (1,180) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	87.56219	1243.83794	87.56219	6.91021	12.67142	.000
STOT	.00007	556.68667	.00007	3.09270	.00002	.996
MTOT	2.39982	1331.74541	2.39982	7.39859	.32436	.570
TTOT	.35558	2318.65502	.35558	12.88142	.02760	.868
ETOT	166.17010	3000.03089	166.17010	16.66684	9.97010	.002

EFFECT .. CLASS

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 87)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.06946	2.62732	5.00	176.00	.026
Hotellings	.07464	2.62732	5.00	176.00	.026
Wilks	.93054	2.62732	5.00	176.00	.026
Roys	.06946				

Note.. F statistics are exact.

EFFECT .. CLASS (Cont.)

Univariate F-tests with (1,180) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	24.07655	1243.83794	24.07655	6.91021	3.48420	.064
STOT	4.72707	556.68667	4.72707	3.09270	1.52846	.218
MTOT	41.35656	1331.74541	41.35656	7.39859	5.58979	.019
TTOT	54.20603	2318.65502	54.20603	12.88142	4.20808	.042
ETOT	152.92426	3000.03089	152.92426	16.66684	9.17536	.003

APPENDIX E

MANOVA TABLES FOR METHOD OF IDENTIFICATION FOR GIFTED SUBJECTS

EFFECT .. IDMETHOD

Multivariate Tests of Significance (S = 1, M = 1 1/2, N = 122 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.09899	5.42706	5.00	247.00	.000
Hotellings	.10986	5.42706	5.00	247.00	.000
Wilks	.90101	5.42706	5.00	247.00	.000
Roys	.09899				

Note.. F statistics are exact.

EFFECT .. IDMETHOD (Cont.)

Univariate F-tests with (1,251) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
PTOT	2.74707	2767.61064	2.74707	11.02634	.24914	.618
STOT	50.14342	2354.14907	50.14342	9.37908	5.34630	.022
MTOT	428.86067	5729.68478	428.86067	22.82743	18.78708	.000
TTOT	520.65503	7302.02679	520.65503	29.09174	17.89701	.000
ETOT	234.18182	11192.6957	234.18182	44.59241	5.25161	.023

APPENDIX F

SUMMARY OF DISCRIMINANT FUNCTION AND CLASSIFICATORY ANALYSES

		Classification % above chance	
Sample	Discriminators	Non-Ident.	Gifted
Total	T M P*	24.4%	2.3%
Age group 1	EMT	26.4%	1.1%
Age group 2	TM	18.5%	18.5%
Age group 3	TMP	18.0%	3.5%
Male	—	—	—
Female	TMP	21.8%	7.4%
F - Age group 1	EM	25.2%	6.2%
F - Age group 2	TMP	25.8%	14.3%
F - Age group 3	TM	26.0%	7.0%
Caucasian	EMTP	20.6%	4.0%
African-American	—	—	—
Objective Method	TM	25.7%	1.2%
Combined Method	PS	21.5%	- 20.2%

* PSMTE - Psychomotor, Sensual, Imaginational, Intellectual, and Emotional

VITA

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Education

Doctor of Philosophy - Educational Psychology: Texas A&M University (August, 1997)
Master of Science - Educational Psychology: University of Calgary (November, 1993)
Bachelor of Arts - Psychology: SUNY - Binghamton (May, 1989)

Research and Professional Experience

My research experience includes acting as project coordinator for a school-based research project for one year and as a research assistant for a National Science Foundation Grant for two years. I have also acted as a consultant and rated Overexcitability Questionnaire data for several research studies.

I have frequently been a teaching assistant for educational psychology and statistics courses at the college level and also been involved in program evaluation. I have also participated in programs for school-age youth as a group facilitator and counselor.

Publications

Ackerman, C. M. (1997). Personality characteristics: A new approach to identifying gifted adolescents, Roeper Review, 19(4), 229-236.

Ackerman, C. M. (April, 1996). The interrater reliability of the Overexcitability Questionnaire. The Dabrowski Newsletter, 2, 5-6.

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Thompson, B., & Ackerman, C. M. (1994). Review of the Myers-Briggs Type Indicator. In J. Kapes, Mastie, M. M., & Whitfield, E. A. (Eds.), A counselor's guide to career assessment instruments (3rd ed., pp. 283-287). Alexandria, VA: National Career Development Association.

Conference Presentations and Invited Addresses

Since 1992 I have given 15 presentations at national and international conferences such as American Educational Research Association, and the National Association for Gifted Children. I have also been invited to speak at three workshops focusing on Dabrowski's Theory of Positive Disintegration in the United States and Canada.

Professional Service

I have been editor of *The Dabrowski Newsletter* since 1994. I have also been active in departmental student and college organizations during graduate school holding the following positions: president, program representative, committee member, and social chair.