

Florida State University Libraries

Electronic Theses, Treatises and Dissertations

The Graduate School

2017

Self-Esteem and Locus of Control: A Longitudinal Analysis of Twice-Exceptional Learners

Lori Jean Best



FLORIDA STATE UNIVERSITY

COLLEGE OF EDUCATION

SELF-ESTEEM AND LOCUS OF CONTROL:

A LONGITUDINAL ANALYSIS OF TWICE-EXCEPTIONAL LEARNERS

By

LORI JEAN BEST

A Dissertation submitted to the
Department of Educational Psychology and Learning Systems
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

2017

Lori Jean Best defended this dissertation on April 7, 2017.

The members of the supervisory committee were:

Steven Pfeiffer
Professor Directing Dissertation

Sandra Lewis
University Representative

Frances Prevatt
Committee Member

Angela Canto
Committee Member

The Graduate School has verified and approved the above-named committee members, and certifies that the dissertation has been approved in accordance with university requirements.

I dedicate this work to my mother, Jong Suk Moll, and my father, William Garrett. From my earliest memories, they instilled a love of learning and thirst for achievement in me. It is for them that I aimed higher, reached farther, and endeavored longer.

ACKNOWLEDGEMENTS

I would first like to express considerable gratitude to my supervising professor, Dr. Steven Pfeiffer, for his continual guidance throughout my graduate studies. His persistence and encouragement helped me overcome numerous obstacles on my journey toward graduation. Without his support, this project may have never come to fruition.

I would like to extend this acknowledgement to members of my committee: Dr. Frances Prevatt, Dr. Angel Canto, and Dr. Sandy Lewis. They raised many challenging points, and their feedback was instrumental in shaping this project. Many thanks also go to Dr. Briley Proctor for her mentorship during my first few years as a doctoral student.

I am grateful to the National Center for Education Statistics for providing access to extensive archives of data. I also appreciate the collective effort of participants, researchers, and administrators who took part in the National Educational Longitudinal Study. Without them, this project would not have been possible.

I cannot overlook the support I received from my mentors and colleagues at Florida State University and at Texas A&M University's Student Counseling Service. I would like to thank Dr. Tim Richel and Dr. Carly McCord for their endless support. Special thanks to Dr. Megan Thoen, a true friend who guided me through critical components of this project.

Finally, I would like to acknowledge and thank my family and friends, who were vital to the success of this project. Jong Suk and Chuck Moll, Dr. Steven and Kelli Garrett, Yvette and Alan Best, and Shannon Best-Rosi share this great accomplishment with me. A very special *thank you* goes to my loving and patient husband, Sean Best, who stood by my side, reminded me to keep putting one foot in front of the other, and with whom I shared every setback and triumph.

TABLE OF CONTENTS

| | |
|---|------|
| List of Tables | vii |
| List of Figures | viii |
| Abstract | ix |
| | |
| 1. INTRODUCTION | 1 |
| Research Questions and Hypotheses..... | 6 |
| 2. LITERATURE REVIEW..... | 9 |
| Self-Esteem | 9 |
| Rise of the Self-Esteem Movement | 10 |
| Self-Esteem Backlash | 12 |
| Contemporary Self-Esteem Research | 14 |
| Correlates of Self-Esteem | 22 |
| Locus of Control | 24 |
| Development of Attributional Patterns | 25 |
| Attribution Retraining..... | 27 |
| Correlates of Internal Locus of Control | 29 |
| Self-Regulation and Locus of Control | 31 |
| Gifted and Talented Learners..... | 34 |
| Conceptualizing Giftedness | 35 |
| Socioemotional Needs of the Gifted Learner..... | 44 |
| Social Significance of Nurturing High Potential | 48 |
| Twice-Exceptional Learners | 50 |
| Gaps in Legislation and Training..... | 51 |
| Access to School Services | 54 |
| IDEA Categories..... | 56 |
| Characteristics of the Twice-Exceptional | 61 |
| Summary, Research Questions, and Hypotheses | 66 |
| Research Questions | 68 |
| 3. METHODS | 71 |
| Research Design..... | 71 |
| Data Source | 71 |
| Participants | 75 |
| Measures and Procedures | 78 |
| Student Surveys | 78 |
| Parent Surveys | 78 |
| Teacher Surveys..... | 79 |
| Transcripts..... | 79 |
| Self-Esteem Measure | 80 |
| Locus of Control Measure | 82 |

| | |
|--|------------|
| Power | 83 |
| Study Scope and Delimitations | 84 |
| 4. RESULTS | 91 |
| Assumptions of the Statistical Design | 91 |
| Normal Distribution of Dependent Variables | 91 |
| Equality of Variances Between Groups | 92 |
| Outliers..... | 93 |
| Equality of Groups..... | 94 |
| Multicollinearity of Dependent Variables | 96 |
| Homogeneity of Variance-Covariance Matrices | 96 |
| Sphericity | 97 |
| Results of the Statistical Analyses..... | 97 |
| Research Questions and Answers..... | 100 |
| Outcome of Research Question One..... | 100 |
| Outcome of Research Question Two | 100 |
| Outcome of Research Question Three | 101 |
| Outcome of Research Question Four..... | 101 |
| Outcome of Research Question Five | 102 |
| Outcome of Research Question Six | 102 |
| 5. DISCUSSION | 104 |
| Limitations of the Study | 107 |
| Sample Limitations | 107 |
| Measurement Limitations | 108 |
| Research Evidence Limitations..... | 110 |
| Implications and Future Direction..... | 110 |
| Theory Development | 110 |
| Practical Applications and Training..... | 112 |
| Contributions to Research..... | 114 |
| APPENDICES | 128 |
| A. INSTITUTIONAL REVIEW BOARD APPROVAL..... | 128 |
| B. NELS:88 ITEMS PERTAINING TO SELF-ESTEEM AND LOCUS OF CONTROL | 129 |
| C. G*POWER OUTPUT | 130 |
| References..... | 131 |
| Biographical Sketch | 148 |

LIST OF TABLES

| | |
|--|-----|
| Table 1. Primary Indicators of Giftedness | 117 |
| Table 2. Primary Indicators of Disability | 118 |
| Table 3. Sample Demographics | 119 |
| Table 4. Normality of Self-Esteem and Locus of Control Scores | 120 |
| Table 5. Means and Standard Deviations of Responses to Self-Esteem and Locus of Control Questionnaires..... | 120 |
| Table 6. Levene’s Test of Homogeneity of Variances for Self-Esteem and Locus of Control Scores..... | 121 |
| Table 7. Correlations Between Self-Esteem, Locus of Control, and Ability Classification..... | 122 |
| Table 8. Multivariate Test for Self-Esteem and Locus of Control Scores Between Ability Classifications Across Time | 123 |
| Table 9. Changes in Self-Esteem and Locus of Control Scores Across Time with Huynh-Feldt Correction for Sphericity | 123 |
| Table 10. Comparisons of Average 8 th , 10 th , and 12 th Grade Scores with Bonferroni Correction | 124 |
| Table 11. Differences in Average Self-Esteem and Locus of Control Scores by Ability Classification..... | 124 |
| Table 12. Comparisons of Average Self-Esteem and Locus of Control Scores by Ability Classification with Bonferroni Correction..... | 125 |

LIST OF FIGURES

Figure 1. Developmental Changes in Self-Esteem Across Time by Ability Classification126

Figure 2. Developmental Changes in Locus of Control Across Time by Ability Classification.127

ABSTRACT

The coexistence of extraordinary gifts and exceptional impairment residing within the same individual is an inherently curious contradiction. Empirical research on gifted students with one or more disabilities, termed twice-exceptional, is limited. The purpose of this investigation was to explore the role of twice-exceptionality on key constructs related to identity development and self-regulation. This study examined developmental changes in students' self-esteem ratings and locus of control ratings from eighth grade through twelfth grade, and compared students identified as twice-exceptional with their peers who were identified as gifted-only, disability-only, or non-identified (i.e., a group of "typical" students). Participants were sampled from an existing dataset – the National Educational Longitudinal Study. Measures included questionnaire items adapted from the Rosenberg Self-Esteem Scale (1965), and from Rotter's Internality-Externality Scale (1966). Results of a two-way mixed design MANOVA revealed no differences between groups on a combination of self-esteem and locus of control ratings, meaning that developmental patterns over time were similar across all ability classifications. Students in the gifted-only group reported the highest levels of self-esteem and the most internalized locus of control, whereas students in the disability-only group reported the lowest self-esteem and most externalized locus of control. Significant differences were revealed between average ratings of twice-exceptional students and ratings of their peers. This manuscript concludes with a discussion of the study's limitations, implications drawn from the study's findings, and directions for future research.

CHAPTER 1

INTRODUCTION

All students possess a unique set of personal attributes and individual experiences that collectively influence their learning and performance in the classroom, and eventually their health and productivity as adults (Smith, 2009). The scope of factors thought to contribute to successful student outcomes has broadened, with much more attention focused on sociocultural and developmental processes than ever before. The result has been a fundamental shift in how schools in the United States have approached education in the latter half of the twentieth century. Whereas teachers used to apply a one-size-fits-all approach to whole classrooms, now there is an emphasis on meeting the specific educational *and developmental* needs of every student through differentiated educational programming (Subban, 2006).

The current emphasis on differentiated instruction can be traced to key historical events of the 1950s and 1960s. One of those events occurred on October 4, 1957, the day that Sputnik was launched. The United States and then-Communist Russia were already embroiled in an arms race, with each country posturing to show their national and ideological superiority. The Russians' successful launch of the first unmanned satellite to orbit the earth represented the intellectual and technological power of the Russians. This event garnered interest and even urgency in prioritizing gifted and talented education across the United States as a matter of national security (Gloss, 1969; Robertson, Pfeiffer, & Taylor, 2011). The National Defense Education Act (NDEA, 1958) was passed the following year. The NDEA authorized \$1 billion of federal funds over a period of four years for the purpose of advancing student scholarship at all educational levels, particularly in what are now referred to as STEM fields (science, technology,

engineering, and math). The field of gifted and talented education was rejuvenated as a result of this effort.

Around the same time that more attention and resources were being allocated to gifted youth, another significant event drew interest to students at the opposite end of the ability spectrum—the Civil Rights Movement. Although the Civil Rights Movement sought to legally end segregation and systemic discrimination for African-Americans specifically, the general climate of social activism set the stage for other marginalized groups to address oppressive and discriminatory practices based on group identity. The general public became increasingly aware that individuals with disabilities were being denied their civil rights, and legislative efforts to reduce systemic discrimination gained traction.

As a result, there has been an explosion of educational reforms over the last half-century, most of which target disadvantaged students and students who are most at risk for academic failure. In the 1960s, in an effort to serve students who were most in need of supplemental school services, the federal government began taking steps toward ensuring greater support for children with identified disabilities. The passage of the Elementary and Secondary Education Act (ESEA, 1965) marked the first attempt in the United States to serve disadvantaged children through government mandates backed by federal funds. This law has since been reauthorized every few years, from the No Child Left Behind Act (NCLB, 2004) to the more recent Every Student Succeeds Act (ESSA, 2015). Whereas NCLB further expanded the role of the federal government in education, ESSA is an attempt to shift more control to individual states. Under authorization of the American Recovery and Reinvestment Act (ARRA, 2009), the Race to the Top (RTT) program is another federal attempt at education reform, this time rewarding competitive grants to states with comprehensive reform plans centered around core RTT

components. Another federally-backed initiative, the Education of the Handicapped Act of 1970, as amended by the Education for All Handicapped Children Act (EHA, 1975), was the first law to require public schools receiving federal funds to address the needs of students with disabilities through a free and appropriate public education (FAPE). The most current iteration of that law, the Individuals with Disabilities Education Improvement Act (IDEA, 2004), now plays a decidedly significant role in shaping the face of public education across the United States.

Despite the simultaneous advancement of education for students at both ends of the ability spectrum, their evolution for the most part occurred separately. Much has been written about students with gifts and talents, and in parallel, vast quantities of books and articles have been written about students with disabilities. As both fields mature, researchers are becoming increasingly aware of a subgroup of students called *twice-exceptional learners*; these are gifted students who also have one or more coexisting disabilities. They are considered exceptional relative to the norm, both in their capacity for great accomplishment, and in light of their deficits and special needs (Trail, 2011). This may seem like a surprising label, given that giftedness is usually associated with advantage, not deficiency. An unfortunate side effect of this popular but false assumption is the longstanding history of under-identification for gifted programming, under-identification of disabilities, underfunding of gifted programming, and uncertainty about the unique educational, psychological, and social-emotional needs of twice-exceptional learners (Pfeiffer, 2013).

The impact of holding coexisting identities as a student with both gifts and deficits is not well-documented in the literature. Research on individuals with disabilities alone shows that students with varying physical and non-physical disabilities internalize negative messages about themselves as a result of persisting stigmatization, oppression, and discrimination. Numerous

researchers have documented more unfavorable self-perceptions among children with disabilities than children without disabilities, as well as more externalized perceptions of control (Alesi, Rappo, & Pepi, 2012; Barber & Mueller, 2011; Shogren, Bovaird, Palmer, & Wehmeyer, 2010). This is an important point because research suggests that positive self-perceptions and perceptions of personal control are significant contributors to a host of favorable life outcomes, including psychological well-being, motivation, academic achievement and various measures of success (Bercher, 2012; Roebbers, Cimeli, Röthlisberger, & Neuenschwander, 2012; Rothman & Cosden, 1995). There is certainly no shortage of empirical research that focuses on the adverse impact of identifying with various marginalized groups.

The self-perceptions of gifted students have also been well-documented in the literature, though findings are mixed. In general, studies show that gifted and talented learners fare as well as or better than their normally-achieving peers with respect to social-emotional adjustment and self-esteem (Riaz, Shahzad, Ahmad, & Khanam, 2013; Vialle, Heaven & Ciarrochi, 2005; Yan & Haihui, 2005). This is particularly true in elementary school (Cross, 2015). However, some studies have demonstrated that gifted learners hold less favorable self-perceptions in the social and physical domains (Rimm, 2002; Shechtman & Silektor, 2012). Cross (2016) identifies several reasons why gifted children may experience social difficulties, such as forced age-grading where gifted children lack intellectual peers among children of the same age, social-emotional or physical development that lags behind a gifted child's cognitive development, and feeling different from peers regardless of actual social aptitude. The common thread here is that gifted students may face inherent difficulty finding opportunities for egalitarian interactions, which form the basis of healthy friendships. Cross also explains that the early success that many

gifted students experience in the academic arena may hinder their desire to pursue other activities, like team sports, due to a fear of failure.

Self-perception may also be shaped by early experiences of gifted students who are not adequately challenged by standard educational curricula (Neumeister, 2015). Identifying as gifted may become associated with finding work easy, or with superior performance at any cost. This association is all too familiar to educators who have worked with a gifted child who cannot tolerate challenge, or who cannot finish an exam due to double and triple checking answers to avoid any errors. Much more research is needed before coming to any conclusions, but Neumeister (2015) certainly gives her readers pause for thought that gifted students may be at risk for developing dysfunctional perfectionistic tendencies.

The coexistence of disabilities with giftedness makes it challenging to draw conclusions from the disparate research findings above. The temptation to extrapolate from existing research focused on students with disabilities alone, or giftedness alone, must also be resisted because research seems to show that the social and emotional considerations are even more complex among the twice-exceptional (Foley Nicpon, 2015). Unfortunately, research studies on the twice-exceptional are often fraught with methodological problems. Most of what is known comes from case studies, anecdotal evidence, or small clinical samples (Foley Nicpon, 2015; Pfeiffer, 2013). However, there is some evidence to indicate that students with these coexisting identities experience confusion and frustration as a result of mixed messages they receive about their abilities (Foley Nicpon, Rickels, Assouline, & Richards, 2012; Kauder, 2009; King, 2005; Reis & McCoach, 2000). For example, behaviors linked to disability, such as poor grades, organizational difficulties, and hypersensitivity, can lead to removal or denial from gifted education opportunities. This may have an adverse effect on the student's motivation and self-

perceptions (Foley Nicpon, 2015). Whereas researchers have generally found that self-concept, self-esteem, and perceptions of control stabilize with age (Erol & Orth, 2011; Orth & Robins, 2014; Wang & Su, 2013), twice-exceptional learners may instead experience destabilization during late childhood and adolescence. For example, they may initially experience a high degree of mastery in early education only to then experience increasing difficulty keeping pace with gifted peers as academic rigor intensifies during middle and high school.

Unfortunately, twice-exceptional learners are severely under-represented in the scientific literature, and there are very few empirical studies that have addressed the effects of twice-exceptionality on self-perceptions as they develop over time. The proposed investigation seeks to fill that gap by comparing the self-esteem and perceptions of control of twice-exceptional learners to their peers in a longitudinal design. This extends research on diversity within gifted populations and the impact of dual-exceptionality on identity development, as well as research within the domains of self-esteem and locus of control.

Research Questions and Hypotheses

Research questions to be explored by the present study are as follows:

- 1) Are individual differences in self-esteem explained by ability classification (i.e., giftedness, disability, twice-exceptionality, and non-identified students)?
- 2) Does ability explain individual differences in self-esteem changes across time? In other words, does the developmental trajectory of self-esteem differ between ability groups?
- 3) How does self-esteem change over time in a group of twice-exceptional high school students?
- 4) Are individual differences in locus of control explained by ability?
- 5) Does ability explain individual differences in locus of control changes across time?

6) How does locus of control change over time in a group of twice-exceptional high school students?

Although longitudinal research on self-esteem and locus of control in exceptional student populations is sparse, a few tentative hypotheses are offered based on the available literature. First, it is anticipated that ability will explain a significant proportion of the variance in average self-esteem ratings between students classified as gifted-only, disability-only, twice-exceptional, and non-identified. Second, it is expected that ability classification will be a significant predictor of individual differences in changes in self-esteem across time. Third, it is expected that twice-exceptional students will report a different pattern of developmental change than the other groups – gifted students will likely report relatively high self-esteem throughout all measured years, and students with disabilities will likely report relatively lower self-esteem throughout all measured years. By contrast, it is hypothesized that the self-esteem of twice-exceptional learners will be comparable to that of their gifted peers during the baseline year, but will trend toward the disability group in subsequent follow-up years as perceptions of self destabilize.

Similar results are expected for locus of control scores. First, it is anticipated that ability will explain a significant proportion of the variance in average locus of control ratings between students classified as gifted-only, disability-only, twice-exceptional, and non-identified. Second, it is expected that ability classification will be a significant predictor of individual differences in changes in locus of control across time. Twice-exceptional learners are hypothesized to have a more internalized locus of control before perceptions of control become more externalized throughout high school. By contrast, it is most likely that gifted students' locus of control will remain more internalized than that of their peers throughout all measured years, whereas students with disabilities will have a more externalized locus of throughout all measured years. The

developmental trajectory of locus of control among twice-exceptional learners is expected to be comparable to that of their gifted peers during the baseline year, but will likely trend toward the disability group in subsequent follow-up years.

CHAPTER 2

LITERATURE REVIEW

The previous chapter briefly introduced the purpose and rationale for the current investigation, and the research questions and hypotheses. The current chapter expounds upon that introduction by presenting a more thorough account of the subject matter. The discussion will begin with self-esteem – one of the most widely researched constructs in social science, thanks to its ability to predict a broad array of life outcomes. Following self-esteem, another principal construct in social science and educational research – locus of control – will be defined and explained. Both constructs serve important self-regulatory functions, and are thought to be shaped by early life experiences. The early developmental experiences of at-risk populations are of particular interest to researchers looking for intervention opportunities in areas of self-regulation. Lately, there has been a growing demand for more research on twice-exceptional learners, an at-risk population whose unique developmental needs are gaining attention within the literature on gifted and talented students. As such, a comprehensive review of the gifted and talented field will be offered before the focus of this manuscript narrows specifically to twice-exceptional learners and issues surrounding twice-exceptionality. Existing literature on the self-esteem and locus of control of twice-exceptional learners, though scarce, will be summarized.

Self-Esteem

In broad terms, self-esteem is an overall evaluation of the self. This is differentiated from the self-concept, which refers to a description of roles and attributes that a person attaches to himself (Sim, Goyle, McKedy, Eidelman, & Correll, 2014). The constructs are certainly related, given that self-esteem is an evaluation of worth based on what a person knows and feels about himself. Personal, cultural, and group identities that make up the self-concept are therefore

closely tied to the development of self-esteem. Moreover, affective processes help to differentiate self-esteem from self-efficacy (Chen, Gully, & Eden, 2004). For example, regardless of whether a person believes he or she will be able to perform a specific task or a set of tasks (i.e., self-efficacy), positive or negative feelings about oneself can still operate independently from those beliefs of efficacy (Chen et al., 2004).

Self-esteem is one of the most widely studied constructs in social science (Zeigler-Hill, 2011). In modern psychology, the construct can be traced back to 1890, when William James presented “self-feeling” as a ratio of one’s “actualities to our supposed potentialities” (James, 1890; Mruk, 2013b). In other words, the greater the *actual* success of a person and the lower his or her *expectation* for success, the higher the self-esteem. Despite James’ writings, the dominant position in the field of psychology was not centered on the self-concept or associated feelings of self-worth. At that time, psychoanalysts were more interested in unconscious processes. Then psychoanalysis gave way to behaviorism, which was more interested in the study of observable phenomena. It was not until the 1960s, with Carl Rogers and Abraham Maslow leading the Humanistic movement, when the construct of self-esteem gained popularity (Ward, 1996).

Rise of the Self-Esteem Movement

Two of the most prominent early contributors to the field of self-esteem are Morris Rosenberg and Stanley Coopersmith. During the 1960s and 1970s, Rosenberg (1965, 1979) and Coopersmith (1967) independently published studies that linked self-esteem to motivation, leadership, anxiety, depression, and a host of other important outcomes (Rosenberg, Schooler, & Schoenbach, 1989). Their writings also suggested that parenting style, socioeconomic status, and ethnicity influenced the self-esteem of children and adolescents (Ward, 1996). Both Rosenberg and Coopersmith defined self-esteem as a feeling or attitude of self-worth. This general attitude

toward the self is influenced by the evaluations of others. They believed that people internalize the attitudes and beliefs expressed by others, particularly those individuals whom they value or perceive as significant. According to this definition, self-esteem is shaped by a person's perception of how he or she is seen and judged by parents, friends, teachers, classmates, and others, also called *reflected appraisals*. These reflected appraisals influence what a person thinks of himself, resulting in the formation of generally favorable or unfavorable attitudes toward the self.

Then in 1969, Nathaniel Branden introduced self-esteem to the general public with his book, *The Psychology of Self-Esteem* (Sciabarra, 2015). Branden's original conceptualization of self-esteem was not the egocentric feeling of uniqueness or inflated self-importance that can sometimes characterize discussions of self-esteem today. Instead, Branden wrote that humans are rational, thinking beings who have been gifted with self-awareness and volition. These tools give people the ability to self-regulate and choose which values to fulfill and which goals to pursue. Awareness, according to Branden, also allows people to take corrective, coping actions when feeling depressed or anxious, or when experiencing self-doubt. Healthy self-esteem is therefore the disposition of being able to cope with the challenges of life and to feel worthy of happiness (Branden, 1969).

In the 1980s and 1990s, self-esteem was thrust into the political arena when a task force was established in the state of California called The California Task Force to Promote Self-Esteem and Personal and Social Responsibility ("Now, the California task force to promote self-esteem," 1986). Poor self-esteem was presented as the source of all of society's major problems, including crime, drug use, underachievement, teen pregnancy, violence, and other undesirable outcomes (Mruk, 2013b; "Now, the California task force to promote self-esteem," 1986). Most

compelling was the promise of healthy self-esteem as a “social vaccine” to address root problems through preventive self-esteem interventions. The task force set out to test those assumptions over a period of three years.

In 1990, the final report was submitted to the California Legislature (California State Department of Education, 1990). Family, followed by schools, were determined to be the two most important environmental factors in nurturing healthy self-esteem. The task force also found that low self-esteem is a significant contributor to drug and alcohol abuse, crime and violence, and teen pregnancy. By contrast, healthy self-esteem was associated with fewer antisocial behaviors, such as violence, drug use, child abuse, and crime. The task force advocated for the cultivation of healthy self-esteem by nurturing the special needs and talents of every student. The report stated that “the building blocks of self-esteem are skills” (p. 81), once again emphasizing that healthy self-esteem is not an artificial inflation of self-worth, but building a disposition toward positive coping based on building a skillset of prosocial “behavioral options.” This statement was greatly appealing to the general public. The idea of enhancing self-esteem became one of the most popular themes in self-help sections of bookstores, published research articles, and in school settings, with educational programs aimed specifically at boosting self-esteem (Emler, 2002; Mruk, 2013b).

Self-Esteem Backlash

Eventually, the popularity of self-esteem led to a backlash against the self-esteem movement (Mruk, 2013b). Self-esteem came under fire from many who contended that feeling good about oneself actually has very little effect on academic success and positive behavioral outcomes. Critics of the self-esteem movement noted that the focus of education was moving too

far toward self-acceptance at the expense of real understanding and competence (Kramer, 1991; Mruk, 2013b; Ross & Broh, 2000).

Dweck (2008) in particular presents a compelling argument against overpraising children, especially when that praise does nothing to reward a person's effort and behavior. Praising innate talent, she writes, may actually do more harm than good because it undermines the motivation to learn and leads to a fragile self-esteem. If an ability is fixed, then there is no way to change it and little motivation to try. If, however, ability is malleable, then it is possible to change it through behavior or intervention. In her review of the literature, she points out that certain types of praise make self-esteem fragile and insecure. When students are praised for their innate intelligence, for instance, then the rewards for "being smart" or at least "looking smart" may outweigh risks of real learning, which often include making mistakes, failing, or appearing ignorant. Dweck's criticisms are not necessarily directed at the worth of self-esteem as a construct, but they are a critique of the misguided attempts to bolster self-esteem through indiscriminate praise that arose during the self-esteem movement.

Baumeister, Smart, and Boden (1996) reviewed the existing literature on self-esteem and challenged the notion that high self-esteem is exclusively associated with positive outcomes. Their review suggested that high self-esteem was actually associated with *undesirable* behaviors, such as egotism, narcissism, and violence. Emler (2002) likewise challenged the zeitgeist of the self-esteem movement. Through a meta-analysis, he found that high self-esteem was linked to more risky behaviors, such as driving too fast or driving under the influence of alcohol. It is worth noting that Emler did find a correlation between low self-esteem and teenage pregnancy, victimization by others, eating disorders, suicide attempts, and suicidal ideation. For men, low self-esteem was associated with lower earnings and greater unemployment. Emler also conceded

that successes and failures, including academic successes and failures, have an effect on self-esteem. Nevertheless, Emler's work challenged researchers to consider whether high self-esteem should continue to be hailed as a proverbial magic bullet. It seemed that self-esteem had been thrust into the spotlight only to come under attack with more careful scrutiny.

Contemporary Self-Esteem Research

Despite these criticisms, modern research, particularly in the field of positive psychology, has generated renewed interest in self-esteem. This new research shows that the study of self-esteem has merit when approached empirically and without exaggerating its predictive value (Mruk, 2013a; Zeigler-Hill, 2011). The following narrative will strive to present a more balanced view of self-esteem and reasons why the construct should remain strongly in focus within developmental and educational discourse.

Definitional specificity. The biggest problem with much of the research on self-esteem is that the term is not consistently defined across studies (Mruk, 2013b). This lack of definitional specificity has led to contradictory findings of either exaggerated claims that it is a cure for all of society's ills, or its dismissal as a popular but useless construct. The aforementioned study conducted by Baumeister et al. (1996) suggested that very favorable self-evaluations can produce very socially undesirable behaviors when those evaluations are threatened. However, the researchers admittedly took a generic view of self-esteem that focused only on egotism, which could be synonymous with arrogance, conceit, narcissism, and a sense of superiority. Egotism is defined simply as having a favorable self-appraisal.

Clearly, this definition of self-esteem is very different from those presented earlier in the chapter. Recall that Branden's (1969) view of self-esteem focused on the power of self-awareness and self-regulation, such that a person with high self-esteem is characterized by a

disposition of being able to cope with life circumstances. A favorable self-evaluation alone (i.e., egotism) is not the same construct as feelings of worth tied to achievement and coping skills (i.e., Branden's definition of self-esteem). Divorcing self-appraisals from actual competence and achievement is potentially problematic. Simply making people feel good about themselves can become completely disassociated with any actual desirable behavior. This attitude essentially entitles all people to experience high self-esteem as simply a matter of valuing oneself. The danger with this approach is in its potential for self-deception and potentially even narcissism, as noted in Baumeister et al.'s (1996) study. Kahne (1996) points out that this entirely affirming approach encourages perpetuation of the status quo without critical reflection. In fact, studies that control for the effects of narcissism show that antisocial and aggressive behaviors are predicted by low self-esteem, not high self-esteem (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Paulhus, Robins, Trzesniewski, & Tracy, 2004).

On the other hand, definitions of self-esteem can also veer too far into the territory of competence and cognitive appraisals. Recall James' (1890) original conceptualization of self-esteem as a ratio of actual success to the expectation for success. According to this model, self-esteem is driven by a self-assessment that compares expectations to real performance. This definition emphasizes the cognitive dimensions of self-esteem (i.e., self-evaluations), in particular the cognitive assessment of one's own competence. Basing self-esteem entirely on competence, however, is associated with unstable self-esteem and coping behaviors that include overachievement (Mruk, 2013a). Kahne (1996) notes that this attitude cultivates feelings of superiority or inferiority, and a competitive orientation.

Definitional ambiguity has certainly led to discrepancies across studies, particularly when definitions lean too heavily on either affective experiences of favorable self-feelings, or

cognitive appraisals of competence. Instead, the two-factor approach to self-esteem balances the cognitive dimensions of self-esteem with the affective dimensions (Mruk, 2013a), and aligns well with Branden's (1969) conceptualization above. The two-factor approach first assumes that all humans have a fundamental need to feel worthy. However, a person's ability to feel self-worth is tied to his or her ability to act competently in areas that he or she deems important. Self-esteem is a sense of worthiness that is grounded in authentic competence or success over time within areas that the self deems significant, that are related to one's personal identity, and that do not compromise the integrity of the self. It is the intersection of competence and worthiness (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995; Swann, Chang-Schneider, & McClarty, 2007).

Predictive specificity. Another flaw in self-esteem research is the mismatched selection of outcome variables to test the predictive value of self-esteem. The predictive value of self-esteem increases when the specificity of the predictive variable matches that of the criterion variable (Marsh & O'Mara, 2008; Swann et al., 2007). Global measures of self-esteem should not be used to measure specific, non-global outcomes. For example, self-esteem better predicts overall mental grit and persistence than its ability to predict scores on a math calculations task (Trzesniewski et al., 2006). It would be more useful to measure specific self-efficacy in the area of math, or to measure cognitive aptitude in domains that are specific to math ability, than to predict math achievement through self-esteem as a principal predictor variable. Instead, self-esteem is most valuable when predicting global outcomes, like life satisfaction, or when predicting outcomes that are bundled together into a more global construct. Depression, for example, is a composite of various symptoms and behaviors and reflects a more global condition that is not task-specific. Although research supports the notion that self-esteem is a robust

predictor of global life outcomes, specific task-related behavior is better predicted by specific predictive measures. Studies with ill-chosen outcome variables therefore obfuscate the large body of evidence in favor of self-esteem research.

Secure versus fragile self-esteem. Another major reason that the link between self-esteem and psychopathology is not entirely clear is because distinctions need to be drawn between secure and fragile self-esteem (Zeigler-Hill, 2011). A high, secure self-esteem describes a person who experiences a high degree self-worth that is not quickly threatened by failure and does not require constant validation from others. In this case, high self-esteem is securely anchored in being able to cope with daily challenges. By contrast, a person with high but fragile self-esteem is preoccupied with protecting and enhancing feelings of self-worth and is particularly sensitive to criticism or validation. More research is needed in this area, but existing studies suggest that there are three key markers that distinguish secure from fragile self-esteem (Zeigler-Hill, Myers, & Clark, 2010). The first marker for fragile self-esteem is a discrepancy between conscious feelings of high self-worth versus feelings of insecurity and self-doubt that exist outside the person's awareness. Another marker is the belief that worth comes from doing certain things or being a certain type of person, particularly when that contingency is in a competitive domain (e.g. winning in sports). Lastly, the third marker is high moment-to-moment fluctuations in self-esteem. This instability comes from being overly sensitive to evaluative events. Most of the research on self-esteem makes no distinction between secure, high self-esteem versus fragile, high self-esteem. By lumping the two categories together, it is no surprise that some researchers have found correlations between high self-esteem and undesirable behaviors, including aggression.

This distinction does not mean that healthy self-esteem will never fluctuate. On the contrary, self-esteem is expected to fluctuate in predictable patterns over the course of a person's life. In terms of normative developmental processes, self-esteem is relatively unstable during childhood and adolescence, as the sense of self is still being formed. Greater mean-level and rank-order changes occur during adolescence, before self-esteem gradually increases and stabilizes throughout adulthood (Erol & Orth, 2011). Self-esteem peaks around ages 50 to 60 before declining again in old age (Morin, Maïnano, Marsh, Nagengast, & Janosz, 2013; Orth & Robins, 2014). This trajectory is unsurprising, given that children and adolescents are still forming a coherent personal identity. Research shows that the clarity of a person's self-concept contributes to confidence and stability about how that person feels about himself or herself (Usborne & Taylor, 2010). As adolescents age and as their self-concepts stabilize, so should their self-esteem. In addition to forming a personal identity, cultural and group identities are also being internalized and incorporated into an adolescent's core sense of self. Negotiating multiple group-based identities presents its own challenges, especially if the norms and values of one group differ from that of another. Examples might include being bi-racial, being a second-generation immigrant, having parents with discordant spiritual beliefs, or even being identified as twice-exceptional. People with more integrated collective identities report higher levels of self-esteem than their non-integrated counterparts (Usborne & Taylor, 2010), which is an important consideration for adolescents who are dealing with multiple collective identities and conflicting views of the self.

Self-esteem moderators. A clearer picture of self-esteem should emerge as researchers reduce definitional ambiguity, select their studies' variables more carefully, and develop a more nuanced understanding of self-esteem development. As it stands, there is still inconsistency

across empirical studies about the impact of cultural identity on self-esteem. The following variables are generally believed to influence the development of self-esteem, though research findings are mixed: gender, ethnicity, socioeconomic status, and the strength of interpersonal relationships (Bachman, O'Malley, Freedman-Doan, Trzesniewski, & Donnellan, 2011; Orth, Trzesniewski, & Robins, 2010). Some studies show that adolescent boys have higher self-esteem than adolescent girls. At younger ages, Black adolescents tend to have higher self-esteem than White adolescents. Higher socioeconomic status also results in higher self-esteem, as does the presence of supportive relationships with family and friends (Bachman et al., 2011). In adolescence, an increased sense of mastery is associated with a large proportion of increases in self-esteem (Erol & Orth, 2011).

Self-esteem as a regulatory system. Researchers have also come to understand that self-esteem may serve a regulatory function. According to sociometer theory (Reitz, Motti-Stefanidi, & Asendorpf, 2016), humans have a fundamental need to belong to social groups, which is an evolutionary instinct that helped humans survive. Humans who were accepted by social groups had a higher likelihood of survival and reproduction than those who were outcast or excluded. Self-esteem is a self-regulatory system intended to increase the likelihood of social inclusion, or at least to monitor the potential for devaluation and rejection. When self-esteem is high, the individual experiences favorable thoughts and feelings about the self. When self-esteem is low, the individual is motivated to manage the potential for rejection in a variety of ways to restore inclusionary status.

Research shows that people who experience social exclusion have lower self-esteem than people whose social encounters are inclusive (Denissen, Penke, Schmitt, & van Aken, 2008; Leary, Tambor, Terdal, & Downs, 1995). Eisenberger, Inagaki, Muscatell, Byrne Haltom, and

Leary (2011) conducted a study in which participants underwent fMRI while receiving social feedback. Each participant was interviewed, and told that the interview would be recorded so that another participant could provide feedback on how the participant was “coming across.” The participants were told that the purpose of the study was to better understand first impressions. Then the participants underwent an fMRI scan, during which time they were told that another research participant would listen to their interview and provide feedback. The other research participant was a confederate, and the feedback was provided visually in 10-second intervals with positive and negative descriptors, such as “intelligent” or “boring.” The researchers examined how neural activity changed in relation to changes in self-esteem ratings from pre-scan to post-scan.

The results of the study (Eisenberger et al., 2011) showed greater brain activity in those regions associated with pain and distress, namely the dorsal anterior cingulate cortex and anterior insula, when the feedback was negative. Greater activity was found in regions of the brain associated with reward when the feedback was positive. Furthermore, participants whose self-esteem dropped during post-scan showed greater medial prefrontal cortical activity than those participants whose self-esteem remained consistent or increased during post-scan. This region of the brain is associated with autobiographical memory, social cognition, and self-referential processing. The participants whose self-esteem decreased during post-scan may have engaged in greater levels of cognitive processing associated with the feedback they received. This response is consistent with sociometer theory, which proposes that self-esteem is a gauge for perceived social rejection. Perceived rejection apparently led to greater brain activity in areas relating to distress, and greater activity in areas relating to social cognition.

Denissen et al. (2008) point out that not all social relationships are equal, so sensitivity to social acceptance or rejection may vary according to the degree of closeness or importance placed on a given relationship. Whereas many studies supporting sociometer theory manipulate social rejection from complete strangers, Denissen et al. (2008) considered relationship *type* as a moderator between social inclusion and self-esteem. They had participants fill out daily questionnaires to track their social interactions and ratings of self-esteem over a period of 25 days. The interactions were categorized by degree of closeness in the relationship. Results demonstrated a significant relationship between self-esteem and social interaction, with stronger associations when the relationships were categorized as being close (e.g., family members, romantic partners).

Lastly, Morin et al. (2013) investigated the developmental trajectories of self-esteem in a sample of over 1,000 adolescents over a four-year period. Their purpose was to ascertain whether self-esteem trajectories could be predicted by school experiences and perceptions of school climate. Their results suggest that psychosocial development can indeed be predicted by the interpersonal, organizational, and instructional components of school life. Examples of these components include students' perceptions of school safety, students' relationships with teachers, and feelings of loneliness versus belonging. Relational components were more predictive of self-esteem trajectories for female students than for male students. Morin et al. also found that, for students with moderate or high self-esteem early in the study, self-esteem remained high and stable during the later measurement points (i.e., after ninth grade). However, students who initially reported low self-esteem went on to demonstrate unstable levels of general self-esteem. The results of Morin et al.'s study demonstrate several key points worth considering for the purposes of this manuscript. First, they suggest self-perceptions are related to malleable factors

in the school environment, particularly relational experiences for female students. Second, creating positive environments for children and adolescents can contribute to later psychological stability and well-being. Third, self-esteem is more likely to destabilize among students with more negative early experiences.

Correlates of Self-Esteem

It turns out that self-esteem remains a valuable construct when approached from this contemporary framework. For instance, Trzesniewski et al. (2006) conducted a longitudinal study in which 980 participants were followed from the age of 3 through 26 years. Ninety-four percent of the initial cohort remained in the study throughout its entire duration. Roughly half of the participants were male, and half were female. Self-esteem, as measured by the *Rosenberg Self-Esteem Scale* (1965), was measured at ages 11, 13, and 15 years. These scores were averaged, and the composite scores were used to predict a host of life outcomes when the participants reached young adulthood. After controlling for numerous variables (including gender, adolescent depression, socioeconomic status, cognitive ability, and childhood body mass index), the researchers found that self-esteem was a significant predictor of later mental health problems, physical health problems, tobacco dependence, school retention, financial outcomes, and criminal convictions. Adolescents with low self-esteem were found to be 1.26 to 1.6 times more likely to experience clinical depression or clinical anxiety, or become dependent on tobacco use. These findings held true regardless of whether the adult mental health data were collected from self-report measures or via informants. Adolescents with low-self-esteem were also found to be 1.32 times more likely to be convicted of a crime and 1.48 times more likely to be convicted of a violent crime during adulthood.

A large body of research corroborates the results of Trzesniewski et al.'s (2006) study, and supports the view that high self-esteem is an important predictor of successful life outcomes. For example, Garaigordobil, Pérez, and Mozaz (2008) found small to moderate correlations between self-esteem and a host of psychopathological symptoms, such as somatization ($r = -.20$), obsession-compulsion ($r = -.33$), interpersonal sensitivity ($r = -.40$), depression ($r = -.40$), and anxiety ($r = -.23$), among others. Paulhus et al. (2004) studied 4,057 undergraduate men and women and found that low self-esteem, as measured by the *Rosenberg Self-Esteem Scale*, was correlated with such antisocial behaviors as criminal activity, bullying, drug or alcohol abuse, reckless driving, and anti-authority behaviors. Their results also suggested that high self-esteem was not associated with anti-social behaviors once the effects of narcissism were statistically removed. More recently, Sowislo and Orth (2013) conducted a meta-analysis of 95 longitudinal studies and found reciprocal effects between self-esteem and depression, and self-esteem and anxiety. They also found that the effects of self-esteem on depression were stronger than the converse. The researchers concluded that their results lent much stronger support for the vulnerability model of self-esteem (i.e., low self-esteem increases the risk for depression) versus the scar model (i.e., depression decreases self-esteem). Likewise, Orth, Robins, and Widaman (2011) tested predictive models through cross-lagged regression analysis. They found that self-esteem predicts a host of life outcome variables, whereas the outcome variables did not predict self-esteem. Variables included positive affect, health, depression, salary, job satisfaction, occupational status, and relationship satisfaction.

Erol and Orth (2014) used data from two separate studies to determine whether self-esteem was related to relationship satisfaction. One of their samples was taken from the Longitudinal Study of Generations from 1988 to 2000, with 885 married or cohabiting couples.

Measures used were the *Rosenberg Self-Esteem Scale* and the *Gilford-Bengtson Marital Satisfaction Scale*. The second sample was taken from the National Survey of Families and Households, which began in 1987 and spanned roughly 15 years. The researchers used a common fate growth curve model to assess whether positive changes in self-esteem over time could predict greater relationship satisfaction in both samples; this association is precisely what the researchers found, with medium effect sizes for both men and women. The effects held true after controlling for age, length of relationship, health, and employment status. This finding supports sociometer theory's premise that self-esteem is closely tied to the quality of one's relationships with others, and the ability to self-regulate in order to maintain social acceptance.

Locus of Control

Self-esteem is one factor that plays a key role in self-regulation. Another commonly cited factor is locus of control. The term *locus of control* (LOC) was first introduced in 1966 by Julian Rotter. Rotter (1966) grounded his discussion of locus of control in social learning theory. In social learning theory, learning occurs within a social context, such that behaviors are reinforced and shaped by a person's environment. Of relevance to this discussion is the idea that a reinforcement strengthens the likelihood of a given behavior *only if the individual can associate that behavior with the reinforcement*. If the individual does not expect a behavior to be followed by reinforcement in the future, then the likelihood of engaging in that behavior will not increase. It is this *expectancy* about the causal relationship between one's own actions and their consequences that Rotter labelled locus of control. In other words, it is the degree to which a person expects his own actions to control outcomes (Rotter, 1966; Weiner, 2010). Some people generally feel that their actions influence events and outcomes, which is referred to as an internal locus of control. Others generally tend to feel that there is little contingency between their own

actions and what happens in life, and that events and outcomes are the result of factors external to the self (e.g., luck, fate, other people); this orientation is referred to as an external locus of control.

Educational researchers in particular have latched onto this construct, given the promising body of evidence suggesting that these control expectancies play a key role in self-regulation (Chodkiewicz & Boyle, 2014). As one's locus of control becomes more external, the motivation to engage in potentially adaptive behaviors decreases. Research overwhelmingly shows that people who consistently feel in control of events and outcomes generally fare better than people who consistently feel powerless and out of control (Ryon & Gleason, 2014). A more complete discussion of how people develop attributional tendencies is offered below, followed by a review of relevant research that links locus of control to a number of important life outcomes.

Development of Attributional Patterns

Like self-esteem, studies show that locus of control is most malleable during childhood and adolescence, and most stable in adulthood (Cobb-Clark & Schurer, 2013). Moreover, a person's locus of control is shaped by experiences in early childhood. A longitudinal study with 8,803 participants found an association between socioeconomic adversity before age 5, and locus of control at age 16 years (Culpin, Stapinski, Miles, Araya, & Joinson, 2015). Early socioeconomic adversity was assessed using such factors as the mothers' educational attainment, parental occupational classifications, family income, family homeownership, and material hardship. The researchers concluded that very early experiences of adversity shaped a more external locus of control orientation by the time their sample reached adolescence. Although socioeconomic adversity cannot be experimentally manipulated, the temporal order of events in

Culpin et al.'s study suggests that the relationship between early experience and locus of control may be directional.

Relatively few studies have addressed exactly how attributional patterns are established and how a person's locus of control orientation develops over time. Available research suggests that an internally-oriented locus of control is more likely to develop when a person experiences repeated success in controlling outcomes and consistent behavioral reinforcement. By contrast, experiencing repeated negative outcomes despite personal effort leads to the erosion of one's own sense of agency, thus encouraging the development of an external locus of control.

Converging evidence supports the view that people develop attributional patterns in response to the cumulative effect of successes and failures over time (Weiner, 2010), and that other factors, such as parenting style, family support, and early peer interactions, collectively contribute to self-perceptions of control during childhood and adolescence (Ahlin & Lobo Antunes, 2015).

Personal characteristics, like gender and ethnicity, may also contribute to locus of control orientation. Kulas (1996) investigated the developmental invariance of locus of control in a sample of 84 boys and girls. The participants were assessed annually over a period of three years using the Delta questionnaire as its locus of control measure. The average age of the sample was 14 years, 1 month at first testing. It was observed that the stability of locus of control scores was moderately significant for males, and insignificant for females. In other words, the stability of locus of control in boys is better established and less variable than that of girls during adolescence. Sherman, Higgs, and Williams (1997) found that female adolescents are more likely to develop an increasingly externalized locus of control across time than their male counterparts. Taken together, locus of control fluctuates more in adolescent girls than boys, with the tendency for girls to increasingly externalize perceptions of personal control over time.

With regard to ethnicity, Wang and Su (2013) used data from the National Educational Longitudinal study of 1988 to investigate the locus of control of high school students over a four-year period. Their results suggest that students in minority groups experience high school differently than their peers, resulting in a more external locus of control. They also found that all students are particularly vulnerable midway into high school, and proposed tailoring the timing of interventions to correspond with these fluctuations in locus of control. Because gender and ethnicity are considered fixed traits, these research studies imply a directional, predictive relationship between a person's earlier developmental experiences and their later attributional expectancies. This study helped prompt the current investigation because it highlights the need to consider the impact of group identity in shaping locus of control, given that certain groups may share common developmental experiences. Whereas Wang & Su (2013) were interested in gender and ethnicity, they are not always the most salient parts of a person's identity. Other aspects should also be explored to identify potential at-risk populations.

Attribution Retraining

Although people develop attributional patterns from past experiences, new experiences can reshape people's expectations when their new attempts to control outcomes are met with successes or failures (Ryon & Gleason, 2014). Attribution retraining focuses on linking actual success with specific behaviors that are likely to increase the probability of future success. For example, consider a student who answers a question correctly in class. If the teacher states that this was a "lucky guess" then an externalized attribution is encouraged. If the teacher states that the student "must have really been paying attention," then the act of listening to instruction is rewarded and encouraged. Chodkiewicz and Boyle (2014), and Perry, Hechter, Menec, and

Weinberg (1993) provide excellent summaries of numerous research studies that illustrate the effectiveness of attribution intervention programs.

For example, in a recent study, researchers investigated the effects of attribution retraining on reading outcomes for students with learning disabilities and other mild disabilities (Berkeley, Mastropieri, & Scruggs, 2011). Participants were 59 seventh, eighth, and ninth grade students, with a mean age of 14-15 years. At the outset of the study, all students demonstrated reading skills that were below grade level, and all had IQs in the normal range. The experimental design consisted of three conditions. One group received instruction for reading comprehension strategies, along with interventions targeted at shaping more internalized attributions. Another group received only instruction in reading comprehension strategies. A third group served as a control and participated in the Read Naturally program, which employs high-interest reading materials and repeated reading practice. After four weeks, comparison of pre- and post- measures demonstrated that students in the experimental conditions performed better in reading comprehension than students in the control group. Effect sizes were large for both experimental groups (1.44 for the reading comprehension strategies plus attribution retraining, and .94 for the reading comprehension strategies group). After another six weeks, only the group who received attribution retraining retained their large effect size (1.21 for the reading comprehension strategies plus attribution retraining, and .71 for the reading comprehension strategies group). Furthermore, students in the attribution retraining group also demonstrated more internalized attributions for reading success during post-test.

Studies like Berkeley et al.'s (2011) demonstrate that the development of an internalized or externalized locus of control is not only influenced by a person's past experiences, but also by new experiences. Other studies have found that locus of control is most malleable during

childhood and adolescence, and that group identity can influence this process through shared group experiences. It is possible to develop a more internalized locus of control through attribution retraining. Increasing internalization of attributions can lead to practical and measurable results on a desired outcome.

Correlates of Internal Locus of Control

Whereas the previous discussion focused on how people develop their attributional patterns, locus of control is not merely a metric of a person's cumulative history of successes and failures. The construct is rooted in social learning theory and plays a critical role in increasing or decreasing the likelihood of behaviors, as demonstrated in the Berkeley et al. (2011) study. The importance of locus of control therefore lies in its potential to regulate future behavior.

Much like high self-esteem, research suggests that an internal locus of control is associated with healthy adjustment and positive life outcomes. People with an internal locus of control are generally more likely to exhibit optimism and positive health behaviors (Ng, Sorensen, & Eby, 2006; Ryon & Gleason, 2014). They are also less likely to experience depression and stress (Culpin et al., 2015; Kennedy, Lynch, & Schwab, 1998; Ryon & Gleason, 2014) or to abuse substances (Blagojević-Damašek, Frencl, Pereković, Čavajda, & Kovaček, 2012). Locus of control has been shown to influence job earnings (Ng et al., 2006), unemployment (Ahn, 2015), achievement (Shepherd, Fitch, Owen, Marshall, 2006), and life satisfaction (Ng et al., 2006).

In a study conducted by Culpin et al. (2015), locus of control is shown to contribute to mental health outcomes. The researchers used data from the Avon Longitudinal Study of Parents and Children (ALSPAC) to evaluate the impact of early socioeconomic adversity (from birth to age 5 years) on depression (at age 18 years), using locus of control (at age 16 years) as a

moderator variable. It was hypothesized that children and adolescents with early experiences of uncontrollable disadvantage are more likely to develop depression when they believe that their own actions have little effect on life outcomes. The ALSPAC was an observational study conducted in the United Kingdom, which followed children from birth through age 18 years. Culpin et al.'s sample includes 8,803 participants. Using structural equation modeling, they found that approximately 34% of the association between adversity and depression was explained by locus of control, after controlling for the participants' gender, parental depression, and maternal negative cognitions. By contrast, the pathway between adversity and depression was weak without the use of locus of control as a moderator in the model. The evidence supported their hypothesis that locus of control is predictive of future mental health outcomes.

As stated above, many researchers are also interested in locus of control for its application in educational settings. The relationship between locus of control and student achievement is supported by the research literature (Kirkpatrick, Stant, Downes, & Gaither, 2008; Shepherd, et al., 2006; You, Hong, & Ho, 2011). For example, in 2012, students from 65 countries participated in the Programme for International Student Assessment (PISA), which tests 15-year old students in a variety of academic domains, with a specific focus on mathematics performance. Kozina and Mlekuž (2014) used data from PISA 2012 to evaluate the relationship between locus of control and mathematics performance at an international level. Results of the regression analysis revealed that locus of control accounted for 11% of the variance in mathematics performance. On a practical level, students' mathematics scores increased by 16.6 points for every unit increase in internal locus of control. Conversely, students' mathematics scores decreased 32.8 points for every unit increase in external locus of control.

Another study used longitudinal data and employed latent growth modeling to evaluate the structural relationships between locus of control, academic engagement (e.g., homework time), social support, and academic achievement over a period of four years (You et al., 2011). A total of 6,000 students were included in the study, and all were in the eighth grade at the onset of the study. Perceived control and social context were assessed at the onset of the study, academic engagement was assessed two years later in the first follow-up, and academic achievement was measured after another two years in the second follow-up. Results of the analysis indicated that locus of control had a direct effect on academic achievement four years later. Moreover, locus of control had an indirect effect on academic achievement that was mediated by academic engagement. Lastly, greater social support from teachers and parents was found to increase students' sense of perceived control.

Self-Regulation and Locus of Control

If locus of control serves a regulatory function, then it would stand to reason that it not only predicts academic achievement, but that it also predicts specific behaviors associated with the learning process. This prediction is precisely what researchers have found. An internal locus of control is associated with more hours spent studying (Bodill & Roberts, 2013), more strategic study approaches (Cassidy & Eachus, 2000; Zhang & RiCharde, 1999), and a lower probability of blaming the teacher when performance is below average (Grimes, Millea, & Woodruff, 2004). Keller and Blomann (2008) conducted an experimental study to explore the role of locus of control on flow. Flow refers to an experiential state in which a person is intensely absorbed in a particular task, and is actively engaged in participating in that task through skill-related behaviors. The degree of task engagement and reference to skills differentiates flow from activities like watching television or listening to music. Characteristics of flow include intense

focus on the present moment, merging of action and awareness, a strong sense of control, a loss of self-consciousness, the absence of worried or distracted thoughts, perceived time distortion where time passes by quickly outside of one's awareness, and finding that engaging in the task is rewarding in and of itself (Keller & Blomann, 2008). People who experience flow describe it as being "in the zone," and it is thought of as the optimal experience while performing or learning.

In their study, Keller and Blomann (2008) sampled 122 undergraduate students and randomly assigned them to one of three conditions based on task difficulty. The task was adapted from the popular computer game Tetris, in which falling objects must be arranged to fill lines at the bottom of the screen. Like the game it was adapted from, participants in each scenario could rotate the objects and move the objects right or left as they were falling. However, the speed at which the objects fell was manipulated according to the participants' condition. In the boredom condition, the task demand was very low and the objects fell at a very slow rate. In the adaptive condition, the speed of falling objects was continuously and automatically adapted to the participants' performance to ensure a good fit between skill level and task demands. In the overload condition, the speed of falling objects was intentionally very fast. Locus of control was assessed before participants completed the task, and measures of flow were assessed afterward (e.g., perception of time, level of enjoyment). The researchers found that, overall, participants in the adaptive condition achieved more flow than those in the boredom and overload conditions. They then divided participants in the adaptive condition into two groups: those with a stronger internal locus of control, and those with a weaker internal locus of control. In doing so, they found that participants with a stronger internal locus of control were more likely to experience flow under the adaptive condition than participants with a weak internal locus of control.

The locus of control construct has also piqued the interest of neuroscientists, and the results of those studies support the view that it plays a regulatory role in behavior. For example, an internal locus of control is correlated with cognitive, socioemotional, self-regulatory, and reward regions of the brain (Hashimoto, Hikaru, Yasuyuki, Sekiguchi, & Nouchi, 2015). Furthermore, a study from 2005 demonstrated that self-esteem and locus of control predicted the body's response to stress, as measured by cortisol samples and structural magnetic resonance neuroimaging (MRI; Pruessner et al., 2005). Cortisol is a glucocorticoid (steroid hormone) that is a known biomarker of stress. It is produced by the adrenal glands to regulate bodily responses to stress, such as blood pressure, activation of the central nervous system, the anti-inflammatory response, and heart rate. Higher cortisol indicates higher levels of stress. The MRI was used to ascertain hippocampal volume, since the hippocampus has high quantities of glucocorticoid receptors and is known to sustain damage from chronic stress over time. Shrinkage in this region would indicate damage from stress.

Pruessner et al. (2005) formed two groups. One group included 16 men in their early twenties, and the other included 23 healthy men and women between the ages of 60 and 84. In both groups, structural brain scans were taken and levels of cortisol were sampled. The young adult sample was first exposed to a mental stress task before brain scans and samples of cortisol were taken. In the older adult sample, participants provided saliva samples over a period of 12 months, in addition to undergoing structural MRIs. In both the young adult and older adult groups, measures of self-esteem and locus of control were also given.

Results of the Pruessner et al. (2005) study showed that, regardless of age, participants with higher self-esteem and internal locus of control had larger hippocampi, suggesting that they sustained less hippocampal damage because they were better able to deal with stress. The

difference in hippocampal volume was even more pronounced in the older adult group than in the young adult group, showing greater brain volume decline across the lifespan in people who have lower self-esteem and more external locus of control. The researchers also showed that, in the young adult group alone, participants with lower self-esteem and more externalized locus of control showed a significantly larger cortisol response to the stress task than participants with higher self-esteem and internal locus of control. In the older adult group, an interaction effect was found in which participants' age was strongly and negatively associated with hippocampal volume only for participants with low self-esteem and external locus of control. In other words, as people with low self-esteem and external locus of control age, hippocampal volume shrinks as a result of stress-related damage. By contrast, this change in hippocampal volume over time was not found within subjects who had high self-esteem and internal locus of control. Though the sample size was small in this study, the results support other research that suggests high self-esteem and internal locus of control provide helpful self-regulatory functions and offer protection against a host of negative life outcomes.

Gifted and Talented Learners

As stated above, self-esteem and locus of control are very appealing constructs because they are non-specific to any particular domain (i.e., they are global constructs), and because they exert influence over a variety of important life outcomes. If healthy self-esteem and an internal locus of control can be shaped by a person's environment, then it stands to reason that early interventions should be targeted at children and adolescents who are still developing their self-perceptions, and especially to at-risk student populations. To that point, the next segment of this manuscript will focus on gifted learners, and then more specifically on twice-exceptional learners, whose self-esteem and locus of control development are not yet well understood.

Conceptualizing Giftedness

To date, there is no universally accepted definition of giftedness (Carman, 2013), partly because a fundamental characteristic of giftedness is that it is not a fixed attribute, like eye color or hair color; rather, it is a label used to identify students whom society believes have a certain promise or potential. For example, rigid cutoff scores on measures of intelligence are often used to identify gifted learners, but it is arbitrary to state that a student with an IQ score of 130 is gifted, whereas a student with an IQ score of 129 is not (Pfeiffer, 2012). Society imposes this fictional dichotomy on learners, which falsely reinforces one of the biggest myths about giftedness—that these individuals truly represent two distinct groups that exist in nature: the gifted and the non-gifted. In fact, the purpose of identifying gifted and talented learners during early childhood is merely to predict later accomplishment so that students with the most promise have access to appropriate resources and opportunities (Keating, 2009). Giftedness is therefore a social construction used to classify individuals who demonstrate the potential to achieve exceptional levels of success or expertise in areas that are valued by society, in whatever way ‘success’ and ‘expertise’ are culturally defined (Keating, 2009; Nicpon & Pfeiffer, 2011; Pfeiffer, 2012; Renzulli, 1978). Note that this conceptualization suggests that a child identified as gifted in one culture may or may not be considered gifted according to the values of another culture, which makes summarizing giftedness research a bit of a challenging (though not impossible) endeavor, given that the concept itself is something of a moving target. In fact, Renzulli (2011a) encouraged individual schools to establish gifted programs that are sensitive to local values, resources, and needs, even using school-wide rather than nationally-standardized norms to identify gifted and talented learners.

Furthermore, although a high IQ is a good predictor of later accomplishment in Anglo-American culture (Sternberg & Grigorenko, 2004; Worrell, 2009 in Pfeiffer, 2012), it is not the only predictor of success. The reality is that many of these individuals who demonstrate such potential during early childhood do not rise to great eminence as adults. Conversely, many very accomplished and extraordinary adults were not initially identified as possessing special talent as children (Pfeiffer, 2012). Non-cognitive factors that influence success include hard work, perseverance, high self-efficacy, and an internal locus of control (Pfeiffer, 2012; Konstantopoulos, Modi, & Hedges, 2001), as well as motivation, interest, and personality (Konstantopoulos et al., 2001; Nicpon & Pfeiffer, 2011). Outside of the individual, such factors as exposure, opportunity, and a supportive environment also come into play (Konstantopoulos et al., 2001; Pfeiffer, 2012; Smith, 2009). As Sternberg and Grigorenko (2004) concisely state, “success is attained through a balance of analytical, creative, and practical abilities” (p. 1429). Clearly, an overly-simplistic definition of giftedness based on arbitrary cutoff scores, or a definition that does not account for contextual factors and non-cognitive determinants of success, is insufficient in capturing what it truly means to be gifted.

Marland report. Despite this variability, there are some characteristics that are commonly agreed upon as core components of giftedness. In 1972, the U.S. Congress commissioned a federal report of gifted and talented education in the United States (Public Law 91-230, section 806) (Marland, 1972). Commonly referred to as the Marland Report, after Sidney P. Marland, Jr., who was the U.S. Commissioner of Education at the time, it provided the first federal definition of giftedness. The definition reads as follows:

Gifted and talented children are those identified by professionally qualified persons who by virtue of outstanding abilities are capable of high performance. These are children who require differentiated educational programs

and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society.

Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination:

1. General intellectual ability
2. Specific academic aptitude
3. Creative or productive thinking
4. Leadership ability
5. Visual and performing arts
6. Psychomotor ability. (p. ix-x, Marland, 1972).

The panel proposed that giftedness is demonstrated by exceptional achievement or potential within at least one of six domains, only one of which included intellectual talent. Although the practice of overemphasizing general intellectual ability in the schools ultimately prevailed, this definition drew attention to non-cognitive predictors of success and has become one of the most influential forces in the evolution of gifted education in the United States (Renzulli, 2000). Since it was first introduced in 1972, the federal definition of giftedness has undergone multiple revisions. For example, the federal definition of giftedness now excludes psychomotor ability as a component of giftedness (No Child Left Behind, 2004); this exclusion has been criticized by those who feel that psychomotor giftedness is essential to sports, the arts, and many other domains (e.g., performing surgery) (Gagné, 1985).

Three-ring conception of giftedness. In 1978, a landmark article was published that similarly expanded the criteria for giftedness beyond mere academic knowledge and cognitive aptitude (Renzulli, 2011a). In that article, Renzulli proposed that giftedness is made manifest through the interaction of three factors: above-average general ability, high levels of task

commitment, and high levels of creativity. Above-average general ability referred to academic aptitude and achievement, with no extra advantage evident for those who possess superior talent beyond a level above average. Task commitment referred to the ability to focus one's energy on a specific task, and it encompassed non-cognitive dispositional traits, such as persistence and a strong work ethic. The third factor, creativity, referred to originality, ingenuity, and the ability to flexibly set aside convention in the pursuit of something that could be deemed societally valuable. In combination, Renzulli proposed that exceptional talent could be applied to a wide range of specific performance areas, such as mathematics or science, suggesting that giftedness is a generalized potential that is not domain-specific. This model became known as the three-ring conception of giftedness. Renzulli stressed that each factor is as important to the model as either of the other two, de-emphasizing the role of intelligence in comparison to prevailing notions of giftedness. It should be noted that in subsequent years, Renzulli (2011b) expanded his theory to include what he calls *co-cognitive conditions*—such as Optimism, Courage, Mental Energy, and a Sense of Destiny—that interact with the aforementioned clusters to direct an individual's efforts into either personal gain or societal contributions.

Star model of giftedness. Since these early developments, many subsequent models also propose that giftedness comprises a multidimensional set of factors (Sousa, 2009). For example, Tannenbaum (1983, 1997) proposed a five-pronged theory of giftedness, termed the star model of giftedness. This theory emphasized that not all early potential is fulfilled, and it therefore distinguished between giftedness in its maturity and gifted potential, which must be developed over time. Tannenbaum proposed that there are five interwoven factors, or antecedents, that contribute to the development of realized gifted ability. Each of these five elements is two dimensional; they can either be static (what a person is capable of at a specific moment in

comparison to others) or dynamic (in progress or in the process of changing). The five elements are as follows: general cognitive ability, specific cognitive aptitudes that can be linked to specific domains of achievement/accomplishment, nonintellectual traits that support success, a nurturing and supportive environment, and chance or life circumstances. Tannenbaum proposed that each of these five factors contribute to all forms of giftedness, though their amount of contribution may vary according to the specific domain of giftedness in question.

Gagné's differentiated model of giftedness and talent. Like Tannenbaum (1983, 1997), Gagné (1985) also made a distinction between the potential for gifted accomplishment and actual gifted accomplishment. He suggested that the terms 'gifted' and 'talented' are too often used interchangeably in the literature, and that they should be used differentially to represent distinct categories. According to Gagné's differentiated model of giftedness, the term 'gifted' refers to possessing potential in at least one of four domains: intellectual, creative, socioaffective, or sensorimotor. The expression of these natural, innate abilities is referred to as 'talent,' which is the outcome of gifts interacting with a variety of internal and external catalysts (e.g., motivation, school environment, family, personality, etc.). Unlike Renzulli (1978), Gagné classified creativity as a domain in which giftedness can be expressed, rather than a necessary attribute of giftedness or precursor to talent. He argued that Renzulli's model fails to accurately capture exceptional talent that does not require creative ability, such as athletic accomplishment or musical proficiency. He also criticized Renzulli's overemphasis on intellectual ability (as opposed to other domains of ability) and de-emphasis on motivation as a separate factor. Gagné also suggested that gifts and talents bi-directionally contribute to one another, such that gifted ability contributes to several domains of talent, and a specific domain of talent is represented by a diverse range of abilities.

Munich model of giftedness. Born out of a large-scale longitudinal study at the University of Munich from 1985 to 1989, another influential theory is the Munich model of giftedness (Perleth & Heller, 1994; Sousa, 2009). According to this model, giftedness comprises four interdependent dimensions. The first dimension includes predictors of giftedness, such as cognitive ability or social competence. The second dimension includes intrapsychic moderators of giftedness, such as distress tolerance and motivation. The third dimension includes external moderators of giftedness, such as learning opportunities and family environment. The fourth dimension includes the criteria for giftedness or specific talent domains, such as math, sports, or music.

Pentagonal implicit theory of giftedness. The pentagonal implicit theory of giftedness (Sternberg & Zhang, 1995) proposed a set of five criteria that people intuitively take into account when making evaluations about giftedness: excellence in one or more dimensions as compared to peers, possession of a unique skill or attribute relative to peers, productivity or accomplishment as a result of one's gift(s), the ability to demonstrate giftedness on valid assessments, and having one's gifts be perceived as valuable by society. Sternberg and Zhang recognized the relativistic quality of their theory, noting that giftedness itself is a social construct that exists to categorize individuals who are outstanding (or have the potential to be outstanding) among their peers.

Expert-performance approach. In the early 1990s, another framework for giftedness was published that dramatically shifted attention away from innate factors. The expert-performance approach attributed exceptional talent to deliberate practice over an extended period of time (Ericsson & Charness, 1994; Ericsson, Krampe, & Tesch-Römer, 1993). Ericsson et al. (1993) defined deliberate practice as the intentional, effortful shaping of behavior through focused training, feedback, challenge, and persistence under optimal conditions. Deliberate

practice is distinguished from other forms of practice, such as mere repetition or routine activities related to a talent domain. For example, many recreational runners have decades of experience practicing the act of running. However, these individuals would not be described as elite athletes. Taking their performance to the next level would require deliberate engagement in activities specifically designed to improve performance over a period of many years. For a large number of talent domains, the amount of deliberate practice required to achieve expert performance is at least 10 years of intense preparation (Ericsson & Charness, 1994, Ericsson et al., 1993).

The work of Ericsson et al. (1993) is compelling, although it has been criticized for inflexibly dismissing innate cognitive factors rather than incorporating innate ability into its framework (Ackerman, 2013; Wai, 2014). Most importantly, there is ample evidence to indicate that individual differences in innate ability account for a significant share of the variability among elite performers, beyond what can be accounted for by environment and deliberate practice alone (Hambrick et al., 2013; Meinz & Hambrick, 2010 ; Plomin, Shakeshaft, McMillan, & Trzaskowski, 2013; Ruthsatz, Ruthsatz-Stephens, & Ruthsatz, 2014; Shavinina, 2010; Wai, 2014). For example, one empirical study found that working memory capacity, which is a highly heritable and stable cognitive factor, significantly adds to predictions of expert performance in the area of piano sight-reading, after accounting for deliberate practice. Another study found that distinct cognitive profiles in child prodigies correspond to each child's specific talent domain in art, music, and math (Ruthsatz et al., 2014). By definition, a child prodigy is one who achieves great distinction through extraordinary talent by the age of 10 years or earlier (Shavinina, 2010), which suggests atypically accelerated mental development that is difficult to explain from the expert-performance framework. Even advocates of the expert-performance

approach have acknowledged that an individual's capacity for deliberate practice is to some extent heritable because such variables as motivation or frustration tolerance are themselves genetically influenced (Ericsson & Charness, 1994).

Talent development model. Another leap forward in the field of gifted education came with the publication of Subotnik, Olszewski-Kubilius, and Worrell's (2011) talent development model. In their landmark monograph, Subotnik and her colleagues offered a comprehensive summary of gifted research, from which they offered one of the most integrated and balanced perspectives of giftedness to date. The talent development model is a multidimensional model that accounts for the influence of innate ability, psychosocial factors, developmental processes, and distinctions between potential and performance.

As in many of the models mentioned in this manuscript so far, the talent development model (Subotnik et al., 2011) proposes that cognitive capacity offers potential for later accomplishment, particularly when one's profile of high cognitive aptitude relates to a specific talent domain. Creativity is also identified as a critical component of giftedness, in that it transforms knowledge and experience into original contributions and innovation. In addition, various psychosocial variables further influence the potential for—and manifestation of—giftedness. These variables are wide-ranging and numerous; they include motivation, task commitment, deliberate practice, personality, emotional experiences, family environment, interest, level of passion, and blind luck. The talent development model also proposes that the *potential* for achievement is most relevant in the earliest stages of talent development, whereas the *manifestation* of giftedness through great accomplishment and eminence is most relevant in later stages. Moreover, Subotnik and her colleagues assert that both cognitive and psychosocial

factors are malleable, and with that in mind, they advocate for strategic interventions targeted at promoting talent.

Tripartite model. Another contemporary framework is the tripartite model of giftedness, which offers three complementary ways in which academic giftedness can be grouped: high intelligence, outstanding accomplishments, and the potential to excel (Pfeiffer, 2013). The elegance of this model is in its ability to simultaneously embrace the traditional notion of giftedness simply as an intellectual trait, while also accounting for more recent conceptualizations that incorporate high achievement and potential, which serves as an important reminder that giftedness is a social construction, so there are multiple ways in which giftedness can be identified, each of which has value. Moreover, it follows that educational programming can be tailored to each of the three groups. For example, students with high intelligence require intellectually stimulating and fast-paced academic material, students with outstanding accomplishments have earned their place in enriched academic environments, and students with the potential to excel require opportunities that will nurture their gifts while removing obstacles that are impeding growth.

The models mentioned above represent only a sample of the most prominent models of giftedness to date; by no means do they represent an exhaustive list. There are many more frameworks that seek to define giftedness, explain how talent develops, or provide suggestions for gifted programming. For example, the autonomous learner model emphasizes the cognitive, emotional, and social needs of learners through the use of activities along five major dimensions, one of which is in-depth study using the learner's own learning plan (Betts & Neihart, 1986). The integrative education model proposes that learning can be enhanced by organizing new knowledge in an integrated and inter-related fashion (Clark, 1986). Then there is the work of

Julian Stanley, whose approach to gifted programming focused on high intellectual ability, motivation, and environmental conditions conducive to talent development. Stanley formed the Study of Mathematically Precocious Youth (SMPY) in 1971, and pioneered the concept of identifying gifted and talented students through a talent search, as well as the practice of radically accelerating education for some gifted learners (Benbow, 2005; Benbow & Stanley, 1983).

Although there are notable differences among these perspectives, some common elements can be drawn from the literature as a whole. First, a concise definition of giftedness is borrowed from Pfeiffer (2013), who states that “the gifted child demonstrates a greater likelihood, when compared to other students of the same age, experience and opportunity, to achieve extraordinary accomplishments in one or more culturally valued domains” (p. 14). Second, many models of giftedness specifically identify cognitive aptitude as a necessary condition for the development of extraordinary talent across domains, particularly when an individual’s cognitive strengths are related to the domain. Third, creativity is regarded as another necessary, but insufficient, factor in the development of talent. Lastly, models of giftedness tend to recognize that there are numerous internal and external factors that either moderate the manifestation of giftedness, or that directly contribute to gifted potential and exceptional talent. Some of these psychosocial factors reside within the individual, and some are the result of environmental, external forces. Common examples include motivation, task commitment, opportunity, and sociocultural context.

Socioemotional Needs of the Gifted Learner

Giftedness implies that a person possesses extraordinary abilities or potentially extraordinary abilities that are beyond the reach of his peers. For example, a gifted student

identified by his high achievement has already outperformed the majority of other students. This belief unfortunately encourages two common misconceptions. The first misconception is that giftedness is exclusively associated with unfair advantage. The second, related misconception is that gifted students cannot fail (Pfeiffer, 2013). It is true that giftedness is a protective factor in general. Many researchers acknowledge that gifted learners are at lower risk for social-emotional or adjustment issues, and may even be more popular until the effects disappear around age 13 (Gagné & Gagnier, 2004; Nail & Evans, 1997 in Shechtman & Silektor, 2012; Yan & Haihui, 2005). Studies of the self-concepts of gifted children generally demonstrate that gifted children possess average to highly favorable self-concepts due to high levels of performance and achievement, as well as recognition or praise as a result of these accomplishments (Hoge & Renzulli, 1991; Rinn, Reynolds, & McQueen, 2011). This association does not mean that all gifted students will be popular, well-adjusted, and successful. Gifted students form a diverse group with specific vulnerabilities to watch out for. The following discussion sheds light on some of the potential challenges that gifted students face.

First, advanced development in the cognitive domain does not necessarily correspond with advanced development in non-cognitive domains. For illustrative purposes, consider a child who consistently outperforms his classroom peers, is described as insatiably curious by his teachers, and obtained scores in the 99th percentile on standardized measures of cognitive abilities. He is a gifted student by most definitions. However, this student lashes out at his teachers when frustrated and has received multiple disciplinary referrals for fighting with schoolmates. His emotional development is not as well-developed as his cognitive development. Dyssynchrony refers to intellectual, emotional, social, and motor gaps in the students' development (Shechtman & Silektor, 2012). Gifted learners are at greater risk of dyssynchrony,

and these exaggerated peaks and valleys across developmental domains can result in greater social-emotional problems and adjustment difficulties. Enrichment opportunities, advanced classes, early grade promotions, and other such interventions designed to engage an intellectually precocious child may have the unintended effect of amplifying behavioral immaturity.

Researchers have shown that gifted children are aware of their developmental gaps. Gifted children tend to hold a more favorable self-concept in areas corresponding to their gifts, but a more unfavorable self-concept in other areas, such as social skills or physical prowess (Hoge and Renzulli, 1993; Rimm, 2002; Rinn et al., 2011; Shechtman & Silektor, 2012).

Social-emotional difficulties can also arise from the lack of a true peer group (Pfeiffer & Foley Nicpon, 2017). Precocious learners may find a limited number of satisfying same-age friendships with whom to share common activities and interests (Shechtman & Silektor, 2012). Moreover, exceptionally gifted learners whose IQs may exceed 160 are at a particular disadvantage and are likely to experience emotional stress related to social isolation (Pfeiffer, 2008; Rimm, 2002). Given the potential for these difficulties, some children may lack sufficient opportunities to practice important social skills that are needed to establish and maintain relationships; this lack of opportunities in turn exacerbates social isolation and social-emotional vulnerability (Shechtman & Silektor, 2012). Some researchers also note that many gifted learners are emotionally advanced and demonstrate higher sensitivity to social situations and social cues. Many are highly empathic and may, for example, be prone to feeling upset or to crying. Ironically, high exceptionality in this domain may yield fewer actual friendships during childhood because of the child's high level of vulnerability (Shechtman & Silektor, 2012).

Even more interestingly, gifted children are susceptible to feelings of difference, social isolation and loneliness, even if others perceive them as being popular (Rimm, 2002; Shechtman

& Silektor, 2012; Swiatek & Dorr, 1998). As Rimm (2002) states, it is the *perception* of social stigma that can lead to adverse effects on social relationships, not necessarily the true presence of social stigma. If gifted children merely perceive themselves as being different, or feel that others view them differently as a result of their giftedness, then they may experience higher degrees of psychological distress. This can be compared to the stereotype threat effect, wherein stereotypical beliefs about one's self-concept can subconsciously and significantly alter that person's own behaviors and performance. Thus, some gifted children may hide their giftedness to maintain peer relationships and social status (Rimm, 2002; Shechtman & Silektor, 2012; Swiatek & Dorr, 1998). For instance, gifted students may intentionally underperform on assignments, projects, and tests. They may feign effort or difficulty on tasks they find simplistic or easy. They may also withdraw from honors classes, achievement-oriented clubs, advanced academic programs, and even certain social circles in order to avoid negative social repercussions associated with being bright (Swiatek & Dorr, 1998). Gifted boys may deflect attention away from their advanced cognitive capabilities by using humor or excelling in sports (Rimm, 2002; Swiatek & Dorr, 1998). Of note, these camouflaging coping mechanisms may be more pronounced in students who must deal with competing group identities.

Another interesting point worth mentioning is that children's identity development, self-perceptions, and attributional patterns are dependent upon their cognitive development (Weitlauf & Cole, 2012). Attributional patterns, for example, develop over time based on expectations of causal relationships. Causal reasoning skills are required to understand whether events and outcomes are within or outside of a person's control. Young children, for example, tend to conflate ability with effort (e.g., laziness may be perceived as being unintelligent). Similarly, the implications of identifying with different cultural groups may be more profoundly experienced

when a child has the cognitive capacity to understand the subtleties and complexities of his culture and environment (Pfeiffer & Foley Nicpon, 2017). This point raises the question of whether gifted children, who possess advanced cognitive skills, might develop a sense of self and attributional style earlier than their peers. Taking this idea a step further, it is possible that the development of self-esteem and locus of control in gifted children could take a different developmental trajectory altogether. These are merely conjectures, but the impact of advanced cognitive development on self-esteem and locus of control bears some consideration.

Social Significance of Nurturing High Potential

Before moving on, it is important to briefly acknowledge that there are some people who oppose directing attention and resources to the gifted population (Geake & Gross, 2008). This opposition is largely based on the two misconceptions stated above: that gifted children are already advantaged and that they are immune to failure. The opposition becomes even more pointed when one considers that programs for disadvantaged students are often underfunded and must directly compete for scarce financial resources. Helping gifted learners reach their full potentials and helping them to overcome developmental challenges are socially significant endeavors. Society as a whole benefits from the contributions of talented individuals in the areas of scientific and technological advancement, economic advancement, leadership, music, and art. It is not enough to settle for basic levels of attainment in reading, writing, and mathematics. Denying resources to society's brightest only serves to dim the future of society as a whole. (Gallagher, 1991; Geake & Gross, 2008; Pfeiffer, 2008).

The importance of maximizing the potential of promising young learners is readily established when one considers the importance of advancement and innovation in today's global market (Reis & Renzulli, 2010). Research studies have shown that the economic growth of both

developed and developing countries is significantly linked to differences in educational outcomes, primarily measured by math and science achievement scores on internationally-administered assessments (Barro, 1999; Hanushek & Woessmann, 2011). Human capital has been shown to have robust effects on economic growth, and is a more powerful predictor of long-term economic growth among developed countries than institutional differences (e.g., international trade, exchange rates, security of property rights) or differences in product and market regulation (Hanushek & Woessmann, 2011). While the link between successful educational outcomes and a healthy economy is already one of importance in an increasingly competitive global arena, the need to develop human capital has become even more pronounced as economies worldwide recover from the 2007 Great Recession. Unfortunately, data collected using the Program for International Student Assessment (PISA) and National Assessment of Educational Progress (NAEP) show that students in the United States are performing below the level of achievement attained by students from other industrialized nations when it comes to math and science (Gallagher, 1991; Hanushek, Peterson, & Woessmann, 2010).

A number of factors have been implicated to explain the relatively lower performance of students in the United States than in other nations. For instance, some have argued that the United States has a more diverse student body, whose educational needs are more uniquely challenging than in countries with more homogenous students. Supporters of this argument maintain that such heterogeneity causes greater difficulty meeting the needs of each individual learner, and thus results in poorer educational outcomes as a whole. Along similar lines, another argument holds that the gap between disadvantaged populations and advantaged populations (e.g., low versus high SES) in the United States is so wide that averaging scores with low-performers masks the achievements of their better-performing peers.

However, data from the National Center for Education Statistics (2013) show that scores among the lowest performers have generally increased over the past four decades, demonstrating that this lag is not merely a problem of low performers “holding back” top performers. Hanushek et al. (2010) conducted an in-depth analysis to explore these very concerns and found flaws with each. The researchers demonstrated that even students who belong to privileged sub-groups in the United States are being outperformed by students in other countries regardless of race/ethnicity, level of parental education, or region of the country. For example, Hanushek et al. (2010) compared the percentage of White students in the United States who scored at an advanced level in math and science with the percentage of students from all racial/ethnic backgrounds in other countries who performed at a highly advanced level, and showed that even an advantaged sub-group of students in the United States are being outperformed by students in other countries. Clearly this problem is not limited to disadvantaged learners; the performance of students across all levels of achievement and aptitude needs to be addressed. The need to cultivate human capital by nurturing the potential gifts and talents of our youth is no doubt of critical importance.

Twice-Exceptional Learners

As illustrated in the previous paragraphs, the social significance of maximizing potentials among gifted and talented youth cannot be understated. Yet there is a unique sub-population of gifted learners who, by definition, are at a disadvantage in the classroom. Twice-exceptional learners are defined as students who are gifted or talented in one or more domains, *and* simultaneously meet criteria for one or more disorder or disability (physical or non-physical). The interaction of giftedness with a coexisting disability is an often overlooked topic in scientific literature. Although the topic has been gaining attention in recent years (Foley Nicpon, Allmon,

Sieck, & Stinson, 2011), most research studies are based on anecdotal clinical reports, or small and unrepresentative clinical samples (Pfeiffer & Foley Nicpon, 2017). Prevalence studies are largely lacking and far from definitive, but estimates suggest a range from five to seven percent of the special education population (McCallum et al., 2013). Across all disability categories, there are an estimated 300,000 twice-exceptional students in the United States (Baum & Owen, 2004).

Gaps in Legislation and Training

Although empirical research on the twice-exceptional is relatively limited, a picture of their distinct challenges is coming into focus. One of the issues that gifted students face in general is the absence of a federal mandate to identify and instruct gifted learners. Without a federal mandate, the onus falls on state and local entities to make decisions about their gifted learners (National Association for Gifted Children [NAGC], 2009; Zirkel, 2004). Even at the state level, there are large differences in the type of guidance and funding provided, if such support is provided at all (Robertson et al., 2011). For instance, as of a 2009 report delivered by the NAGC, early entrance to kindergarten was disallowed in 13 states, whereas only 10 states specifically granted their approval for early entrance. Two states specifically prohibit academic acceleration based on level of proficiency. Only 6 states have fully funded their mandates to provide services to gifted and talented students, while 18 states do not allocate any funds to specifically address gifted education at all.

In addition, the data show that many educators receive inadequate training to meet the needs of gifted learners, and thus lack the skills and knowledge to effectively serve this population (Croft, 2003; Robertson et al., 2011). Only a handful of states require prospective teachers to undergo specific training in the needs of gifted and talented students, and many don't

require general education teachers to receive such training at all over the course of their careers (NAGC, 2009; Robertson et al., 2011). This situation is alarming, given the fact that general education teachers provide a potential pathway toward gifted identification. Additionally, teachers who specialize in gifted education are not necessarily required by their respective states to obtain official certification or endorsement as a gifted education specialist, or to seek out continuing education on an annual basis, which speaks to the lack of accountability by federal and state systems to advance our gifted learners and legitimize their needs (Zirkel, 2004).

An empirical investigation conducted by Robertson et al. (2011) revealed that the absence of federal and state accountability has led to measurable gaps in educator training. The researchers surveyed 300 members of the National Association of School Psychologists and found that 37% of the respondents received no training on gifted theory, gifted assessment, gifted curriculum, characteristics of gifted students, the social-emotional needs of gifted children, or the twice-exceptional. Nearly one-third had no experience in gifted assessment during their graduate-level practicum experiences. Furthermore, 94% of the respondents had received little to no graduate program training in gifted screening and assessment. These figures demonstrate a serious need for school psychology programs to provide formal training in gifted education.

One might argue that service providers have numerous opportunities after graduating to fill any apparent gaps in knowledge through post-curricular training. However, the same study by Robertson et al. (2011) showed that only about a quarter of the respondents reported attending any in-service workshops or courses related to gifted student populations after graduating from their training programs. A lack of training in this area translated into deficiencies in knowledge. Most of the respondents were unfamiliar with authorities in the gifted field, or with common concepts related to giftedness. Furthermore, over half of the participants reported that they

infrequently, rarely, or never conducted gifted student evaluations or consulted with teachers about gifted students. These are serious systemic issues in legislation and training that compromise the quality of gifted education for all gifted students in the United States.

Another systemic issue worth mentioning is the lack of appropriate settings for many twice-exceptional students. Certain types of physical disabilities are challenging for schools to accommodate in mainstream classroom settings and often result in placing students in specialized, separate classrooms or institutions that educators feel are better equipped to meet students' needs (Morningstar, Kurth, & Johnson, 2017). Despite their ability to accommodate deficits, these schools may be less able to provide specialized support for gifts and talents than their mainstream counterparts (Foley Nicpon et al., 2011; Foley Nicpon, Assouline, & Colangelo, 2013; Pfeiffer, 2008).

Lastly, the language of IDEA has led to some disagreement about whether twice-exceptional students should be entitled to academic interventions if their academic performance is commensurate with that of their grade-level peers (Foley Nicpon et al., 2011; Robertson et al., 2011, Zirkel, 2004). The Individuals with Disabilities Education Improvement Act (2004) states that students are entitled to a free and appropriate public education, in the least restrictive environment. It further states that children are eligible for special education services if they have "one or more disabilities which substantially limit one or more major life activities" (IDEA, 2004). In the case of a twice-exceptional gifted student whose academic performance is average (but whose potential is well above average), this language leaves room for interpretation as to whether or not that student is "substantially limited." Compared to peers, the student is not substantially limited and therefore would not qualify for special education services. However, limiting the capabilities of students with the greatest potential is no doubt a disservice to them

and to society as a whole. Furthermore, the least restrictive environment for such a student might instead be interpreted as an enriched setting designed to cultivate that student's strengths.

Access to School Services

In addition to the systemic issues described above, twice-exceptional learners are less likely to be identified for gifted programming than their non-disabled peers. (Henderson & Bryan, 2004). The spread phenomenon refers to the tendency to generalize a specific disability to the entire person. In this way, an individual with a specific physical disability, such as a hearing impairment, may be assumed to also be cognitively compromised despite there being no actual evidence for generalized impairment. Thus, a disability is perceived to have spread from a circumscribed aspect of a person's being to other areas, which may not be impacted at all. Although it is entirely possible for a physical disability, such as traumatic brain injury, to affect multiple areas of a person's functioning, this situation tends to be the "exception rather than the rule" (Henderson & Bryan, 2004, p.54). Individuals with physical disabilities are not the only population in which the spread phenomenon can be applied. Students with emotional difficulties and behavioral problems may also be assumed to be less intelligent than their well-behaved counterparts.

This focus on deficiency rather than ability can lead professionals to ignore or downplay a student's strengths. A recent study by Bianco and Leech (2010) showed that teachers are susceptible to being influenced by disability labels when making gifted referral decisions. The study included general education teachers, as well as teachers of special education and gifted education. Each participant was given three vignettes that described a hypothetical gifted student; the vignettes were identical in every way except for the disability status of the student (i.e., no disability, learning disability, or emotional/behavioral disorder). The results showed that,

regardless of teacher background (general, special, or gifted education backgrounds), all teacher groups were less willing to refer students to gifted programs when a disability label was provided. The authors of the study concluded that the teachers may have been overly focused on remediating deficits rather than emphasizing strengths, particularly in light of the fact that the special education teachers were the least likely group to refer students to gifted programs regardless of disability status. The outcome of the study suggests that students with disabilities may be under-identified as gifted due to this bias.

Another reason that the gifts of twice-exceptional students are hard to identify is because their gifts can be masked by their disability (Henderson & Bryan, 2004; Pfeiffer, 2013). For example, certain tools that are widely used to identify gifted students may over-rely on measures of spatial ability, decoding, working memory and processing speed, which are often lower in twice-exceptional students (Assouline, Foley Nicpon, & Whiteman, 2010; Fugate, Zentall, & Gentry, 2013). This dependence on these types of measures could prevent otherwise qualified students from accessing gifted resources. Many gifted students have coexisting reading difficulties, which can adversely impact their performance in the classroom and on standardized exams (Monroe, 2002). Furthermore, certain characteristics of giftedness can mimic behavioral manifestations of psychological disorders (Antshel, 2008; Assouline, Foley Nicpon, & Doobay, 2009; Foley Nicpon et al., 2011; Neihart, 2000; Pfeiffer, 2013; Webb et al., 2004), resulting in potential misdiagnosis rather than placement in a gifted education curriculum.

Of equal importance is the potential to overlook a student's disability because it is masked by extraordinary strengths (Pfeiffer, 2013; Webb et al., 2004). Assouline et al. (2009) conducted a case-study comparison of two profoundly gifted girls, one with Autism Spectrum Disorder and one without. The girls were well-matched in terms of their cognitive and

achievement profiles, and they both demonstrated social deficits. It was only by conducting a thorough and multi-dimensional assessment that distinctive markers of ASD were detected and differentiated from characteristics of giftedness. The researchers concluded that symptoms of a diagnosable condition, such as autism, can easily be overlooked and improperly attributed to gifted traits. In the example above, this misdiagnosis would have resulted in overlooking social deficits and failing to provide appropriate remediation of ASD symptoms. In fact, Assouline et al. (2009) state that “missed” diagnosis (overlooking a disability) may be an even greater concern than “misdiagnosis” (attributing gifted traits to a disability), because it interferes with appropriate intervention for areas of need.

IDEA Categories

Most of the research on twice-exceptional learners focuses on academic giftedness and non-physical disabilities, especially learning disabilities, which is probably due to the paradoxical and perplexing nature of this combination—exceptional advantage and exceptional disadvantage along the same ability continuum, both simultaneously existing within one individual. The other most common disability categories reviewed in the twice-exceptional literature are attention disorders and autism spectrum disorders (Foley Nicpon et al., 2011; Nicpon, 2015; Pfeiffer, 2013). Thus, the following paragraphs will broadly summarize the characteristics of students with learning disabilities, attention disorders, and autism spectrum disorders. The lack of empirical research dedicated to the remaining IDEA categories is a notable gap in the literature.

Learning disabilities. Students with learning disabilities possess core academic weaknesses compared to their typically achieving peers. These students demonstrate deficits within a specific area of learning (e.g., reading, writing, and math), despite relatively intact

functioning in other areas, that cannot be explained by any other means (e.g., mental retardation) (American Psychiatric Association, 2013; Mash & Wolfe, 2005; Swanson & Ching-Ju, 2009). Learning difficulties are associated with greater anxiety and lower levels of self-efficacy (Heiman & Precel, 2003). Students with learning disabilities also tend to lack important study skills that otherwise have the potential to mediate the negative effects of cognitive deficits (Ruban, McCoach, McGuire, & Reis, 2003; Trainin & Swanson, 2005). Kovach and Wilgosh (1999) found that students with learning disabilities reported significant weaknesses in the areas of motivation, selecting main ideas, self-testing, and test-taking skills, in addition to reporting significant levels of anxiety. Reaser, Prevatt, Petscher, and Proctor (2007) also found lower levels of motivation among college students with learning disabilities than their non-disabled peers.

As with many other marginalized groups, students with disabilities face prejudicial attitudes. As children and adolescents with disabilities form an identity, these prejudicial attitudes may be internalized and applied toward the self. As these students develop their self-concepts, or their descriptions of themselves, they may be constructed in a manner that reflects negative self-stereotypes and beliefs (Bear, Minke, & Manning, 2002). Furthermore, having more negative perceptions of learning disabilities is significantly correlated with more negative self-perceptions of ability, writing competence, behavior, and social acceptance among individuals who have a learning disability (Heyman, 1990; Jones, 2012; Ju, Zhang, & Katsiyannis, 2013; Rothman & Cosden, 1995; Wei & Marder, 2012).

Chapman (1988) reviewed the literature on students with learning disabilities and found these effects to be true and stable from grade 3 through high school, with larger discrepancies for academic self-concept than for general self-concept among youth with disabilities. He further

noted that this difference remained even after accounting for classroom placement (mainstream versus segregated educational settings). Heyman (1990) also conducted a study of 87 pre-adolescent children and found that self-perception of one's own learning disability was significantly correlated with one's academic self-concept and self-esteem. These effects remained unaffected by gender, ethnicity, age, reading and math achievement, classroom placement, and age at diagnosis.

The specific learning disability (SLD) category is currently the most common classification of the 13 IDEA categories, and most students with an SLD classification are identified as having reading difficulties (American Psychiatric Association, 2013). Approximately 5-15% of school-age children have a specific learning disorder, according to the American Psychiatric Association (2013). Some estimates are even higher, with prevalence rates of dyslexia (a type of reading disorder) alone reaching as high as 5-17% of all school-age children (Mash & Wolfe, 2005). Given the high co-occurrence of writing problems with reading problems (Mash & Wolfe, 2005), and the relatively large number of children with reading disabilities, the prevalence of written language disorders is estimated at approximately 10% of all school-age children (Swanson & Ching-Ju, 2009).

Within the gifted population, approximately 3.5% of all gifted children have coexisting learning disabilities (Nielsen, Higgins, & Hammond, 1995), and up to 10% of gifted children demonstrate reading skills that are two or more grade levels below their current grade level (Monroe, 2002). The paradoxical aspect of this twice-exceptional population is that the label of academically gifted implies the potential to excel academically, whereas the learning disability label denotes real academic struggle. Pfeiffer (2013) notes that this group of twice-exceptional

students may exhibit one or more of the following characteristics: unhealthy perfectionism, low self-esteem, low frustration tolerance, and a “fixed mindset” about their own abilities.

Attention deficit hyperactivity disorder. Attention deficit hyperactivity disorder (ADHD) is one of the most commonly diagnosed childhood disorders (Antshel, 2008; Pfeiffer, 2013). Just over six million school-age children (about 11%) have been diagnosed with ADHD in the United States (Centers for Disease Control and Prevention [CDC], 2013). Of those children, it has been suggested that around 10% perform at least two standard deviations above average on measures of cognitive ability (Bloom, Jones, & Freeman, 2013). Children with ADHD may be eligible to qualify for school services under the Other Health Impairment category of IDEA (2004); this category captures those conditions under which vitality, strength, and alertness to educational stimuli are significantly reduced as a result of identified health problems (e.g., heart conditions, asthma, anemia, etc.). An ADHD diagnosis corresponds to a constellation of behavioral symptoms that are related to high levels of impulsivity, hyperactivity, and inattention. These behavioral markers are the result of impaired executive functions that are used to control and regulate cognitive processes, such as reasoning, problem solving, and planning (American Psychiatric Association, 2013; Barkley, 2012).

Again, the paradox of cognitive advantage coexisting with cognitive impairment makes this twice-exceptional population particularly interesting to researchers. Another aspect of ADHD that interests giftedness researchers is the overlap between the behavioral characteristics of each population (Pfeiffer, 2013). For example, both gifted children and children with ADHD can be characterized as intense, overexcitable, oppositional, and inattentive (Foley Nicpon et al., 2011; Pfeiffer, 2013). However, the sources of these behavioral tendencies seem to differ. Children with ADHD, as noted above, experience deficits in executive functioning that hinder

their ability to self-regulate. On the other hand, gifted children may be more likely to act out when their natural curiosity and precociousness is restricted, or they may find themselves bored and inattentive when placed in unstimulating environments relative to their capacity (Antshel, 2008; Pfeiffer, 2013). Regardless of the source of these traits, gifted children with ADHD are more likely to repeat grades, require academic support, and exhibit more disruptive behaviors. However, the onset of symptoms (or possibly just the age of diagnosis) is later due to advanced cognitive functioning masking ADHD symptoms in gifted students (Foley Nicpon, 2015).

Autism spectrum disorder. The third disability category that is most commonly investigated in the twice-exceptional literature is autism spectrum disorder (ASD) (Foley Nicpon et al., 2011). ASD is characterized by deficits in social communication and interaction, as well as restricted repetitive behaviors, activities and interests (American Psychiatric Association, 2013). The prevalence rate of parent-reported ASD in school-age children is about 2% (Blumberg et al., 2013). Again, the interest in dual-exceptionality is likely due to the symptomatic overlap between children with ASD and those identified as gifted. These commonalities include verbal fluency, excellent memory, and intense absorption in esoteric interests, like memorizing facts about a specific subject. Both ASD children and gifted children may exhibit the tendency to continuously ask questions or elaborate endlessly on a topic—such behaviors may be described by others as socially inappropriate, odd or annoying (Foley Nicpon et al., 2011; Neihart, 2000). Despite exhibiting similar behaviors, their source may again be very different. Manifestations of neuropsychological dysfunction and rigid inflexibility for one child may only be healthy manifestations of intense curiosity for another child (Assouline et al., 2009).

Characteristics of the Twice-Exceptional

Again, research in the area of twice-exceptionality is limited, but there is sufficient information to infer that the twice-exceptional are uniquely impacted by the interaction of extraordinary gifts and deficits. Hannah and Shore (1995, 2008) conducted two studies to investigate metacognitive skills in twice-exceptional students. Metacognitive skills refer to the application of self-awareness and self-assessment to solve problems, adapt to new experiences, and generally guide behavior. These skills allow a person to self-regulate learning through such behaviors as coordinating, planning, monitoring, self-testing, and checking. Gifted children are considered to have better developed metacognitive skills compared to their peers, whereas students with learning disabilities and ADHD are thought to have more poorly developed metacognitive skills (Assouline et al., 2010; Hannah & Shore, 1995). Hannah and Shore (1995) found that the metacognitive performance of twice-exceptional students more closely aligned with the performance of gifted-only participants than with the performance of participants with learning disabilities.

However, a follow-up study by Hannah and Shore in 2008, which used the same data from the earlier study (Hannah & Shore, 1995), revealed that older twice-exceptional students were more likely to doubt their comprehension on a reading task than younger twice-exceptional students. In that study, twice-exceptional boys in late elementary school and late high school were sampled, and then asked to read a passage with blatant errors or inconsistencies, and with unknown vocabulary words. Thus, comprehension of the passage was purposefully made difficult. As the students read through the passage, they were asked to think aloud, and this information was recorded for later analysis. Interestingly, the twice-exceptional high school students were more likely than their younger counterparts to attribute comprehension problems

to themselves, rather than to errors or inconsistencies in the text. They also expressed less confidence in their own comprehension of the text than the younger participants, which suggests more negative self-perceptions, possibly the result of experiencing academic difficulties compounding over time.

Based on the few studies that have examined the social and emotional development of gifted students with ADHD, this population of twice-exceptional learners may be at a distinct social disadvantage. Children with ADHD generally demonstrate social deficits and less emotional maturity than non-ADHD children (Neihart, 2003). Studies of twice-exceptional children with both giftedness and ADHD show similar patterns (Kaufmann & Castellanos, 2000). Gifted children with ADHD tend to report greater emotional distress and peer difficulties than their gifted-only peers, and are in greater need of academic support (Antshel, 2008). Furthermore, gifted children identified as having ADHD also tend to display more impairment than children with ADHD who are not gifted, suggesting that milder forms of ADHD are masked by giftedness (Kaufmann & Castellanos, 2000; Kaufmann, Kalbfleisch, & Castellanos, 2000; Neihart, 2003). It is also important to consider the impact of placing gifted children with ADHD in similar environments as gifted children without ADHD, given that gifted children tend to demonstrate advanced cognitive, social, and emotional maturity for their age and grade level. Placing a twice-exceptional child in an enriched classroom with gifted-only peers may make any social deficits appear even more pronounced (Neihart, 2003). On the other hand, some studies have found that gifted students with ADHD do not underperform relative to gifted-only students. In one study, researchers found no difference between gifted students with ADHD and their gifted-only counterparts in their interpersonal relationships, popularity, social stress, or perceived

intelligence. However, they reported significantly lower self-esteem than gifted students with no coexisting diagnosis (Nicpon, 2015).

Barber and Mueller (2011) conducted a study that examined how the social and self-perceptions of twice-exceptional students are impacted by their dual status as both gifted and learning disabled. Using data from the National Longitudinal Study of Adolescent Health (ADD Health), they sampled 90 twice-exceptional students, along with three matched comparison groups: gifted students, students with learning disabilities, and non-identified students. Their study had three main goals. The first goal was to examine whether the groups differed in their social perceptions of their relationships with other students and with their parents. The researchers found that twice-exceptional students had less positive perceptions of their parental relationships than students in the gifted group. Group differences in perceptions of peer relationships were not significant. The researchers suggested that twice-exceptional students who seem to not be living up to their full potential might create a uniquely frustrating dynamic between children and their parents. The second goal of the study was to determine how self-perceptions of twice-exceptional students differed from their peers. The researchers found that twice-exceptional students had more negative self-concepts than gifted students and students in the non-identified group, but not students in the learning disability group. The third goal of the study was to determine whether social perceptions either mediate or moderate the relationship between group membership and self-concept. The researchers found that when they introduced an interaction between perceptions of parental relationships and group membership, the self-concepts of twice-exceptional learners were significantly more favorable than that of their gifted peers when perceptions of parental relationships were poor. However, when perceptions of parental relationships were positive, gifted students had more positive self-concepts than any of

the other groups. This finding suggests that social perceptions, particularly perceptions of parental support, are more strongly associated with a positive self-concept among gifted students than students in the twice-exceptional, learning disability, or non-identified groups.

Barber and Mueller's (2011) study limited twice-exceptionality to the learning disability category, but supports the larger picture that twice-exceptional students feel less support from their families than their gifted-only, disability-only, or non-identified peers. It also suggests that familial support plays an important role in self-concept development. Lastly, it is curious that perceived parental support produced a weaker association among twice-exceptional students than students in the gifted or learning disability groups. The researchers suggest that parents are less effective in shaping self-concepts of children with multiple exceptionalities, possibly due to a lack of knowledge or understanding in the issues their children face. If the self-concept is shaped differently in children with multiple opposing identities, there are implications for the current investigation. Recall that self-esteem improves when collective identities are well integrated within a person's self-concept. If the self-concepts of twice-exceptional students are different from their peers, then their self-esteem is also likely to differ.

Even though Barber and Mueller (2011) did not find any group differences in perceived peer support, Vespi and Yewchuk (1992) found that the twice-exceptional children in their study were dissatisfied with their peer relationships despite possessing good social skills. The researchers also documented greater feelings of frustration and fears of failure, as well as more negative self-concepts for academic tasks. On the other hand, they also found that their twice-exceptional participants demonstrated high levels of self-confidence and possessed a positive self-image. Twice-exceptional children also seem to cope with these difficulties in healthier,

more adaptive ways than children with disabilities who are not identified as gifted (Coleman, 1992).

Van Boxtel and Mönks (1992) conducted an empirical analysis using a sample of 772 male and female adolescents between the ages of 12 and 15. They compared gifted achievers with gifted underachievers. They found that gifted underachievers demonstrated significantly more negative academic self-concepts, higher test anxiety, and a more externally-focused locus of control. Gifted underachievers also demonstrated lower scores in areas related to well-being and motivation. Gifted underachievers were defined as students identified as gifted whose actual academic performance fell short of their potential, so they are not a true twice-exceptional sample. Nevertheless, these results support the belief that twice-exceptional learners are at greater risk of holding negative self-perceptions, lower motivation, poorer psychosocial health, and a more external locus of control than their gifted-only peers.

Understanding how the intersection of giftedness and disability impacts a child provides an opportunity for targeted interventions. Olenchak (1995) studied 108 twice-exceptional learners in fourth through sixth grades. In addition to remedial interventions targeted at their weaknesses, they were given interventions that were targeted at strengths. Among these targeted interventions were opportunities during the school day to explore interests and areas of high performance to enrich their educational experiences. Self-concept and attitudes toward learning were measured at the beginning and the end of the school year. Results showed that a strengths-based intervention yielded statistically significant gains in self-concept (effect size of .339). The results of this study are promising in terms of designing interventions for twice-exceptional learners.

Summary, Research Questions, and Hypotheses

Successful student outcomes can no longer be narrowly defined by grades and test scores alone. In order to help students develop into more productive, healthy members of society, a great deal of attention has been placed on identifying factors that not only help students in the classroom, but also contribute to positive life outcomes that ultimately benefit both the individual and society as a whole. With international and economic pressure to compete in a global market, even policymakers at the highest levels are invested in developing human capital. Borrowing terms from Pfeiffer et al. (2016), human capital includes more than “strengths of the head” (i.e., cognitive abilities); it also includes “strengths of the heart,” such as social skills, character strengths, and emotional intelligence. After all, a circumscribed understanding of students can only lead to a circumscribed approach to their education, whereas a more comprehensive and nuanced understanding of the *whole* student expands the opportunities for investment and intervention (Pfeiffer et al., 2016). In the classroom, this investment translates into meeting the unique strengths and weaknesses of every student, and identifying factors (cognitive and non-cognitive) that both predict future outcomes and are amenable to early interventions. It has been found that positive self-perceptions and self-regulating mechanisms are critical components of success inside and outside of the classroom. For these reasons, global factors, like self-esteem and locus of control, have become two of the most popular constructs in social science.

In addition to targeting global predictors of success, certain populations are being targeted for intervention, either to mitigate vulnerabilities or to capitalize on exceptional strengths. While students with disabilities and those with exceptional gifts are already competing for funding and attention, a sub-group of students share characteristics of both populations. For a child or adolescent who is constructing an identity or self-concept that is influenced by *both*

giftedness *and* one or more disabilities, opposing messages about one's likelihood of success can be confusing. The effects of these mixed messages are unclear because there are few empirical studies to date that specifically address the self-esteem of twice-exceptional learners. From the few studies that exist, however, there is reason to believe that twice-exceptional students may experience decreased self-esteem, a more externalized locus of control, and a greater sense of inadequacy than gifted youth without disabilities (Foley Nicpon et al., 2012; Kauder, 2009; Nicpon, 2015).

Contrary to the view that giftedness is associated exclusively with advantage, a review of existing literature suggests that twice exceptional learners form a particularly vulnerable group whose self-esteem and locus of control development should be better understood so that appropriate interventions (e.g., attribution retraining) can be designed. In fact, Pfeiffer and Burko (2015) identify a number of areas in which counseling may help to address some of the developmental challenges that gifted students face, such as coping with perfectionism, navigating social interactions with non-gifted peers, bullying, and dealing with affiliation conflicts for intersecting identities. Accordingly, leading researchers in the field have called for researchers to examine the developmental trajectories of social-emotional factors among twice-exceptional students over time (Nicpon, 2015). If the self-esteem and locus of control development of twice-exceptional learners is especially vulnerable during adolescence, then the timing of interventions can be more precisely applied. The current study seeks to fill that gap, and to contribute to the growing body of knowledge on self-esteem, locus of control, and twice-exceptional learners. Specific research questions and hypotheses that will be explored by the present study are as follows:

Research Questions

Research question one. Are individual differences in self-esteem explained by ability classification (i.e., gifted, disability, twice-exceptional, or non-identified)?

Hypothesis one. Statistically significant differences in average self-esteem ratings between ability groups is the expected outcome of the analyses. It is predicted that students identified as gifted will have higher self-esteem ratings than all other ability groups, and students identified with disabilities will have lower self-esteem ratings than all other groups. It is tentatively suggested that students in the twice-exceptional group will report self-esteem levels that are lower than their gifted-only peers, but higher than their disability-only peers. It is unknown how twice-exceptional students will compare to a non-identified group of typical students.

Research question two. Does ability explain individual differences in self-esteem changes across time?

Hypothesis two. An interaction effect between ability and time on self-esteem is tentatively hypothesized. In other words, changes in self-esteem across time are hypothesized to differ based on ability classification. It is possible that self-esteem ratings will remain relatively stable within the gifted-only, disability-only, and non-identified groups, whereas ratings will show more change over time within the twice-exceptional group.

Research question three. How does self-esteem change over time in a group of twice-exceptional high school students?

Hypothesis three. Twice-exceptional learners are tentatively hypothesized to have high self-esteem during their eighth-grade baseline year, followed by a decline in self-esteem over the next four years of high school. This is expected to contrast with changes reported by other

groups – gifted students without disabilities are likely to retain high levels of self-esteem at all measured timepoints, and students with disabilities are expected to demonstrate consistently lower levels of self-esteem throughout all measured timepoints.

Research question four. Are individual differences in locus of control explained by ability classification?

Hypothesis four. Average locus of control scores are expected to differ significantly depending on ability classification. Students identified as gifted are expected to have the most internalized locus of control, whereas students with disabilities are expected to have the most externalized locus of control. Students identified as twice-exceptional are tentatively hypothesized to report their locus of control as more externalized than the gifted-only group, but more internalized than the disability-only group. It is unknown how locus of control will differ between the twice-exceptional group and the non-identified group of typical students.

Research question five. Does ability explain individual differences in locus of control changes across time?

Hypothesis five. An interaction effect between ability and time on locus of control is tentatively hypothesized, such that patterns of change across time will depend on ability classification. Similar to predictions made regarding self-esteem, the author cautiously predicts greater developmental stability within the gifted, disability, and non-identified groups than the twice-exceptional group.

Research question six. How does locus of control change over time in a group of twice-exceptional high school students?

Hypothesis six. The developmental trajectory of locus of control among twice-exceptional learners is expected to differ significantly from that of their peers. Whereas gifted

students without disabilities are expected to retain highly internalized locus of control throughout all measured timepoints, and students with disabilities are expected to demonstrate the most externalized locus of control throughout all measured timepoints, the twice-exceptional group is expected to show the most change in locus of control across time as compared to the other ability conditions. Specifically, it is hypothesized that the locus of control among twice-exceptional learners will be highly internalized during eighth grade, but will become increasingly externalized throughout the remainder of high school.

CHAPTER 3

METHODS

Research Design

The research questions will be answered with a two-way mixed-design MANOVA. The two factors are (1) ability classification and (2) time of data collection. Ability classification consists of four levels (Gifted, Twice-Exceptional, Disability, Non-Identified) in which comparisons will be made between groups (i.e., the between-subjects factor). Each of these levels will be described in greater detail in the *Participants* section of this chapter. The time of data collection consists of three levels (Baseline Year, First Follow-Up, Second Follow-Up), requiring a repeated measures analysis (i.e., the within-subjects factor). The combination of both a between-subjects factor and a within-subject factor is referred to as a mixed design analysis (i.e., combining mean group differences within a repeated measures design). The dependent variables are: (1) self-esteem and (2) locus of control, and will be further explained in the *Measures and Procedures* section of this chapter. Because self-esteem and locus of control are related concepts that represent core self-evaluations, and because they are thought to be moderately correlated with each other (Saadat, Ghasemzadeh, Karami, & Soleimani, 2012), the MANOVA is a more powerful test of significance over separate ANOVAs. If the overall multivariate test is significant for a main effect or for an interaction, univariate ANOVAs and post-hoc tests will be used to ascertain more specific information for each measure of interest.

Data Source

One of the biggest challenges faced by researchers who are interested in twice-exceptional learners is obtaining a sample large enough to perform statistical analyses and draw reliable conclusions. Twice-exceptional learners, by definition, are exceptional to the norm and

therefore exist in relatively small numbers. Another important consideration in sample selection is the representativeness of the participants so that results can be generalized to the larger population. Data used in the current study are derived post hoc from a very large, nationally representative sample of eighth-grade students who participated in the National Educational Longitudinal Study of 1988 (NELS:88), an effort that was sponsored by the National Center for Education Statistics (NCES; U.S. Department of Education). The NCES was tasked with collecting data related to education in the United States, and launched several studies beginning in 1972 in an effort to gather data on a multitude of factors that could impact student attitudes and academic performance. The NELS:88 is the third study initiated by the NCES in order to better understand the educational, vocational, and personal development of students transitioning into high school and eventually the workforce. The NELS:88 was designed so that comparisons could be made to the former studies (Ingels, Abraham, Karr, Spencer, & Frankel, 1990). This large-scale longitudinal study follows the same cohort from the spring of 1988 to 1992, and was conducted in three waves that each took place two years apart in 1988, 1990, and 1992. This study follows the same group of students from eighth grade through the end of high school. Data continued to be collected even if students dropped out of school.

A two-stage process was used to obtain the NELS:88 sample. First, a mix of public and private schools was selected out of the 39,000 schools in the United States with an eighth-grade cohort. This database was compiled by Quality Education Data, Inc (QED), which was considered to be the most readily available database of public and private schools in the United States with the most complete and accurate data. QED obtained its data by contacting each public-school district, each Catholic diocese, and all private schools on record on an annual basis. QED records were also compiled from various agencies like the National Catholic

Educational Association, the Council of American Private Education, and the Association of Christian Schools, among others. Schools that were excluded from the NELS:88 sample included special education schools, vocational schools that did not enroll students directly, schools for dependents of U.S. personnel overseas, schools without any eighth graders enrolled in the spring of 1988, and schools that had been closed. Most of the schools that were excluded were small, private schools with no eighth-grade students.

Schools were stratified by school type (public, Catholic, or other private) and geographic region (northeast, south, north central, west), and then sub-stratified by degree of urbanization (urban, suburban, or rural) and minority classification (schools with greater or fewer than 19% minority students). Lastly, public schools were sorted and selected by estimated eighth grade enrollment, meaning that the total number of schools selected for each type and region (superstratum) had to be proportional to the collective estimated eighth grade enrollment of all the schools in that superstratum. Through stratified random sampling, a total of 1,655 schools with an eighth grade cohort were eligible for inclusion in the study. Of those, 1,057 schools ultimately agreed to participate in the study.

In the second stage, a sample of students was drawn from the selected schools. A measure of size (MOS) was calculated for each school so that the probability of selection was proportional to eighth grade enrollment, with an average of 24 students desired for each selected school plus an oversample of 2,200 additional students to represent Asian-Pacific Islanders and Hispanic students. To achieve this, each participating school supplied three separate lists for enrolled Asian, Hispanic, and all other eighth grade students. Random samples were independently selected from each list for each school.

Students were also excluded from the sample at the time of sample selection based on seven ineligibility codes. These codes were developed with the intent of excluding students only if individual limitations would prevent meaningful survey participation. The exclusionary criteria are as follows:

- a. Part-time attendance at the sampled school; primary enrollment at another school
- b. Physical disability such that the student was unable to complete the NELS:88 instruments
- c. Mental disability such that the student was unable to complete the NELS:88 instruments
- d. Absent or truant for 20 consecutive days and not expected to return
- e. Primary language other than English, in addition to an insufficient command of English to complete the NELS:88 instruments
- f. Transferred out of school since the time the roster was compiled
- g. Deceased

School coordinators examined the sampling roster and assigned an exclusionary code to students on an individualized basis. Students receiving special education services and students with limited English proficiency were not to be categorically excluded from the study. If there was any doubt as to whether a student could meaningfully participate in the study, school coordinators were instructed to consider the student capable of participating in the study. After following the above sampling procedures and obtaining consent, an average of 26 students represented each school (N=24,599), including approximately 24 regularly sampled students, and two additional Hispanic and Asian/Pacific Islander students to ensure a representative sample.

Participants

To address the research questions in the current study, the total NELS:88 sample was assigned to one of the following four ability groups and then further sub-sampled to ensure equal group sizes to improve statistical power:

- a. Gifted (Gifted, No Disability)
- b. Twice-Exceptional (Gifted, Disability)
- c. Disability (Not Gifted, Disability)
- d. Non-Identified (Not Gifted, No Disability)

Table 1 shows the two NELS:88 items used to create a composite Gifted/Talented classification for this study. During the baseline year, students and parents responded to yes/no questionnaire items that identified current enrollment in gifted or talented programming – these two responses were aggregated into a single variable that was used to classify students as gifted. Positive identification on either of the two items triggered a gifted classification. The previous chapter provided ample evidence for the challenges researchers and practitioners face when attempting to accurately conceptualize giftedness. Although it is likely that certain types of gifted learners are underrepresented in this sample, it was important to embrace prevailing social constructions of giftedness at the time the students matriculated through school. The label of gifted, either applied by the self or bestowed by important others, is of interest when considering the impact that identity labels have on self-perception. Eisenberger et al.'s (2011) study showed that social cues and labels impact self-esteem ratings even when social feedback is entirely manipulated by a researcher. Thus, positive identification from parent and student questionnaire items during the baseline measurement is sufficient for the purposes of this exploratory study.

Table 2 shows the two NELS:88 items that were used to create a composite Disability classification for this study. These items were derived from parent questionnaires during the baseline year of the study. Positive identification on either of these items triggered a disability classification. Consideration was given to dividing physical from non-physical disabilities. However, in the interest of representing all disabilities and all twice-exceptional learners – a notable gap in the existing literature – all disability types were included within the overall disability composite. One of the major weaknesses of previous studies on the twice-exceptional is an overemphasis on learning disabilities, attention disorders, and autism spectrum disorders, to the exclusion of students with other categories of disabilities. This study will first focus on representing all disabilities, with the recommendation that future studies investigate within-group differences among the twice-exceptional. Even though specific procedures used to make educational and diagnostic classifications were neither standardized nor specified by the NELS:88, it is the established social label that is of primary interest to the present investigation. Additional commentary on sample selection is provided within the *Study Scope and Delimitations* section of this chapter.

Missing data were eliminated through listwise deletion. Out of 11,198 students who participated in the NELS:88 study, and whose data were complete across all three waves, 2,802 students were identified as gifted and talented (25%). Another 1,902 students were classified as having either a physical or a non-physical disability (17%). Another 6,866 students were neither identified as gifted, nor identified as having a disability (61%). Thirteen percent of the 2,802 students who fell into the gifted and talented category, and 20% of the 1,902 students who fell into the Disability category, were classified as Twice-Exceptional (n=372). Based on the total number of students who participated in the NELS:88 (N=24,599), approximately 1.5% were

identified as twice-exceptional – an expected figure based on the atypical combination of possessing exceptional gifts and exceptional deficits simultaneously. The size of the Twice-Exceptional group was disproportionately smaller than the other groups, greatly increasing the probability of violating the assumption of homogeneity during statistical analyses. Thus, the sample sizes of the remaining three groups were reduced through random sub-sampling. After reducing the total size of the Gifted, Disability, and Non-Identified groups to 372 students each through random selection, a total of 1,488 participants were included in this study.

The proportion of gifted and talented students who participated in the NELS:88, and whose data were complete, is high relative to the overall population (25%). This is likely a function of the NELS:88 sampling procedures in which certain schools and students were systematically excluded by design. As stated above, special education schools were excluded from the first selection stage. Then in the second selection stage, individual students were excluded due to disabilities or limited English language proficiency that would have prevented completion of the study's tasks, or that would have been inappropriate for behavioral or emotional reasons (Ingels & Quinn, 1996). Moreover, students who dropped out, did not complete all questionnaire items, transferred out of the school after rosters were compiled, or who attended the sampled school on a part-time basis with primary enrollment at another school, could have skewed the characteristics of the overall sample toward higher functioning and higher achieving students with more stable environments. An expanded discussion of sample-related and other delimitations appears in a later section of this chapter.

Demographic information for the 1,488 research participants is available in Table 3. The NELS:88 study, from which the current sample was obtained, was carefully designed to mirror key demographic characteristics of the overall U.S. population. Therefore, it is no surprise that

there is roughly equivalent representation based on sex, with males comprising 54% of the sample, and females comprising 46% of the sample. Regarding race/ethnicity, the proportion of participants who identified as “White, Not Hispanic” (76%), “Black, Not Hispanic” (7%), “Hispanic” (10%), “Asian or Pacific Islander” (6%), and “American Indian or Alaska Native” (1%) roughly match 2010 census information but are largely unequal in group size. Household income is also shown in Table 3, and is adjusted for inflation from 1987 to 2016 – these adjustments are approximate to the nearest \$500 and explain the irregular intervals between each reported income bracket. Twenty-six percent of the participants reported an annual household income of less than \$52,999, as compared to 40% whose household income fell within the \$53,000-\$105,999 range, 17% whose income fell within the \$106,000-\$159,499 range, 6% in the \$159,500-\$425,499 range, and 8% whose income was \$425,500 or above. Three percent of participants did not provide information about household income.

Measures and Procedures

Student Surveys

Data for the NELS:88 were collected via student surveys, parent surveys, teacher surveys, and student transcripts. Student surveys were administered primarily in group settings, either at school or during an off-campus session (e.g., at a library). Students were given up to about an hour to complete the paper-and-pencil self-administered survey, though it usually did not take that long. A cognitive test battery was also administered.

Parent Surveys

The parent questionnaire packet was distributed to students while they were in school, who took the packets home to give to their parents or guardians. Some schools insisted that the packets be mailed directly to the students’ parent(s), in which case the envelope was addressed to

“the parents of (Name of Student),” along with a letter to introduce the study and provide instructions. One parent questionnaire was administered per student, so two-parent households were instructed to select the parent who was best informed of the student’s educational situation and plans. If no response was given, follow-ups were conducted by mail, telephone, or an in-person visit. The parent questionnaires took about 35-40 minutes to complete.

Teacher Surveys

The teacher questionnaires were completed by the students’ full- or part-time teachers in the areas of math, science, English/language arts, or social studies. Two teachers were selected per student based on one of the following combinations:

- a. Science and English;
- b. Science and Social Studies;
- c. Math and English; or
- d. Math and Social Studies.

Balanced assignment of the above categories was attempted, based on geographical categories and by school size. Students and parents did not receive any incentives to participate in the study, but teachers received \$2-5 per student, up to 24 students.

Transcripts

Academic transcripts for grades nine through twelve were also reviewed during the Second Follow-Up in 1992. If information from previous grades was discovered during the transcript review, that information was also collected. In order to collect transcript data, materials were mailed to principals in August 1992. The following materials were included in the packet: a cover letter, instructions on what transcript data to collect, instructions on how to collect reimbursement for preparation expenses, student checklists (for enrollment status, withdrawal

dates, etc.), student program identification questionnaires (e.g., bilingual education), disclosure notices, release forms, and prepaid envelopes for return mail. Principals were also instructed to submit any materials that might aid in coding the data, such as student handbooks or course catalogs. Six weeks after mailing the packet to school principals, a telephone follow-up was conducted if no response was given. A data entry clerk reviewed all transcript-related documents for completeness and clarification of discrepancies. Missing data were obtained by phone or mail before data were entered into a computer-assisted data entry system. Coder training was provided, and included a coding manual, self-study materials, discussion, walkthroughs, feedback from a supervisor, and the use of a practice database. Only coders with an acceptable error rate (five percent or less) were permitted to code the data.

Self-Esteem Measure

One of the dependent variables in the current investigation is global self-esteem. Self-esteem is a sense of worthiness and satisfaction with the self that comes from general competence (Rosenberg et al., 1995; Swann et al., 2007). The student questionnaire included seven items related to self-esteem. These items required participants to rate the degree to which they agreed that the statements described themselves, using a Likert-type scale with the following response options: “Strongly Disagree,” “Disagree,” “Agree,” or “Strongly Agree.” Items were adapted from the Rosenberg Self-Esteem Scale (1965). The Rosenberg Self-Esteem Scale is one of the most widely-used measures of self-esteem and has received support for its psychometric properties (Schmitt & Allik, 2005; Sinclair et al., 2010). Studies on this tool generally demonstrate good construct validity and high internal consistency, with Cronbach’s alpha coefficients ranging from .84 to .95 across demographic groups, according to a study by Sinclair et al. (2010). The scale is also acceptable for use in adolescent populations, with good

internal reliability and test-retest reliability among high school students (Bagley, Bolitho, & Bertrand, 1997).

Because measures on the NELS:88 were selected, in part, to make direct comparisons to the two prior studies that were initiated by the NCES, self-esteem items were adapted from the original Rosenberg Self-Esteem Scale for inclusion in the study. For example, several items from the Rosenberg Self-Esteem Scale were directly incorporated into the NELS:88 self-esteem composite (e.g., “I feel I do not have much to be proud of,” “On the whole, I feel satisfied with myself”). However, the wording of other items was altered (e.g., “I am able to do things as well as most other people” was changed to “I am able to do good things as well as most other people”), and other items were excluded entirely (e.g., “I feel that I have a number of good qualities”). The internal consistency of the NELS:88 self-esteem scale was .785 (Ingels, Abraham, Karr, Spencer, & Frankel, 1990), demonstrating evidence for good construct validity.

Although the student questionnaire measured seven self-esteem items, only a total of four items were retained in the present study based on Wang and Su’s research (2013). In Wang and Su’s study, one self-esteem item was dropped (“I feel useless at times”) due to redundancy/high multicollinearity with another self-esteem item (“At times I think I am no good at all”). Additionally, two more items were dropped after cross-loading on both self-esteem and locus of control factors in an exploratory factor analysis, which left four items pertaining to self-esteem. This is consistent with Marsh, Parada, Yeung, and Healey’s (2001) decision to retain only four NELS:88 self-esteem items in their study. Internal consistency was also tested within the current study using Cronbach’s alpha. At $\alpha = .72$, the internal reliability was lower than that of other studies evaluating the Rosenberg Self-Esteem Scale, but consistent with the reported internal consistency of the full NELS:88 self-esteem scale. The full list of questionnaire items relating to

self-esteem is included in Appendix B for reference. A composite self-esteem score for each of the measured timepoints was generated by summing self-ratings of the four retained self-esteem items.

Locus of Control Measure

The other dependent variable in the current investigation is locus of control. Locus of control is the degree to which a person expects his own actions to control outcomes (Rotter, 1966; Weiner, 2010). Items pertaining to locus of control were adapted from Rotter's (1966) Internality-Externality Scale. Like the Rosenberg Self-Esteem Scale, this is a very well-established measure and is appropriate for use with high school students (Zerega, Tseng, & Greever, 1976). Reliability coefficients for Rotter's Internality-Externality Scale average about .66 across studies (and are as high as .93), with test-retest reliability estimates averaging about .67 across studies (and as high as .86; Beretvas, Suizzo, Durham, & Yarnell, 2008). As with the self-esteem items, items pertaining to locus of control were either directly borrowed from the original measure (e.g., "When I make plans, I am almost certain I can make them work") or altered slightly for inclusion in the NELS:88 measure (e.g., "It is impossible for me to believe that chance or luck plays an important role in my life" was reversed to "Chance and luck are very important for what happens in my life"). Not all items from the original measure were incorporated into the NELS:88 questionnaire. In total, there were six items on the student questionnaire pertaining to locus of control. These items required participants to rate the degree to which they agreed that the statements described themselves, using a Likert-type scale with the following response options: "Strongly Disagree," "Disagree," "Agree," or "Strongly Agree." Like the self-esteem composite, consideration was given to the construct validity of the composite measure, as well as the ability to make comparisons with the two prior studies

initiated by the NCES. The internal consistency of the NELS:88 locus of control scale was .678 (Ingels et al., 1990).

Based on Wang and Su's research (2013), four of the six locus of control items were retained in the present study. One item was dropped after cross-loading on both locus of control and self-esteem ("When I make plans, I am almost certain I can make them work"). One more was dropped due to redundancy with another item ("Chance and luck are very important for what happens in my life" was similar to "In my life, good luck is more important than hard work for success"). Thus, only four of the six items were used to represent the locus of control construct. Internal consistency was also tested for the current investigation using Cronbach's alpha. At $\alpha = .63$, the internal reliability is consistent with other published psychometrics for Rotter's Internality-Externality Scale, as well as with the reported internal consistency of the full NELS:88 locus of control scale. Appendix B contains the full listing of locus of control items included in the NELS:88 questionnaire. A composite locus of control score for each of the measured timepoints was generated by summing self-ratings of the four retained locus of control items.

Power

A post hoc power analysis was conducted instead of an *a priori* power analysis because the archival dataset identified for this study has a fixed sample size. A two-way mixed-design MANOVA poses unique challenges to accurately estimating power, and it is generally understood that power estimation is problematic in repeated measures designs. However, a gross approximation of power was conducted using the G*Power 3.1 program (Faul, Erdfelder, Lang, & Buchner, 2007). The analysis was conducted for an *F* test of differences between four ability groups in a repeated-measures MANOVA with two outcome measures (self-concept and locus of

control) over three measurement periods (baseline year plus two follow-up measurements). In total, this creates 24 unique conditions. A medium effect size of $f = .25$ was used, and the alpha level (false probability rate) was set to $\alpha = .05$. Since the total sample size is $N=1488$, it was estimated that power of 1.00 can be achieved. This value is well within the Beta error probability guidelines proposed by Kazdin and Bass (1989) for research in the social sciences ($\beta \geq .80$). In other words, the probability of this test to detect significant differences, if those differences truly exist in nature, is more than sufficient. The G*Power output is available in Appendix C.

Study Scope and Delimitations

The research questions focus on changes in self-esteem and locus of control over time. A longitudinal research design was desired to establish a developmental sequence within the same group of participants, and to control for any potential cohort effects. Cohort effects are unique characteristics of a group of people due to being exposed to the same events and sharing the same experiences over time, such as when people are born in the same year. They are more problematic in cross-sectional studies that investigate developmental changes using different participants to represent different age groups, where it is unknown whether the dependent variable is being influenced by the independent variable or by unique characteristics of a given cohort. Unfortunately, large-scale longitudinal research requires significant resources that are impractical for many researchers. Because twice-exceptional students represent a relatively small subset of the overall population, it is even more challenging to obtain a sufficiently large sample size that follows participants over a period of four years during critical years of identity development. Thus, existing data were sought that could answer the researcher's questions using a longitudinal design.

Despite these advantages, working with existing data is not without its disadvantages. There are a number anticipated constraints of this study, given the selected variables, measures, statistical analysis, and sample. For instance, despite the original researchers' effort to obtain a nationally representative sample of students, data were not obtained from special education schools, vocational schools, ungraded classrooms (because students' grades had to be standardized and compared across transcripts), Bureau of Indian Affairs (BIA) schools, schools for dependents of U.S. personnel overseas, and students deemed incapable of participation due to language or severe disability status (National Center for Education Statistics, 1997). Students who were home-schooled or who dropped out of school before reaching the eighth grade were not represented by the study's participants, limiting generalizability to those populations, and potentially underrepresenting students with disabilities due to initial sample selection. Moreover, attrition and incomplete data across all three waves further limit the strength of this study's findings. Even though the dataset represents one of the largest and most comprehensive sources of archived data in the field of education, it is by no means perfect and excludes students in the above categories.

A second major drawback for researchers in the field of gifted education is that most large-scale longitudinal studies contain limited measures with which to identify gifted students or students with disabilities. The proposed study is no exception since the identification of gifted students or students with disabilities depends on self-report and parent-report questionnaire items. In some ways, this method of ability classification is advantageous since the *perception* of giftedness or disability status is of particular importance. Recall the 2011 study conducted by Eisenberger et al., in which participants were interviewed and then told how they were coming across by a confederate. Even though the positive or negative feedback delivered by the

confederate was completely fake, participants' self-esteem ratings were manipulated by the type of feedback they received. Eisenberger et al.'s (2011) study shows that identity labels and social feedback impact self-perceptions and ratings of self-esteem, even when feedback is arbitrarily delivered. Labels, group identities, and self-perceptions are an important part of self-esteem development. Nevertheless, a standardized procedure was not used to identify a gifted sample. The methods by which students were identified were left to local policies and procedures rather than research-based selection criteria. Based on common identification practices at the time, it is likely that many of these students were identified as gifted based on teacher referral, followed by an evaluation with heavy emphasis on classroom achievement and the results of a cognitive abilities measure. However, tighter controls should be placed on definitional consistency and consistency of identification procedures in future studies.

Similarly, no standardized procedure was used to identify a disability sample. There is a wide range of criteria used to identify students as requiring special education services for disabilities, with no standardized criteria used across all participants since criteria vary across districts and schools. Furthermore, students in the current study were grouped on the basis of a categorical yes/no response to giftedness and to disability status, without taking into the account the age at which students were identified. The age of identification is important because, conceivably, students who were identified earlier might identify more with that label and have incorporated it into their self-constructs than students who were identified later.

One final thought on identification procedures – the qualification criteria for giftedness, or for disabilities, have surely changed in many states and local districts since the NELS:88 data were first collected. The publication of the latest Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013) alone alters identification

procedures, not to mention fluctuations in funding or updated assessment practices. These changes, of course, reduce the potential for generalizability because students deemed “exceptional” within the NELS:88 sample may not represent the true population of interest according to today’s standards.

The NELS:88 questionnaire items pertaining to disability status differentiate educational disabilities from physical disabilities (see Table 2). However, the questionnaire items are not refined enough to classify students based on all specific disability categories. For example, autism is not distinguished from other disabilities. Because the twice-exceptional population is comparatively small, most researchers would be challenged to follow each twice-exceptional category over a four-year period. Indeed, most of the research on twice-exceptional students focuses primarily on students with learning disabilities, attention deficits, and autism spectrum disorder, to the almost complete exclusion of physical disabilities. The NELS:88 sample was deemed adequate to provide an initial exploratory look into self-esteem and locus of control development over time. The investigator also determined it was important to represent all twice-exceptional students regardless of disability classification. Ideally, however, the developmental trajectories of twice-exceptional learners with each distinct disability classification would be tracked separately.

With respect to the sample itself, it is also notable that the percentage of students (25%) identified as gifted and talented, and whose data are complete, exceeds that of the true population. The relative number of students identified as gifted and talented in the United States is currently much lower, at about six to ten percent of the total student population (NAGC, 2009). One possible explanation is that students and parents falsely reported more desirable attributes, i.e., giftedness, on the questionnaire items. Another possibility is that the skew is a

byproduct of the sampling design. As explained in an earlier section of this chapter, students at the lower end of the ability spectrum were disqualified from the sample due to the exclusion of students who were severely hindered from completing the necessary tasks (Ingels & Quinn, 1996) – the original NELS:88 sample includes nearly 25,000 students, of whom 20% were identified as gifted and talented. It is also possible that disproportionate attrition over a four-year period contributed to greater amounts of missing data for students at the lower end of the ability spectrum, further skewing the sample toward the upper end of the ability spectrum. Gifted students may have been more motivated to remain in the study as compared to non-gifted students. Along the same lines, students in all conditions may represent a more motivated group of students as a whole than those who dropped out of the study. This weakens the generalizability of results and is noted as a further delimitation of this investigation.

Another limitation of this study is that the measures are constrained to those used in the original study. Although questionnaire items were adapted from the two of the most widely-used instruments to measure self-esteem and locus of control, the NELS:88 uses abbreviated scales to derive the two composite scores. The Cronbach's alpha coefficients from the NELS:88 scales provide evidence for the construct validity of the measures, but the NELS:88 scales are simply not as well-established as the Rosenberg's Self-Esteem Scale and Rotter's Internality-Externality Scale. It should also be noted that other measures could yield different findings from the results of this study.

Another delimitation of this study is that the proposed data analysis compares mean differences between groups over time, rather than individual variations of growth for each participant. Latent growth curve modeling (LGCM) is a comparatively new statistical method based on exploratory factor analysis and principal components analysis. LGCM emphasizes

individual trajectories over time, whereas repeated-measures analysis of variance focuses on group changes over time (Preacher, Wichman, MacCallum, & Briggs, 2008). The proposed statistical method is a traditional approach to analyzing longitudinal data, and will sufficiently answer the proposed research questions, but as compared to LGCM, repeated-measures analysis of variance is more sensitive to missing data and assumes a more strict set of assumptions (e.g., sphericity and/or homogeneity of variance). That being said, LGCM is considered a large-sample method in which fit indices are sensitive to sample size, even when the sample size is fair to moderate ($n=200$) (Hertzog, Lindenberger, Ghisletta, & Oertzen, 2006). This makes differences that are small in magnitude difficult for LGCM methods to detect. At any rate, different statistical procedures may yield different results even if the same sample, variables, and measures are used.

Also relating to the design of this study, there are a multitude of potential covariates that future researchers might wish to account for. For instance, the family and school context are important factors that contribute to healthy self-esteem. Studies show that greater social support from parents and teachers increases feelings of personal control. Other potential covariates are the type of programming and interventions that the students received, either in consideration of their giftedness or their disability status. These factors are not accounted for within the present investigation. Reasons for their omission include insufficient data collected by the original NELS:88 researchers, an insufficient sample size to stratify participants into additional sub-groups, and the reduction in power upon introducing additional factors. The increased complexity of a multiple factor mixed design analysis was also considered outside the scope of this study, which is largely exploratory, given the absence of research studies on self-esteem and locus of control in twice-exceptional student populations. Depending on the results of this study,

and other converging evidence from other empirical studies, future researchers may choose to introduce additional factors or moderators as appropriate.

Lastly, because the NELS:88 was conducted nearly three decades ago, any findings from this study should be replicated with a more recent sample to ensure there were no cohort effects. Cohort effects are generally a concern with all longitudinal studies since experiences unique to a cohort could impact the outcome. For example, the desirability of gifted labeling or the stigma of disability labeling could differ for students entering high school now as compared to students entering high school in the late 1980s. The relative impact of these labels on identity development and self-esteem might differ on the basis of cohort. Replication of any findings with more recent samples, and with cross-sectional or mixed-design studies can help to confirm or refute any findings uncovered by the present study.

It is apparent that post hoc analysis of historical data limits the ability to select the study's participants and instruments. Nevertheless, because gifted learners represent a relatively small percentage of the population, with twice-exceptional learners forming an even smaller percentage, it would be imprudent to overlook such a large body of existing longitudinal data. Most researchers do not have the necessary resources, both in terms of time or finances, to sample such a large a group of twice-exceptional students and follow them over the course of four years. Access to this existing dataset allows an exploratory look into an area that is not yet well documented. Using data from the NELS:88 directly addresses two of the main criticisms of self-esteem research – namely, the lack of studies that use longitudinal designs and the lack of a sufficiently large sample size (Garaigordobil et al., 2008; Trzesniewski et al., 2006).

CHAPTER 4

RESULTS

The statistical findings of the current investigation are presented in this chapter. A two-way mixed-design MANOVA was used to answer the research questions, so the first part of this chapter will address assumptions of the statistical test. Next, the output of the statistical analyses will be presented. Finally, statistical results will be discussed in direct relation to the six research questions posed in the previous chapter.

Assumptions of the Statistical Design

Assumptions about the data are made when conducting a two-way mixed-design MANOVA. Ensuring that those assumptions are satisfied increases confidence in the results, and reduces the probability of making Type I or Type II errors (i.e., false positives or false negatives). The following assumptions will therefore be reviewed in greater detail: normality of dependent variables, equality of variances between groups, multicollinearity of the dependent variables, homogeneity of variance-covariance matrices, and sphericity.

Normal Distribution of Dependent Variables

Data normality is one assumption of the MANOVA. There are three main indicators of normally-distributed data. These include visual inspection of data plots, skewness, and kurtosis (Table 4). Histograms are data plots that are preferable to the stem-and-leaf plot when sample sizes are large (Utts & Heckard, 2015). Histograms with an overlaid normal curve were produced for self-esteem, and for locus of control, for each of the three measured timepoints. By examining the frequency histograms, it appears that the data are skewed slightly to the left but otherwise appear relatively normal. This indicates that average self-esteem ratings were generally more favorable than unfavorable, and that average locus of control ratings were

generally more internalized than externalized. Visual observation of the histograms, in conjunction with examination of the means and standard deviations of the measures (Table 5), also revealed that ceiling effects restricted the range of scores and therefore reduced sensitivity to inter-individual differences in the outcome variables. The P-P Plot is another type of data plot that was used to visually inspect normality of the data. As with the histograms, the P-P Plot supported the assumption of normality.

Skewness is a measure of data symmetry relative to the mean. Numbers closer to zero represent greater symmetry, and thus greater normality. Table 4 shows that the skewness ranges from $-.273$ to $-.525$. These statistics are well within acceptable values (Gravetter & Wallnau, 2014), although it is evident that the distribution is skewed slightly to the left. Data that are skewed left means that there were more observations above the mean (higher self-esteem; internal locus of control) than below the mean (lower self-esteem; external locus of control). Kurtosis measures the thickness of the peak versus the tails, or in other words, the proportion of observations that are centered around the mean compared to a normal distribution. Values closer to zero support the assumption of normality, whereas values greater than zero indicate that the distribution has a higher peak and thinner tails as compared to a normal distribution. Table 4 shows that the kurtosis ranges from $.302$ to $.831$, providing further evidence for the assumption of normality.

Equality of Variances Between Groups

The MANOVA also assumes that all groups (Gifted, Disability, Twice-Exceptional, and Non-Identified) have similar variances. To ensure that the homogeneity of variances assumption is met, there are an equal number of participants in each group. Levene's test is also used to test whether similar variances exist between groups. Results are displayed in Table 6. For self-

esteem, all tests were non-significant: base year ($p = .269$), first follow-up ($p = .105$), second follow-up ($p = .502$). For locus of control, all tests were non-significant: base year ($p = .683$), first follow-up ($p = .519$), second follow-up ($p = .184$). These non-significant results for Levene's test lend further support that this assumption is satisfied.

Outliers

The data were inspected for univariate outliers and multivariate outliers. For the analysis of univariate outliers, z-scores were calculated for all dependent variables. Data cases with z-scores ± 3.29 standard deviations outside the group mean for each variable were removed. The cutoff value of 3.29 is supported by the literature (Tabachnick & Fidell, 2007) and represents extreme values that occur $<0.1\%$ of the time in a normal population distribution. This resulted in the removal of four data points from the Baseline Year Self-Esteem measure, six data points from the First Follow-Up Self-Esteem measure, and five data points from the Second Follow-Up Self-Esteem measure. There were also three outlying cases removed from the Baseline Year Locus of Control measure, four cases removed from the First Follow-Up Locus of Control measure, and eleven cases removed from the Second Follow-Up Locus of Control measure. The data were also examined for multivariate outliers, which is the combination of extremely unlikely scores on multiple variables. Multivariate outliers were identified using Mahalanobis distance. This is an indicator of distance from the centroid of the intersection of means among the variables being used in the model (self-esteem and locus of control across all three measurement points). Seven cases were eliminated whose probability estimates for the Mahalanobis distance exceeded a significance level of $p < .001$.

The outlying data points were all on the lower end of the ratings scales. Recall that low scores are indicators of lower self-esteem and a more externalized locus of control. The

eliminated cases were not unique to any one ability group, and were spread evenly across conditions. By removing extreme outlying values, data normality was improved (see Table 4). Skewness previously ranged from -.273 to -.525; after removing outliers, the range was -.027 to -.412. Kurtosis previously ranged from .302 to .831; after eliminating extreme values, the range dropped to -.007 to -.417. The results of Levene's test (Table 6) also remained non-significant across all self-esteem and locus of control measurement points.

Equality of Groups

The four ability groups were also compared across demographic characteristics to see if they differed significantly between conditions. The selected demographic variables consisted of sex, race/ethnicity, and income. A chi-square test of independence was performed to determine whether the ability groups differed significantly in group composition based on sex. A significant relationship was found between ability classification and sex, $\chi^2(3, N = 1452) = 20.91, p < .001$. There were fewer males than females in the Gifted and Non-Identified groups, and fewer females than males in the Disability and Twice-Exceptional groups. The impact of these group characteristics is discussed in Chapter 5.

A chi-square test of independence was also performed to determine whether the ability groups differed significantly in race/ethnicity composition. A significant relationship was also found between ability classification and race/ethnicity, $\chi^2(12, N = 1448) = 52.00, p < .001$. The number of participants who self-identified as "Asian" was proportionately larger in the Gifted group than the other ability classifications, whereas they were less well-represented in the Disability group. The proportion of participants who self-identified as "Hispanic" was largest in the Gifted and Non-Identified groups and smallest in the Disability and Twice-Exceptional groups. The number of participants who self-identified as "Black, Not Hispanic" was

disproportionately high in the Gifted group and small in the Disability group. There were far more participants who self-identified as “White, Not Hispanic” in the Disability group than the other classifications. Overrepresentation of minority students within the Gifted group may have been due, in part, to the NELS:88 oversampling procedures that added 2,200 Asian-Pacific Islanders and Hispanic students to the sample. It may also be a reflection of national trends in gifted student identification at the time. After all, the Jacob K. Javits Gifted and Talented Students Education Act of 1988 strongly encouraged states to adopt more culturally inclusive criteria for gifted identification, and by 1994, most states did report using alternative identification methods for special populations (e.g., quota systems, trial placements; Ford, 1998). Disproportionate group characteristics based on sex and race/ethnicity is discussed in Chapter 5 as a potential confound and limitation of this study.

A one-way ANOVA was used to compare the four ability groups on income. It should be noted that income was treated as a continuous variable even though it was coded according to specified income brackets as an interval variable. The results of the ANOVA were non-significant between groups for income, $F(3, 1448) = 1.59, p = .190$. This suggests that the ability conditions did not differ significantly between groups based on income.

Taken together, these results show that the four ability groups are not identical on all demographic variables. This inequality reduces the power of the statistical analyses, given that trajectories of self-esteem and locus of control cannot be completely isolated to the effects of ability classification. Caution should be exercised when interpreting the results of the primary analyses.

Multicollinearity of Dependent Variables

A MANOVA was selected over independent ANOVAs due to the expectation that the dependent variables in this investigation are related. However, a high degree of correlation between variables is an indicator that the variables represent the same construct. A correlation matrix was therefore used to determine how strongly the self-esteem and locus of control variables are related with each other (see Table 7). As expected, weak to moderate correlations ($r = .372$ to $r = .483$) were found between the self-esteem composites of each measured timepoint. A weaker correlation was found between the baseline year and second follow-up than between consecutive measurements. There were also weak to moderate correlations between the locus of control composite scores of each measured timepoint. The correlation coefficients of locus of control ranged from $r = .333$ between the baseline year and second follow-up, to $r = .445$ between the first and second follow-ups. Weak to moderate correlations were also found between self-esteem and locus of control, although the coefficients were slightly lower and ranged from $r = .223$ to $.462$. Based on these results, it can be assumed that a MANOVA is preferred over an ANOVA, and that the dependent variables are not so related as to represent a single construct.

Homogeneity of Variance-Covariance Matrices

Box's test is used to evaluate equality of the within-groups covariance matrices in a MANOVA. This is the multivariate version of the bivariate assumption of homoscedasticity in an ANOVA. Because the number of participants in each cell is roughly equal, it was expected that a non-significant test result be found. Results of the test revealed that Box's M (53.51) was not significant, $p = .808$. This indicates that there are no significant differences between the covariance matrices, satisfying the assumption of homogeneity. The appropriate test to use for the multivariate analyses will be Wilk's Lambda.

Sphericity

The repeated measures design assumes that the variances of the differences between all combinations of within-subject values are equal. This is referred to as sphericity. Mauchly's test indicated that the assumption of sphericity for the self-esteem measure had been violated, $\chi^2(2) = 21.50, p < .001$. It is not uncommon to find that this assumption is violated. When this occurs, corrections should be applied to the degrees of freedom until a critical F-value is obtained (Verma, 2016). Therefore, the Huynh-Feldt correction will be used to interpret results.

Results of the Statistical Analyses

First, the results of the primary statistical analyses will be reported. Post-hoc tests were required in some cases, and are reported below where appropriate. Afterward, the statistical results will be explained within the context of each of the six research questions. A discussion of the findings and implications will follow in the next chapter.

The interaction of the between-subjects effect (ability classification) and within-subjects effect (time across repeated measures) on self-esteem and locus of control scores was assessed using a two-way mixed design MANOVA using the Wilk's Lambda test. Using an alpha level of .05, the results are non-significant, Wilk's $\lambda = 1.00, F(12, 5790) = 1.11, p = .349$ (see Table 8). The non-significant F indicates that there are no significant differences between ability groups on a combination of self-esteem and locus of control scores from eighth grade through twelfth grade. In other words, the trajectory of developmental changes across time on a combination of self-esteem and locus of control scores did not vary between ability groups. Figures 1 and 2 illustrate the similar developmental patterns between groups over time.

Because the interaction was not found to be significant, results were examined for potential main effects. Using an alpha level of .05, the within-subjects changes across time on a

combination of self-esteem and locus of control scores was significant, Wilk's $\lambda = .97$, $F(4, 5790) = 21.47$, $p < .001$, $\eta_p^2 = .015$ (see Table 8). The significant F -value indicates that there are statistically significant within-subjects fluctuations in self-esteem and locus of control scores across the three measured timepoints. A partial eta squared value of .015 implies that developmental change over time (i.e., time itself as the independent variable) uniquely accounts for a small proportion (1.5%) of variance in a combination of self-esteem and locus of control scores, across all ability groups, that is not attributable to ability classification.

Univariate tests were needed to determine whether the significant developmental changes across time were related to self-esteem scores or locus of control scores, or both. Post hoc analyses of the univariate tests using the Huynh-Feldt correction for sphericity showed that these changes were significant for both self-esteem scores and for locus of control scores at $\alpha = .05$. The within-subjects change in self-esteem scores from eighth grade through twelfth grade was significant, $F(1.98, 2863.69) = 29.97$, $p < .001$, $\eta_p^2 = .020$ (see Table 9). Pairwise comparisons were made using the Bonferroni correction (adjusted $p < .017$; see Table 10). The Bonferroni correction adjusts the significance level ($\alpha = .05$) by the number of tests (three pairwise comparisons), thereby reducing the probability of producing false positives that inherently arises from running multiple simultaneous tests. Results showed that self-esteem scores dropped significantly from 8th grade ($M = 13.3$, $SD = 1.85$) to 10th grade ($M = 12.9$, $SD = 1.88$) before increasing significantly by 12th grade ($M = 13.3$, $SD = 1.92$). The difference in scores between 8th grade and 12th grade was not statistically significant.

In addition to demonstrating significant changes in self-esteem scores across time, post hoc analyses also revealed that the within-subjects change in locus of control scores was significant $F(1.97, 2855.43) = 18.88$, $p < .001$, $\eta_p^2 = .013$ (see Table 9). Pairwise comparisons

using the Bonferroni correction (adjusted $p < .017$; see Table 10) revealed that students' locus of control ratings were significantly higher and more internalized during the 8th grade ($M = 12.5$, $SD = 2.05$) than ratings during the 10th grade ($M = 12.2$, $SD = 2.00$) and 12th grade ($M = 12.3$, $SD = 2.00$). The difference in locus of control ratings was not statistically significant between grades 10 and 12.

Furthermore, the between-subjects effects were found to be significant at $\alpha = .05$ (see Table 11). Ratings of self-esteem differed significantly between groups based on ability classification, $F(3, 1448) = 9.42$, $p < .001$, $\eta_p^2 = .019$. The effect size as measured by partial eta squared was small. Post hoc tests using the Bonferroni correction for six simultaneous comparisons (adjusted $p < .008$; see Table 12) revealed that the Gifted group ($M = 13.5$, $SD = 1.95$) had significantly higher self-esteem ratings than the Twice-Exceptional group ($M = 13.2$, $SD = 1.90$), Non-Identified group ($M = 13.1$, $SD = 1.90$), and Disability group ($M = 12.9$, $SD = 1.87$). None of the other between-group comparisons revealed statistically significant differences in self-esteem scores between ability classifications. Self-ratings of locus of control also differed significantly between groups based on ability classification, although the effect size was small, $F(3, 1448) = 11.30$, $p < .001$, $\eta_p^2 = .023$. Post hoc tests using the Bonferroni correction (adjusted $p < .008$) found a similar pattern in that the Gifted group significantly differed from all other ability classifications on a measure of locus of control. Higher scores signified a more internalized locus of control whereas lower scores signified a more externalized locus of control; therefore, locus of control was found to be significantly more internalized in the Gifted group ($M = 12.7$, $SD = 2.06$) than the Twice-Exceptional group ($M = 12.3$, $SD = 2.06$), Non-Identified group ($M = 12.3$, $SD = 1.97$), and Disability group ($M = 12.0$, $SD = 2.02$). The Disability group

also reported having a significantly more externalized locus of control than the Twice-Exceptional group.

Research Questions and Answers

Outcome of Research Question One

The first research question asks whether between-subjects differences in average self-esteem scores can be explained by ability. The author hypothesized that significant differences would be found between the means of each ability group, with students in the gifted group reporting the highest levels of self-esteem, and students in the disability group demonstrating the lowest levels of self-esteem. It was predicted that students in the twice-exceptional and non-identified groups would report more moderate self-esteem ratings, although it was unknown whether differences would exist between the twice-exceptional and non-identified groups. Results of the statistical analyses show that the hypotheses are only partially supported. A significant effect was found between ability classification and mean self-esteem scores ($p < .001$). However, the effect size was small ($\eta_p^2 = .019$), and only the gifted group demonstrated statistically significant mean differences from the remaining three conditions. In examining the means and standard deviations, differences between group scores were generally small and perhaps not clinically meaningful. The only meaningful difference may be between students identified as gifted and students identified with disabilities, given the larger amount of disparity in their self-esteem scores. It appears that gifted students consistently experience higher self-esteem than students with disabilities throughout high school.

Outcome of Research Question Two

The second research question asks whether within-subjects differences in average self-esteem scores across time can be explained by ability. The author proposed that an interaction effect

would be found, in which developmental patterns would differ between the ability groups. It was predicted that developmental patterns would be similar between the gifted, disability, and non-identified groups. By contrast, the twice-exceptional group was expected to show the most change over time. The predicted results were disconfirmed by the analysis. On the contrary, there was no interaction effect between ability and time on a combination of self-esteem and locus of control scores from grades 8 through 12 ($p = .349$). Developmental changes did not differ significantly between groups, and instead followed a similar pattern that will be better described in the paragraph below.

Outcome of Research Question Three

The third research question asks how average self-esteem ratings of twice-exceptional learners change over time, from 8th grade through 12th grade. The author tentatively hypothesized that twice-exceptional learners would begin the study with a high level of self-esteem, followed by increasingly lower levels of self-esteem during the first and second follow-ups. Again, the results of the statistical analyses do not support the hypothesis offered. Changes in self-esteem across time were statistically significant ($p < .001$), though the effect size was small ($\eta_p^2 = .020$), and the pattern of change was not as expected. Self-esteem decreased slightly for all ability groups between 8th grade and 10th grade before recovering to baseline levels during the 12th grade.

Outcome of Research Question Four

Each of the remaining research questions pertain to locus of control – the fourth question asks whether between-subjects differences in locus of control can be attributed to ability. The author predicted a significant between-subjects effect, with gifted students reporting the most internalized locus of control, students with disabilities reporting the most externalized locus of

control, and students in the remaining conditions falling somewhere in the middle of the two extremes. This was found to be partially supported. Results of the analyses suggest that ability has a significant effect on locus of control ($p < .001$), although the size of the effect is small ($\eta_p^2 = .023$). Pairwise comparisons isolated the differences and showed significantly more internalized locus of control among the gifted group than all other groups, and significantly more internalized locus of control among the twice-exceptional group than the disability group.

Outcome of Research Question Five

The fifth research question asks whether developmental changes in locus of control across time differ among the ability groups. It was predicted that the developmental trajectory of locus of control among twice-exceptional learners would differ significantly from that of their peers. Moreover, gifted students without disabilities were expected to retain highly internalized locus of control throughout all measured timepoints, and students with disabilities were expected to demonstrate the most externalized locus of control throughout all measured timepoints. Students in the non-identified group of typical students were likewise expected to show relative stability over time. Findings from the current investigation do not support these hypotheses. Rather, there were no significant differences in a combination of self-esteem and locus of control scores based on an interaction between ability and time ($p = .349$). Changes in locus of control scores over time followed the same developmental trajectory regardless of ability group – their trajectory will be described in the paragraph below.

Outcome of Research Question Six

The sixth and final research question asks how locus of control scores of twice-exceptional learners change over time, from 8th grade through 12th grade. The author predicted that locus of control would be highly internalized during eighth grade before becoming

increasingly externalized throughout the remainder of high school. The statistical findings partially support the hypothesized trajectory. Locus of control was most internalized during the baseline year for all ability groups before becoming slightly more externalized during the first follow-up. However, scores remained stable between grades 10 and 12.

CHAPTER 5

DISCUSSION

The intent of this research was to explore the impact of twice-exceptionality on self-esteem and locus of control development over time. Due to the influence of significant social events in the mid-twentieth century, educational reform and funding brought the needs of exceptional students to light (Gloss, 1969). Students with identified disabilities, or students who were identified as gifted, could receive access to special services and accommodations in the classroom. Unfortunately, students with disabilities were largely studied separately from students identified as gifted, and the two camps even competed for funding and resources (Geake & Gross, 2008). It has become increasingly apparent that gifted students are not impervious to academic failure, nor are they immune to the presence of disabilities (Pfeiffer, 2008). In the interest of promoting later success and significant societal contributions from our most promising youth, it is imperative that researchers begin to understand the impact of twice-exceptionality on development and later accomplishment. An interest in these twice-exceptional learners is therefore growing among educators and researchers (Foley Nicpon, Allmon, Sieck, & Stinson, 2011), although empirical studies are comparatively sparse in the educational literature. So as not to understate this point, Pfeiffer and Foley Nicpon (2017) observed that there is no prospective, epidemiological study to date that has examined the etiology, prevalence, or developmental course for twice-exceptional learners in a large non-clinical sample.

A review of the literature in Chapter 2 reveals that twice-exceptional students differ from their gifted-only and disability-only peers. For instance, Nicpon (2015) found that twice-exceptional students report lower self-esteem than their gifted-only counterparts. Barber and Mueller (2011) found significant differences between the self-perceptions of twice-exceptional

students and their peers. Van Boxtel and Mönks (1992) found that gifted underachievers have more negative self-perceptions and more external locus of control orientations than their gifted-only peers. Many other prominent researchers (Assouline et al., 2010; Neihart, 2003; Pfeiffer, 2013; Vespi & Yewchuk, 1992) also contend that twice-exceptional students differ from their peers across a number of key dimensions.

It is no surprise that many of the empirical studies on twice-exceptional learners are concerned with self-perceptions and associated constructs like self-concept, self-esteem, self-efficacy, and locus of control. Researchers and educators are naturally fascinated by the simultaneous yet paradoxical dichotomy of possessing extraordinary abilities and disabilities. Indeed, there is evidence to suggest that poorly integrated identities, particularly discordant identities, are associated with unstable identity development. Hannah and Shore (2008) found that twice-exceptional students exhibited greater self-doubt on a task of reading comprehension as they progressed from elementary school to high school. Their findings may or may not point to a more global destabilization of the self, but if so, then twice-exceptional students are also more likely to experience problems related to social adjustment and overall mental health (Culpin et al., 2015; Erol & Orth, 2014; Garaigordobil et al., 2008; Shepherd et al., 2006; Trzesniewski et al., 2006).

Two of the most prevalent constructs that are related to identity development are self-esteem and locus of control. Both factors are thought to play key roles in self-regulation, and are important not only because they are correlated with a wide variety of life outcomes, but also because of their potential for early intervention. This study was therefore designed to describe how self-esteem and locus of control change over time in a group of adolescent students, and observe whether developmental differences exist between twice-exceptional students, students

identified as gifted-only, students with disabilities, and non-identified students. Although there were few existing empirical studies to postulate the impact of twice-exceptionality on self-esteem and locus of control changes over time, it was tentatively hypothesized that the developmental trajectory would differ in the twice-exceptional group such that self-esteem and locus of control would be similar to the gifted-only group at the beginning of the study, but would trend toward the disability-only group by the final measurement period.

To answer the research questions, a two-way mixed-design MANOVA was conducted using archival data from a large-scale study sponsored by the National Center for Education Statistics. A group of students was followed from grades eight through twelve. They completed questionnaire items that measured their self-esteem and locus of control at three different timepoints. The findings of this study challenge the view that twice-exceptionality is associated with greater destabilization of self-esteem and locus of control over time, as compared to their peers. On the contrary, there were no significant differences among groups in terms of relative change over time. This was surprising, given that researchers have documented the adverse impact of conflicting identities on grades, behavior, motivation, and overall self-perceptions (Foley Nicpon, 2015; Foley Nicpon, Rickels, Assouline, & Richards, 2012; Kauder, 2009; King, 2005; Reis & McCoach, 2000). All groups demonstrated a slight decline in self-esteem scores from eighth grade to tenth grade, followed by a period of recovery from tenth grade to twelfth grade. Moreover, all groups evidenced increasingly externalized locus of control from eighth grade to tenth grade, but non-significant changes from tenth grade to twelfth grade.

Another theme that emerged from the analysis was that gifted students consistently demonstrated slightly higher self-esteem and more internalized locus of control than the other ability groups. This finding was consistent with prior research studies associating giftedness with

higher self-esteem and a greater sense of control (Gagné & Gagnier, 2004; Hoge & Renzulli, 1991; Rinn, Reynolds, & McQueen, 2011). Validating the expectation that gifted students with disabilities differ from their gifted-only peers, students in the twice-exceptional group had significantly lower self-esteem and more externalized locus of control than students in the gifted-only group. Twice-exceptional students also demonstrated more internalized locus of control scores than their peers in the disability group, further validating the view that caution should be exercised before reading the literature on gifted students, or reading the literature on students with disabilities, and overgeneralizing findings to students whose exceptionalities span both groups (Foley Nicpon, 2015; Pfeiffer, 2013).

Limitations of the Study

Delimitations were described in Chapter 3 to identify *a priori* those constraints and design decisions that reduced the internal and external validity of the study. Examples include the age of the database, the methods by which ability classifications were assigned, and the decision to exclude certain variables from the study. Without repeating that discussion, there were additional limitations encountered during the statistical analyses that should be taken into consideration when interpreting results.

Sample Limitations

One such limitation relates to demographic characteristics across conditions. Group composition was found to differ based on sex and race/ethnicity. There were fewer males than females in the Gifted and Non-Identified groups; conversely, females were underrepresented in the Disability and Twice-Exceptional groups. Given the expectation for adolescent boys to report higher self-esteem than adolescent girls (Bachman et al., 2011), it is possible that any inter-group

differences related to ability were suppressed by disproportionate group membership based on sex.

Further complicating the picture, it was found that a larger proportion of racial minority groups were represented in the Gifted classification than the Disability classification. Whereas Bachman et al. (2011) found that Black adolescents tend to report higher self-esteem than White adolescents, Wang and Su (2013) found that students in racial minorities tend to report a more external locus of control than their White counterparts. These group differences are potential confounds that threaten the internal validity of the study. Confounds reduce confidence in the statistical results because any observed changes in self-esteem and locus of control over time cannot be isolated to the effects of ability classification alone.

The exclusion of additional covariates, such as sex or race/ethnicity, was deliberate. In large part, that decision was motivated by the desire to maintain sufficient group sizes and statistical power, rather than divide participants into additional sub-groups. As mentioned before, the twice-exceptional population inherently represents a smaller pool of potential participants. Unfortunately, common statistical methodologies (e.g., analysis of variance) require sufficient power to produce valid results. It is therefore anticipated that researchers interested in twice-exceptional learners will continue to be challenged in their efforts to study twice-exceptional learners.

Measurement Limitations

Another limitation of this study is the apparent imprecision of the self-esteem and locus of control measures. Average self-esteem ratings were generally quite favorable, and average locus of control ratings generally demonstrated a more internal locus of control across all groups, regardless of ability classification. Standard deviations were relatively small, indicating that

participants' self-ratings were somewhat restricted to a reduced range of values. An analysis of data normality indicated that the data were normal enough for the application of parametric statistics. However, it seems that the measures may not have been sensitive enough to detect subtle differences between participants, particularly at the upper end of the scales. A lack of sensitivity in measurement tools resulted in decreased power to detect real differences between groups.

It is also possible that the effects of social desirability influenced the way in which participants responded to the questionnaire items. If participants knowingly or subconsciously reported possessing more favorable traits, then their response bias would explain why most participants demonstrated high self-esteem and an internal locus of control. There are methods to mitigate social desirability effects, that unfortunately were not engineered into the design of the present investigation.

An alternative possibility is that most adolescents simply have high self-esteem and a more internalized locus of control, or that students in this sample have higher self-esteem and a more internalized locus of control than the general population. Chapter 3 described the sampling methodology. The exclusion of students from non-traditional schools, and participant attrition over a four-year period, may have resulted in sampling bias.

One final thought on this issue – the high school years were of particular interest to the researcher, with the expectation of observing large developmental fluctuations that are characteristic of adolescence. In hindsight, it is possible that the results would have been different, and the changes over time more pronounced, if the sample were followed from kindergarten through high school. The range restriction in scores may have inadvertently been

manufactured into the research design because the participants were not identified and followed from an earlier age.

Research Evidence Limitations

One of the most significant limitations of this investigation is a lack of prior research studies on the topic at hand (Pfeiffer & Foley Nicpon, 2017). A single research study, by itself, does not definitively answer questions about an area of interest. Confidence increases when there is converging evidence from multiple studies that use multiple measures, methodologies, samples, statistics, research questions, and perspectives. Each piece of knowledge gained is then woven into the larger tapestry to create a more cohesive, valid, and reliable narrative. In the case of this investigation, it is difficult to draw sound conclusions about the self-esteem and locus of control of twice-exceptional students because there are so few studies with which to compare its results. Results demonstrating a slightly higher self-esteem and more internalized locus of control among gifted high schoolers is certainly consistent with conclusions drawn from prior research studies. It was also unsurprising that self-esteem and locus of control scores, overall, decreased from eighth grade through tenth grade. Despite demonstrating significant group differences between twice-exceptional students and their gifted, or disabled, peers, it is still unclear to what extent any real differences can be attributed to ability classification alone. Much more research is needed to validate these claims, although the findings of the present investigation are certainly promising.

Implications and Future Direction

Theory Development

High self-esteem is a sense of being competent and worthy, and it comes from experiencing success in areas that are deemed important. Self-esteem helps individuals monitor the likelihood that they will be socially accepted or rejected. Low self-esteem, according to

sociometer theory, is a cognitive and affective indicator of potential social rejection (Reitz et al., 2016). From that standpoint, adolescents with a low sense of mastery in socially valued domains (e.g., academics, sports) are most at risk for experiencing low self-esteem. In this study, students with the highest likelihood of academic mastery were also those who reported the highest levels of self-esteem. The results of this study offer additional support for sociometer theory, and are consistent with research studies that demonstrate a correlation between low self-esteem and social exclusion (Denissen et al., 2008; Leary et al., 1995).

As with self-esteem, locus of control is also a self-regulatory system. Locus of control is the pattern of attributing successes and failures to one's own behaviors, or to external forces, such as chance or luck (Rotter, 1966; Weiner, 2010). This regulatory system is designed to either encourage or suppress behaviors based on beliefs about the consequences of one's own actions. People who experience repeated failures, despite their efforts, eventually learn that their own actions have no influence over outcomes. The results of the present study support the idea that one's locus of control develops over time in response to experiences of failure or success. Students with the most internalized locus of control were also students most likely to experience academic success – the gifted-only group. As expected, students whose ability to learn in the classroom was compromised – the disability-only group – demonstrated the most externalized locus of control.

Whereas some theoretical concepts were reinforced by the present investigation, others were contradicted. For example, in Chapter 2, the author presumed that the development of self-esteem over time could be destabilized by non-integrated, seemingly incompatible identities. This is based on research that suggests a well-integrated and stable identity contributes to higher self-esteem and generally more positive feelings about the self (Usborne & Taylor, 2010). To the

contrary, the results of this study did not show a significant relationship between twice-exceptionality and destabilization of self-esteem and locus of control over time. Moreover, the author tentatively speculated that advanced cognitive abilities could affect self-esteem or locus of control development in gifted students. In other words, more rapid development in a child's ability to understand social cues and cultural subtleties, or advanced abilities to associate cause with effect (and therefore make earlier attributional associations), could result in different self-esteem or locus of control trajectories among gifted students. These ideas were not substantiated by the results of the analysis. It is certainly possible that the results failed to detect true developmental differences between groups. The more likely explanation is that adolescence is already a period of rapid developmental change and identity integration, and so all students in this study demonstrated similar developmental patterns regardless of any identity conflicts or advanced cognitive development.

Practical Applications and Training

There are also several practical takeaways for educators, practitioners, and training institutions, such as graduate schools and continuing education programs. Although the effect sizes in this study were small, significant differences were found between gifted students with and without disabilities on measures of self-esteem and locus of control. This supports the view that twice-exceptional students are a distinctly unique population, whose personal adjustment and success are not guaranteed by merely being labelled as gifted. The notion that gifted students are too advantaged to fail is false – researchers have found that gifted traits sometimes conceal co-existing disabilities, in turn preventing students from receiving needed interventions (Pfeiffer, 2013; Pfeiffer & Foley Nicpon, 2017). However, many service providers have no formal training on gifted student populations, nor are they prepared to handle giftedness and disabilities that co-

exist in the same student (Robertson et al., 2011). Educators and service providers should therefore seek out training on gifted students in general, and twice-exceptional learners specifically. Training institutions are likewise responsible for offering curricula on exceptional student identification and intervention.

Examples of successful interventions include those of Olenchak (1995, 2009) and Berkeley et al. (2011). Olenchak (1995, 2009) leveraged Individual Education Plans, strengths-based interventions, weekly individual and group counseling, and enrichment opportunities in his approach. Remedial interventions were tailored to students' areas of weakness, and enrichment opportunities helped students better develop areas of strength. Counseling sessions incorporated components of the Talents Unlimited model – students practiced productive thinking, communication, forecasting, decision making, and planning. After a year-long intervention, gifted students with learning disabilities demonstrated significant improvement in their attitudes toward school and self-concepts. This is consistent with Pfeiffer and Foley Nicpon's (2017) recommendation to employ strengths-based approaches, based on their summary of treatment outcomes with twice-exceptional youth. In another study that was previously mentioned in Chapter 2, Berkeley et al. (2011) found that academic interventions were more effective and long-lasting when supplemented with attribution retraining. These studies demonstrate that twice-exceptional students can benefit from targeted interventions, provided that service providers have the knowledge and resources to implement them.

The current investigation adds to that body of knowledge by mapping the development of self-esteem and locus of control among high school students in a longitudinal design. The results of the analyses suggest that all high school students, regardless of ability classification, tend to experience lower self-esteem and more externalized attributions midway through high school.

Tenth grade may represent a particularly vulnerable time for most adolescents, with important implications for designing appropriate interventions. An appropriate intervention, for instance, might take the form of a tier two social skills program for all ninth-grade students. Another possibility would be to increase opportunities for twice-exceptional students, who may lack a true peer group in their daily lives, to meet and connect with peers throughout their state through mentorship programs, enrichment opportunities, or even support groups.

This leads to the fact that lawmakers shape children's educational opportunities through their legislative policies and allocation of funds. The examples in the previous paragraph depend on having the funds to implement large-scale programs, hire qualified professionals, and transport students who want to participate in extracurricular and enrichment activities.

Shortchanging prevention and early intervention is a shortsighted solution to budgetary constraints. Studies show that human capital is an important ingredient for economic growth (Hanushek & Woessmann, 2011). The decision to nurture extraordinary potential in the areas of science, math, art, technology, athletics, and so on, represents an empirically based economic and societal investment (Gallagher, 1991; Geake & Gross, 2008; Pfeiffer, 2008).

Contributions to Research

In addition to providing theoretical and practical insights, this study makes three key contributions to the literature on twice-exceptional student populations. First, the outcome of this study strengthens the argument that twice-exceptional students are uniquely impacted by their co-existing exceptionalities. Second, the developmental changes in self-esteem, and changes in locus of control, are charted over a four-year period among the same cohort of participants. This fills a needed gap in the literature, namely that there are few studies seeking to explain developmental changes over time in a longitudinal design. Third, the present study represents the

twice-exceptional population as a whole, without systematically excluding certain categories of disabilities.

One possible area for further investigation might be to replicate this study with a more recently acquired sample. The impact of cohort effects on the generalizability of the present study could then be confirmed or rejected. Comparisons could also be made regarding the impact of gifted or disability labelling on identity development, then versus now. Even if the findings of the present study are contradicted by a more recent sample, that result could provide valuable information about reduced stigma associated with disabilities among today's adolescents, or improved identification and intervention practices.

Future research studies should incorporate more nuanced models and measures of self-esteem whenever possible. The stability or fragility of self-esteem should be considered, not simply whether self-esteem is high or low. The multi-dimensional model is a more accurate representation of self-esteem, and is more true to its definition. By including the stability dimension, healthy self-esteem can be differentiated from a falsely inflated, but highly volatile, sense of self-worth.

For that matter, there are many other developmental constructs, outside of self-esteem and locus of control, that researchers may be interested in studying. Out of the more recent positive psychology literature, it would be useful to understand the subjective well-being of twice-exceptional students, or factors related to resiliency. Subjective well-being refers to the way that people think and feel about their lives, and is influenced by factors such as cognitive flexibility and optimism (Dolan, Peasgood, & White, 2008). Resilience refers to the ability to overcome challenges, and research studies suggest that personal experiences can build resilience, as can resilience training (Robertson & Cooper, 2013). Likewise, Dweck's (2008) research on

encouraging a growth mindset can be applied to twice-exceptional students, who may benefit from believing that perseverance and hard work are the keys to success, above and beyond any innate talents or deficits.

Lastly, there needs to be a greater emphasis on twice-exceptional students with physical disabilities, and other disability classifications that are not commonly found in the twice-exceptional literature. A student with a visual impairment, for example, may miss out on enrichment opportunities that heavily favor visual aids and written text. As another example, gifted students with severe orthopedic impairments may not be able to attend traditional classrooms, and therefore may have limited access to gifted curricula. Clearly, more research is needed in this area.

In summary, it appears that the pattern of self-esteem and locus of control development over time is similar across all high school students, regardless of ability status. Tenth grade seems to represent the period of greatest instability. Students with disabilities consistently reported the lowest self-esteem ratings and the most externalized attributions, whereas students identified as gifted consistently reported the highest self-esteem ratings and the most internalized attributions. Average ratings of the twice-exceptional group differed from that of their peers, further substantiating the recent interest in this population. Unfortunately, effect sizes were small, and ceiling effects may have restricted the range of scores on the outcome measures. There were many limitations, either by design or outside the control of the researcher, that reduced confidence in the study's findings. However, this investigation achieved its purpose of contributing to the twice-exceptional literature, by exploring key constructs related to identity development and self-regulation, and offering direction for future prospective studies.

TABLE 1

Primary Indicators of Giftedness

| <u>Source</u> | <u>Baseline Year (8th Grade)</u> |
|---------------|--|
| Parent | BYP51. Is your eighth grader currently enrolled in a gifted or talented program? |
| Student | BYS68A. Are you enrolled in any of the following special programs/services? a. Classes for gifted or talented students |
| Teacher | N/A |
| Transcript | N/A |

Note: From U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year, First, and Second Follow-up Surveys.

TABLE 2

Primary Indicators of Disability

| <u>Source</u> | <u>Baseline Year (8th Grade)</u> |
|---------------|--|
| Parent | BYP48. Has your 8th-grader ever received special services for any or all of the following? a. Visual handicap (not correctable by glasses), b. Hearing problem, c. Deafness, d. Speech problem, e. Orthopedic problem (for example: club foot, absence of arm or leg, cerebral palsy, amputation, polio), f. Other physical disability, g. Specific learning problem (for example: dyslexia or other reading, spelling, writing, or math disability), h. Emotional problem BYP49. Is your 8th-grader currently enrolled in any of the following special programs/services? c. Special services for orthopedically handicapped students, d. Special education services for students with learning disabilities |
| Student | N/A |
| Teacher | N/A |
| Transcript | N/A |

Note: From U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year, First, and Second Follow-up Surveys.

TABLE 3*Sample Demographics*

| Demographic | Group | n | Percent |
|-------------|---------------------------------|------|---------|
| Gender | Male | 804 | 54% |
| | Female | 684 | 46% |
| Race | White, Not Hispanic | 1133 | 76% |
| | Black, Not Hispanic | 103 | 7% |
| | Hispanic | 146 | 10% |
| | Asian, Pacific Islander | 92 | 6% |
| | American Indian, Alaskan Native | 10 | <1% |
| | Missing | 4 | <1% |
| Income | \$52,999 and Under | 398 | 26% |
| | \$53,000 - \$105,999 | 592 | 40% |
| | \$106,000 - \$159,499 | 248 | 17% |
| | \$159,500 - \$425,499 | 85 | 6% |
| | \$425,500 and Over | 115 | 8% |
| | Missing | 50 | 3% |

TABLE 4*Normality of Self-Esteem and Locus of Control Scores*

| Measure | Year | (N = 1,488) | | Outliers Removed (N = 1,452) | |
|------------------|------------------------|-------------|----------|------------------------------|----------|
| | | Skewness | Kurtosis | Skewness | Kurtosis |
| Self-Esteem | 8 th Grade | -.525 | .603 | -.286 | -.336 |
| | 10 th Grade | -.312 | .695 | -.027 | -.310 |
| | 12 th Grade | -.428 | .384 | -.209 | -.417 |
| Locus of Control | 8 th Grade | -.520 | .302 | -.412 | -.007 |
| | 10 th Grade | -.273 | .365 | -.137 | -.031 |
| | 12 th Grade | -.395 | .831 | -.116 | .035 |

TABLE 5*Means and Standard Deviations of Responses to Self-Esteem and Locus of Control Questionnaires*

| Measure | Year | Gifted | | Disability | | Twice-Exceptional | | Control | | Total | |
|------------------|------------------------|----------|-----------|------------|-----------|-------------------|-----------|----------|-----------|----------|-----------|
| | | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Self-Esteem | 8 th Grade | 13.6 | 1.84 | 12.9 | 1.82 | 13.4 | 1.90 | 13.3 | 1.80 | 13.3 | 1.85 |
| | 10 th Grade | 13.3 | 1.93 | 12.7 | 1.81 | 12.9 | 1.84 | 12.8 | 1.91 | 12.9 | 1.88 |
| | 12 th Grade | 13.6 | 1.92 | 13.1 | 1.93 | 13.3 | 1.90 | 13.1 | 1.92 | 13.3 | 1.92 |
| | Total | 13.5 | 1.95 | 12.9 | 1.87 | 13.2 | 1.90 | 13.1 | 1.90 | - | - |
| Locus of Control | 8 th Grade | 12.9 | 2.02 | 12.1 | 2.06 | 12.6 | 2.06 | 12.5 | 2.00 | 12.5 | 2.05 |
| | 10 th Grade | 12.5 | 2.05 | 11.9 | 1.97 | 12.1 | 2.04 | 12.2 | 1.92 | 12.2 | 2.00 |
| | 12 th Grade | 12.6 | 2.04 | 12.0 | 1.93 | 12.2 | 2.01 | 12.2 | 1.96 | 12.3 | 2.00 |
| | Total | 12.7 | 2.06 | 12.0 | 2.02 | 12.3 | 2.06 | 12.3 | 1.97 | - | - |

TABLE 6*Levene's Test of Homogeneity of Variances for Self-Esteem and Locus of Control Scores*

| Measure | Year | (N = 1,488) | | Outliers Removed (N = 1,452) | |
|------------------|------------------------|-------------|------|------------------------------|------|
| | | <i>F</i> | Sig. | <i>F</i> | Sig. |
| Self-Esteem | 8 th Grade | 1.313 | .269 | 1.299 | .273 |
| | 10 th Grade | 2.053 | .105 | 2.257 | .080 |
| | 12 th Grade | .785 | .502 | .312 | .816 |
| Locus of Control | 8 th Grade | .500 | .683 | .119 | .949 |
| | 10 th Grade | .756 | .519 | .827 | .479 |
| | 12 th Grade | 1.615 | .184 | 2.077 | .101 |

TABLE 7*Correlations Between Self-Esteem, Locus of Control, and Ability Classification*

| | 8 th Grade Self-Esteem | 10 th Grade Self- Esteem | 12 th Grade Self-Esteem | 8 th Grade Locus of Control | 10 th Grade Locus of Control | 12 th Grade Locus of Control | Ability Group |
|--|--------------------------------------|---|---------------------------------------|--|---|---|------------------|
| 8 th Grade Self-Esteem | - | - | - | - | - | - | - |
| 10 th Grade Self-Esteem | .465** | - | - | - | - | - | - |
| 12 th Grade Self-Esteem | .372** | .483** | - | - | - | - | - |
| 8 th Grade Locus of Control | .402** | .262** | .208** | - | - | - | - |
| 10 th Grade Locus of Control | .281** | .462** | .306** | .444** | - | - | - |
| 12 th Grade Locus of Control | .223** | .295** | .435** | .333** | .445** | - | - |
| Ability Group | -.015 | -.066* | -.082** | -.041 | -.042 | -.055* | - |

** Significant at $\alpha = .01$ * Significant at $\alpha = .05$

TABLE 8*Multivariate Test for Self-Esteem and Locus of Control Scores Between Ability Classifications Across Time*

| Factor | Wilk's λ | <i>F</i> | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|----------------|------------------|----------|---------------|----------|---------|---------------------|
| Time | .97 | 21.47 | 4 | 5790 | <.001** | .015 |
| Time * Ability | 1.00 | 1.11 | 12 | 5790 | .349 | .002 |

** Significant at $\alpha = .01$ * Significant at $\alpha = .05$ **TABLE 9***Changes in Self-Esteem and Locus of Control Scores Across Time with Huynh-Feldt Correction for Sphericity*

| Factor | Measure | Type III Sum of Squares | df | Mean Square | <i>F</i> | Sig. | Partial Eta Squared |
|--------|------------------|-------------------------|-------|-------------|----------|---------|---------------------|
| Time | Self-Esteem | 119.291 | 1.978 | 60.318 | 29.97 | <.001** | .020 |
| | Locus of Control | 91.056 | 1.972 | 46.175 | 18.88 | <.001** | .013 |

** Significant at $\alpha = .01$ * Significant at $\alpha = .05$

TABLE 10*Comparisons of Average 8th, 10th, and 12th Grade Scores with Bonferroni Correction*

| Measure | Time A | Time B | Mean Difference (A-B) | Std. Error | Sig. | 95% Confidence Interval for Difference | |
|------------------|------------------------|------------------------|-----------------------------|------------|---------|---|-------------|
| | | | | | | Lower Bound | Upper Bound |
| Self-Esteem | 8 th Grade | 10 th Grade | .358 | .051 | <.001** | .237 | .480 |
| | 8 th Grade | 12 th Grade | .015 | .055 | 1.000 | -.118 | .148 |
| | 10 th Grade | 12 th Grade | -.343 | .051 | <.001** | -.465 | -.221 |
| Locus of Control | 8 th Grade | 10 th Grade | .334 | .056 | <.001** | .200 | .469 |
| | 8 th Grade | 12 th Grade | .269 | .061 | <.001** | .122 | .416 |
| | 10 th Grade | 12 th Grade | -.066 | .055 | .709 | -.198 | .067 |

** Significant at $\alpha = .01$ * Significant at $\alpha = .05$ **TABLE 11***Differences in Average Self-Esteem and Locus of Control Scores by Ability Classification*

| Factor | Measure | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---------|------------------|----------------------------|----|-------------|-------|---------|------------------------|
| Ability | Self-Esteem | 185.979 | 3 | 61.993 | 9.42 | <.001** | .019 |
| | Locus of Control | 244.752 | 3 | 81.584 | 11.30 | <.001** | .023 |

** Significant at $\alpha = .01$ * Significant at $\alpha = .05$

TABLE 12*Comparisons of Average Self-Esteem and Locus of Control Scores by Ability Classification with Bonferroni Correction*

| Measure | Group A | Group B | Mean Difference (A-B) | Std. Error | Sig. | 95% Confidence Interval for Difference | |
|------------------|-------------------|-------------------|-----------------------------|------------|---------|---|-------------|
| | | | | | | Lower Bound | Upper Bound |
| Self-Esteem | Gifted | Disability | .57 | .110 | <.001** | .28 | .86 |
| | Gifted | Twice-Exceptional | .29 | .110 | .049* | .00 | .58 |
| | Gifted | Non-Identified | .40 | .110 | .002** | .11 | .69 |
| | Disability | Twice-Exceptional | -.28 | .110 | .073 | -.57 | .01 |
| | Disability | Non-Identified | -.17 | .110 | .763 | -.46 | .12 |
| | Twice-Exceptional | Non-Identified | .11 | .110 | 1.000 | -.18 | .40 |
| Locus of Control | Gifted | Disability | .67 | .115 | <.001** | .36 | .97 |
| | Gifted | Twice-Exceptional | .33 | .115 | .026* | .02 | .63 |
| | Gifted | Non-Identified | .39 | .115 | .004** | .09 | .69 |
| | Disability | Twice-Exceptional | -.34 | .115 | .020* | -.64 | -.03 |
| | Disability | Non-Identified | -.28 | .115 | .095 | -.58 | .03 |
| | Twice-Exceptional | Non-Identified | .06 | .115 | 1.000 | -.24 | .36 |

** Significant at $\alpha = .01$ * Significant at $\alpha = .05$

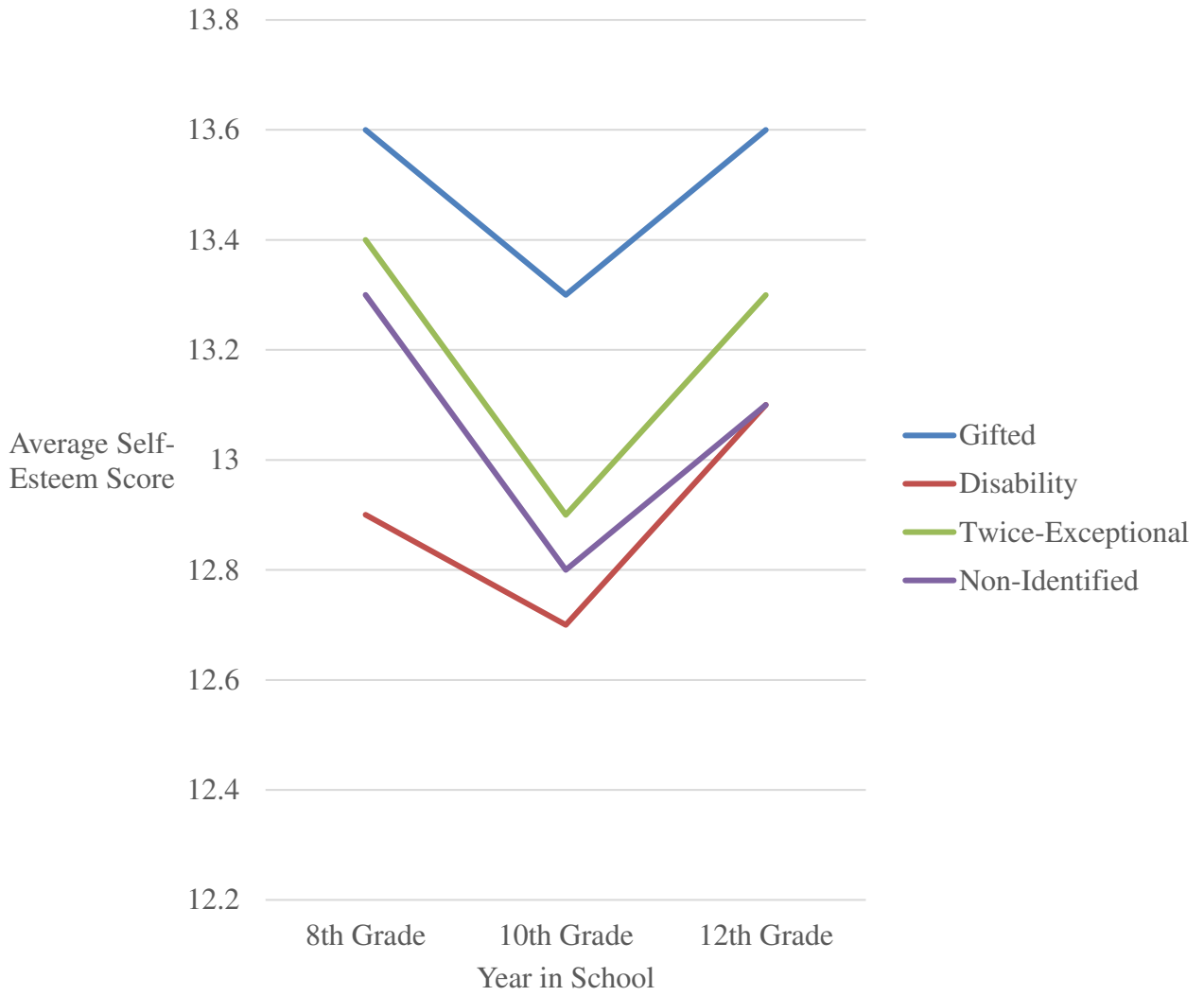


FIGURE 1

Developmental Changes in Self-Esteem Across Time by Ability Classification

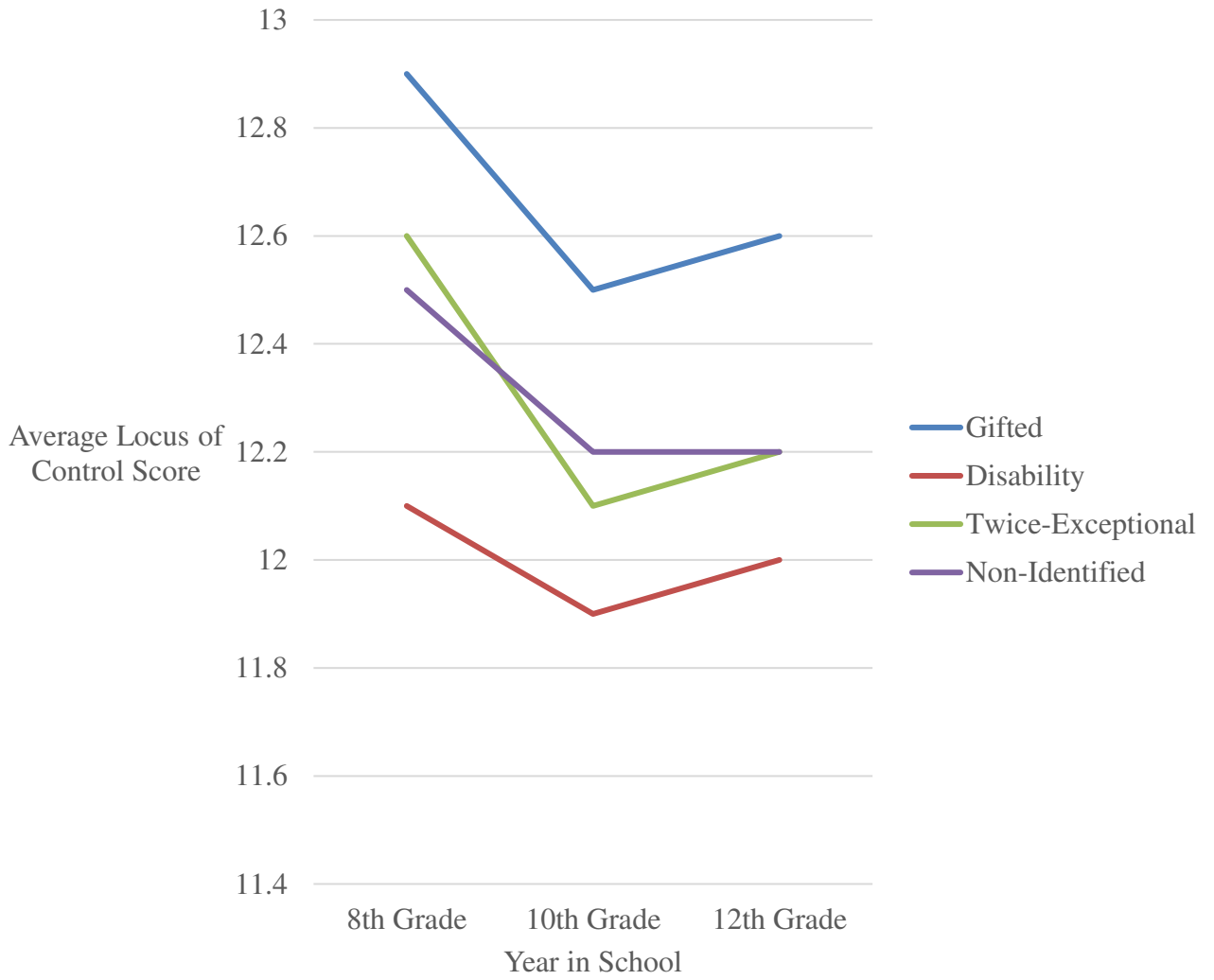


FIGURE 2

Developmental Changes in Locus of Control Across Time by Ability Classification

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL



Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 12/09/2016

To: Lori Best

Address:

Dept.: EDUCATIONAL PSYCHOLOGY AND LEARNING SYSTEMS

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Self-Esteem and Locus of Control: A Longitudinal Analysis of Twice-Exceptional Learners

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Exempt per 45 CFR § 46.101(b)4 and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 12/08/2017 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Steven Pfeiffer
HSC No. 2016.19250

APPENDIX B

NELS:88 ITEMS PERTAINING TO SELF-ESTEEM AND LOCUS OF CONTROL

How do you feel about each of the following statements?

- a. I feel good about myself*
- b. I don't have enough control over the direction my life is taking**
- c. In my life, good luck is more important than hard work for success**
- d. I feel I am a person of worth, the equal of other people*
- e. I am able to do good things as well as most other people*
- f. Every time I try to get ahead, something or somebody stops me**
- g. My plans hardly ever work out, so planning only makes me unhappy**
- h. On the whole, I am satisfied with myself*
- i. I feel useless at times *†
- j. At times, I think I am no good at all*††
- k. When I make plans, I am almost certain I can make them work**††
- l. I feel I do not have much to be proud of*††
- m. Chance and luck are very important for what happens in my life **†††

Strongly Disagree... Disagree... Agree... Strongly Agree...

* Self-Esteem

** Locus of Control

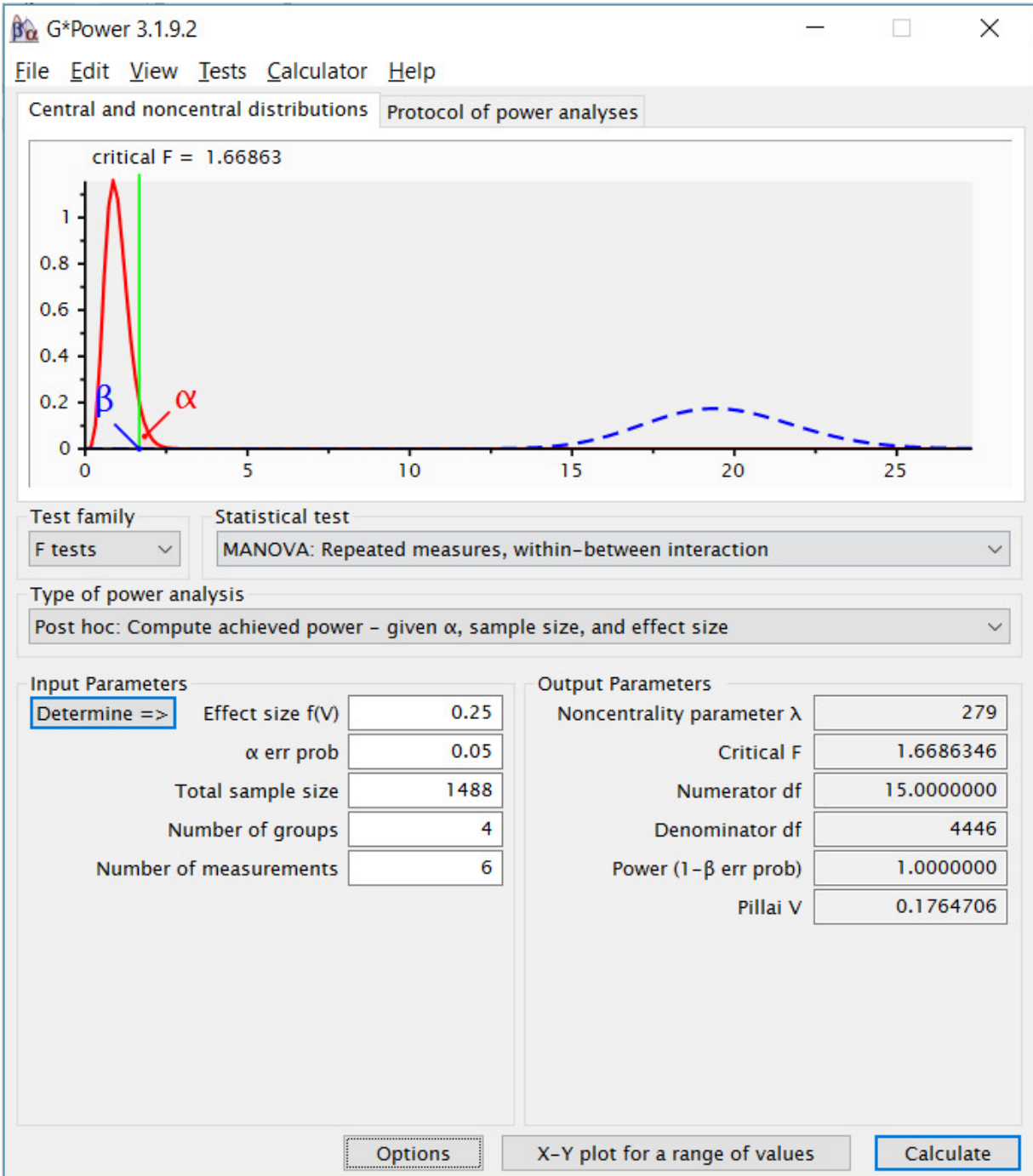
† Item dropped due to high multicollinearity with item (j)

†† Item dropped due to cross-loading on both factors

††† Item dropped due to poor construct validity and redundancy with item (c)

APPENDIX C

G*POWER OUTPUT



REFERENCES

- Ackerman, P. L. (2013). Nonsense, common sense, and science of expert performance: Talent and individual differences. *Intelligence*. Retrieved from: <http://dx.doi.org/10.1016/j.intell.2013.04.009>
- Ahlin, E. M., & Lobo Antunes, M. J. (2015). Locus of control orientation: Parents, peers, and place. *Journal of Youth and Adolescence*, *44*(9), 1803-1818. doi: 10.1007/s10964-015-0253-9
- Ahn, T. (2015). Locus of control and job turnover. *Economic Inquiry*, *53*(2), 1350-1365. doi: 10.1111/ecin.12173
- Alesi, M., Rappo, G., & Pepi, A. (2012). Self-esteem at school and self-handicapping in childhood: Comparison of groups with learning disabilities. *Psychological Reports*, *111*(3), 952-962. doi: 10.2466/15.10.PR0.111.6.952-962
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*. 5th ed. Arlington, VA: American Psychiatric Publishing.
- American Recovery and Reinvestment Act (ARRA), Pub. L. No. 111-5, 115 Stat. 123 (2009).
- Antshel, K. M. (2008). Attention-deficit hyperactivity disorder in the context of a high intellectual quotient/giftedness. *Developmental Disabilities Research Reviews*, *14*(4), 293-299. doi: 10.1002/ddrr.34
- Assouline, S. G., Foley Nicpon, M., & Doobay, A. (2009). Profoundly gifted girls and autism spectrum disorder: A psychometric case study comparison. *Gifted Child Quarterly*, *53*(2), 89-105. Doi: 10.1177/0016986208330565
- Assouline, S. G., Foley Nicpon, M., & Whiteman, C. (2010). Cognitive and psychosocial characteristics of gifted students with specific learning disabilities. *Gifted Child Quarterly*, *54*, 102-115. doi: 10.1177/001698620935597
- Bachman, J. G., O'Malley, P. M., Freedman-Doan, P., Trzesniewski, K. H., & Donnellan, M. B. (2011). Adolescent self-esteem: Differences by race/ethnicity, gender, and age. *Self and Identity*, *10*(4), 445-473. doi: 10.1080/15298861003794538
- Bagley, C., Bolitho, F., & Bertrand, L. (1997). Norms and construct validity of the Rosenberg Self-Esteem Scale in Canadian high school populations: Implications for counselling. *Canadian Journal of Counselling*, *31*(1), 82-92.
- Barber, C., & Mueller, C. T. (2011). Social and self-perceptions of adolescents identified as gifted, learning disabled, and twice-exceptional. *Roeper Review*, *33*(2), 109-120. doi: 10.1080/02783193.2011.554158

- Barkley, R. A. (2012). *Executive functioning and self-regulation: Extended phenotype, synthesis, and clinical implications*. New York: Guilford Publications.
- Barro, R. J. (1999). Human capital and growth in cross-country growth regressions. *Swedish Economic Policy Review*, 6(2), 237-277.
- Baum, S. M., & Owen, S. V. (2004). *To be gifted and learning disabled: Strategies for helping bright students with LD, ADHD, and more*. Mansfield Center, CT: Creative Learning Press.
- Baumeister, R. F., Smart, L., & Boden, J. M. (1996). Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review*, 103(1), 5-33.
- Bear, G. G., Minke, K. M., & Manning, M. A. (2002). Self-concept of students with learning disabilities: A meta-analysis. *School Psychology Review*, 31(3), 405-427.
- Benbow, C. P. (2005). A great man standing with Terman and Hollingworth: Julian C. Stanley 1918-2005. *Gifted Child Quarterly*, 49(4), 360-361.
- Benbow, C. P., & Stanley, J. C. (1983). An eight-year evaluation of SMPY: What was learned? In C.P. Benbow & J. C. Stanley (Eds.). *Academic precocity: Aspects of its development* (pp. 205-214). Baltimore, MD: Johns Hopkins University Press.
- Bercher, D. A. (2012). Self-monitoring tools and student academic success: When perception matches reality. *Journal of College Science Teaching*, 41(5), 26-33.
- Beretvas, S. N., Suizzo, M.-A., Durham, J. A., & Yarnell, L. M. (2008). A reliability generalization study of scores on Rotter's and Nowicki-Strickland's Locus of Control Scales. *Educational and Psychological Measurement*, 68(1), 97-119. doi: 10.1177/0013164407301529
- Berkeley, S., Mastropieri, M. A., & Scruggs, T. E. (2011). Reading comprehension strategy instruction and attribution retraining for secondary students with learning and other mild disabilities. *Journal of Learning Disabilities*, 44(1), 18-32. doi: 10.1177/0022219410371677
- Betts, G. T., & Neihart, M. (1986). Implementing self-directed learning models for the gifted and talented. *Gifted Child Quarterly*, 30(4), 174-177. doi: 10.1177/001698628603000406
- Bianco, M., & Leech, N. L. (2010). Twice-exceptional learners: Effects of teacher preparation and disability labels on gifted referrals. *Teacher Education and Special Education*, 33(4), 319-334. doi: 10.1177/0888406409356392
- Blagojević-Damašek, N., Frencl, M., Pereković, V., Čavajda, Z., & Kovaček, M. (2012). Locus of control, social support, and alcoholism. *Alcoholism*, 48(1), 5-12.

- Bloom, B., Jones, L. I., & Freeman, G. (2013). *Summary health statistics for U.S. children: National health interview survey, 2012*. National Center for Health Statistics.
- Blumberg, S. J., Bramlett, M. D., Kogan, M. D., Schieve, L. A., Jones, J. R., & Lu, M. C. (2013). *Changes in prevalence of parent-reported autism spectrum disorder in school-aged U.S. children: 2007 to 2011-2012*. National Center for Health Statistics.
- Bodill, K., & Roberts, L. D. (2013). Implicit theories of intelligence and academic locus of control as predictors of studying behaviour. *Learning and Individual Differences, 27*, 163-166. doi: 10.1016/j.lindif.2013.08.001
- Branden, N. (1969). *The psychology of self-esteem: A new concept of man's psychological nature*. Los Angeles, California: Nash Publishing Corporation.
- California State Department of Education, California Task Force to Promote Self-esteem and Personal and Social Responsibility. (1990). *Toward a state of esteem: The final report*. Sacramento, CA: Bureau of Publications, California Department of Education.
- Carman, C. A. (2013). Comparing apples and oranges: Fifteen years of definitions of giftedness in research *Journal of Advanced Academics, 24*(1), 52-70. doi: 10.1177/1932202X12472602
- Cassidy, S., & Eachus, P. (2000). Learning style, academic belief systems, self-report student proficiency and academic achievement in higher education. *Educational Psychology, 20*(3), 307-322. doi: 10.1080/713663740
- Centers for Disease Control and Prevention. (2013). *National Center on Birth Defects and Developmental Disabilities*. Retrieved from <http://www.cdc.gov/ncbddd/adhd/data.html>
- Chapman, J. W. (1988). Learning disabled children's self-concepts. *Review of Educational Research, 58*(3), 347-371.
- Chen, G., Gully, S. M., & Eden, D. (2004). General self-efficacy and self-esteem: toward theoretical and empirical distinction between correlated self-evaluations. *Journal of Organizational Behavior, 25*, 375-395. doi: 10.1002/job.251
- Chodkiewicz, A. R., & Boyle, C. (2014). Exploring the contribution of attribution retraining to student perceptions and the learning process. *Educational Psychology in Practice, 30*(1), 78-87. doi: 10.1080/02667363.2014.880048
- Clark, B. (1986). *Optimizing learning: The integrative education model in the classroom*. Columbus, OH: Merrill Publishing.
- Cobb-Clark, D. A., & Schurer, S. (2013). Two economists' musings on the stability of locus of control. *The Economic Journal, 123*(570), 358-400. doi: 10.1111/eoj.12069

- Coleman, M. R. (1992). A comparison of how gifted/LD and average/LD boys cope with school frustration. *Journal for the Education of the Gifted*, 15(3), 239-265. doi: 10.1177/016235329201500304
- Coopersmith, S. (1967). *The antecedents of self-esteem*. San Francisco: Freeman.
- Croft, L. J. (2003). Teachers of the gifted: Gifted teachers. In N. Colangelo & G. Davis (Eds.), *Handbook of gifted education* (3rd ed., pp. 558-571). Boston, MA: Allyn & Bacon.
- Cross, J. R. (2015). Gifted children and peer relationships. In M. Neihart, S. I. Pfeiffer, & T. L. Cross (Eds.), *Social and emotional development of gifted children* (2nd ed., pp. 41-53). Waco, TX: Prufrock Press.
- Culpin, I., Stapinski, L., Miles, O. B., Araya, R., & Joinson, C. (2015). Exposure to socioeconomic adversity in early life and risk of depression at 18 years: The mediating role of locus of control. *Journal of Affective Disorders*, 183, 269-278.
- Denissen, J. J. A., Penke, L., Schmitt, D. P., & van Aken, M. A. G. (2008). Self-esteem reactions to social interactions: Evidence for sociometer mechanisms across days, people, and nations. *Journal of Personality and Social Psychology*, 95(1), 181-196. doi: 10.1037/0022-3514.95.1.181
- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29, 94-122.
- Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. *Psychological Science*, 16(4), 328-335. doi: 10.1111/j.0956-7976.2005.01535.x
- Dweck, C. S. (2008). Mindsets: How praise is harming youth and what can be done about it. *School Library Media Activities Monthly*, 24(5), 55-58.
- Education for All Handicapped Children Act (EHA), Pub. L. No. 94-142, 89 Stat. 773 (1975).
- Eisenberger, N. I., Inagaki, T. K., Muscatell, K. A., Byrne Haltom, K. E., & Leary, M. R. (2011). The neural sociometer: Brain mechanisms underlying state self-esteem. *Journal of Cognitive Neuroscience*, 23(11), 3448-3455.
- Elementary and Secondary Education Act (ESEA), Pub. L. No. 89-10, 79 Stat. 27 (1965).
- Emler, N. (2002). The costs and causes of low self-esteem. *Youth Studies Australia*, 21(3), 45-48.
- Ericsson, K. A., & Charness, N. (1994). Expert performance: Its structure and acquisition. *American Psychologist*, 48(8), 725-747.

- Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, *100*, 363-406.
- Erol, R. Y., & Orth, U. (2011). Self-esteem development from age 14 to 30 years: A longitudinal study. *Journal of Personality and Social Psychology*, *101*(3), 607-619.
- Erol, R. Y., & Orth, U. (2014). Development of self-esteem and relationship satisfaction in couples: Two longitudinal studies. *Developmental Psychology*, *50*(9), 2291-2303. doi: 10.1037/a0037370
- Every Student Succeeds Act (ESSA), Pub. L. No. 114-95, 129 Stat. 1802 (2015).
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.
- Foley Nicpon, M. (2015) The social and emotional development of twice-exceptional children. In M. Neihart, S. I. Pfeiffer, & T. L. Cross (Eds.), *Social and emotional development of gifted children* (2nd ed., pp. 29-40). Waco, TX: Prufrock Press.
- Foley Nicpon, M., Allmon, A., Sieck, B., & Stinson, R. D. (2011). Empirical investigation of twice-exceptionality: Where have we been and where are we going? *Gifted Child Quarterly*, *55*(1), 3-17. doi: 10.1177/0016986210382575
- Foley Nicpon, M., Assouline, S. G., & Colangelo, N. (2013). Twice-exceptional learners: Who needs to know what? *Gifted Child Quarterly*, *57*(3), 169-180. doi: 10.1177/0016986213490021
- Foley Nicpon, M., Rickels, H., Assouline, S. G., & Richards, A. (2012). Self-esteem and self-concept examination among gifted students with ADHD. *Journal for the Education of the Gifted*, *35*(3), 220-240. doi: 10.1177/0162353212451735
- Ford, D. Y. (1998). The underrepresentation of minority students in gifted education: Problems and promises in recruitment and retention. *Journal of Special Education*, *32*(1), 4-14.
- Fugate, C. M., Zentall, S. S., & Gentry, M. (2013). Creativity and working memory in gifted students with and without characteristics of attention deficit hyperactivity disorder: Lifting the mask. *Gifted Child Quarterly*, *57*(4), 234-246. doi: 10.1177/0016986213500069
- Gagné, F. (1985). Giftedness and talent: Reexamining a reexamination of the definitions. *Gifted Child Quarterly*, *29*(3), 103-112. doi: 10.1177/001698628502900302
- Gagné, F., & Gagnier, N. (2004). The socio-affective and academic impact of early entrance to school. *Roeper Review*, *26*(3), 128-138. doi: 10.1080/02783190409554258

- Gallagher, J. J. (1991). Programs for gifted students: Enlightened self-interest. *Gifted Child Quarterly*, 35(4), 177-178. doi: 10.1177/001698629103500403
- Garaigordobil, M., Pérez, J. I., & Mozaz, M. (2008). Self-concept, self-esteem and psychological symptoms. *Psicothema*, 20(1), 114-123.
- Geake, J. G., & Gross, M. U. M. (2008). Teachers' negative affect toward academically gifted students: An evolutionary psychological study. *Gifted Child Quarterly*, 52, 217-231. doi: 10.1177/0016986208319704
- Gloss, G. G. (1969). *Sputnik Plus Ten; Ohio's program for the gifted, 1957-1967*. Columbus: Division of Special Education, Ohio Department of Education.
- Gravetter, F., & Wallnau, L. (2014). *Essentials of statistics for the behavioral sciences* (8th ed.). Belmont, CA: Wadsworth.
- Grimes, P. W., Millea, M. J., & Woodruff, T. W. (2004). Grades – who's to blame? Student evaluation of teaching and locus of control. *Journal of Economic Education*, 35(2), 129-47.
- Hambrick, D. Z., Oswald, F. L., Altmann, E. M., Meinz, E. J., Gobet, F., & Campitelli, G. (2013). Deliberate practice: Is that all it takes to become an expert? *Intelligence*. Retrieved from: <http://dx.doi.org/10.1016/j.intell.2013.04.001>
- Hannah, C. L., & Shore, B. M. (1995). Metacognition and high intellectual ability: Insights from the study of learning-disabled gifted students. *Gifted Child Quarterly*, 39(2), 95-108. doi: 10.1177/001698629503900206
- Hannah, C. L., & Shore, B. M. (2008). Twice-exceptional students' use of metacognitive skills on a comprehension monitoring task. *Gifted Child Quarterly*, 52(1), 3-18. doi:10.1177/0016986207311156
- Hanushek, E. A., Peterson, P. E., & Woessmann, L. (2010). U. S. math performance in global perspective: How well does each state do at producing high-achieving students? (PEPG Report No. 10-19). Cambridge, MA: Harvard's Program on Education Policy and Governance and *Education Next*. Retrieved July 31, 2013, from http://www.hks.harvard.edu/pepg/PDF/Papers/PEPG10-19_HanushekPetersonWoessmann.pdf
- Hanushek, E. A., & Woessmann, L. (2011). How much do educational outcomes matter in OECD countries? *Economic Policy*, 26(67), 427-491. doi: 10.1111/j.1468-0327.2011.00265.x
- Hashimoto, T., Hikaru, T., Yasuyuki, T., Sekiguchi, A., & Nouchi, R. (2015). Neuroanatomical correlates of the sense of control: Gray and white matter volumes associated with an internal locus of control. *NeruoImage*, 119, 146-151.

- Heiman, T., & Preceel, K. (2003). Students with disabilities in higher education: Academic strategies profile. *Journal of Learning Disabilities, 36*(3), 248-258.
- Henderson, G., & W. Bryan. (2004). *Psychosocial aspects of disability (3rd ed.)*. Springfield, IL: Charles C. Thomas.
- Hertzog, C., Lindenberger, U., Ghisletta, P., & Oertzen, T. (2006). On the power of multivariate latent growth curve models to detect correlated change. *Psychological Methods, 11*(3), 244-252. doi: 10.1037/1082-989X.11.3.244
- Heyman, W. B. (1990). The self-perception of a learning disability and its relationship to academic self-concept and self-esteem. *Journal of Learning Disabilities, 23*(8), 472-475.
- Hoge, R. D., & Renzulli, J. S. (1991). *Self-concept and the gifted child (RBDM 9104)*. Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.
- Hoge, R. D., & Renzulli, J. S. (1993). Exploring the link between giftedness and self-concept. *Review of Educational Research, 63*(4), 449-465. doi: 10.3102/00346543063004449
- Individuals With Disabilities Education Improvement Act (IDEA), Pub. L. No. 108-446, 118 Stat. 2647 (2004).
- Ingels, S. J., Abraham, S. Y, Karr, R., Spencer, B. D., & Frankel, M. R. (1990). *Data file user's manual: National Educational Longitudinal Study of 1988*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- Ingels, S. J., & Quinn, P. (1996). *Technical Report: Sample Exclusion in NELS:88*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- James, W. (1890). *The principles of psychology*. New York: Holt.
- Jones, J. (2012). Factors associated with self-concept: Adolescents with intellectual and development disabilities share their perspectives. *Intellectual and Developmental Disabilities, 50*(1), 31-40.
- Ju, S., Zhang, D., & Katsiyannis, A. (2013). Self-concept and academic achievement for students with disabilities: An analysis of SEELS data. *Journal of Disability Policy Studies, 24*(1), 4-14. Doi: 10.1177/1044207311427727
- Kahne, J. (1996). The politics of self-esteem. *American Educational Research Journal, 33*(1), 3-22.
- Kauder, J. K. (2009). *The impact of twice-exceptionality on self-perceptions*. (Doctoral dissertation). Retrieved from <http://ir.uiowa.edu/etd/301>

- Kaufmann, F. A., & Castellanos, F. X. (2000). Attention-deficit/hyperactivity disorder in gifted students. In K. A. Heller, F. J. Monks, R. J. Sternberg, & R. F. Subotnik (Eds.), *International handbook of giftedness and talent* (2nd ed., pp. 621-632). Amsterdam: Elsevier.
- Kaufmann, F. A., Kalbfleisch, M. L., & Castellanos, F. X. (2000). *Attention deficit disorders and gifted students: What do we really know?* Storrs, CT: National Research Center on the Gifted and Talented, University of Connecticut.
- Kazdin, A. E., & Bass, D. (1989). Power to detect differences between alternative treatments in comparative psychotherapy outcome research. *Journal of Consulting and Clinical Psychology, 57*, 138-147.
- Keating, D. P. (2009). Developmental science and giftedness: An integrated life-span framework. In F. D. Horowitz, R. F. Subotnik, & D. J. Matthews. (Eds.), *The development of giftedness and talent across the life span* (pp. 189-208). Washington, DC: American Psychological Association.
- Keller, J., & Blomann, F. (2008). Locus of control and the flow experience: An experimental analysis. *European Journal of Personality, 22*(7), 589-607. doi: 10.1002/per.692
- Kennedy, B. L., Lynch, G. V., & Schwab, J. J. (1998). Assessment of locus of control in patients with anxiety and depressive disorders. *Journal of Clinical Psychology, 54*(4), 509-515.
- King, E. W. (2005). Addressing the social and emotional needs of twice-exceptional students. *Teaching Exceptional Children, 38*(1), 16-20.
- Kirkpatrick, M. A., Stant, K., Downes, S., & Gaither, L. (2008). Perceived locus of control and academic performance: Broadening the construct's applicability. *Journal of College Student Development, 49*(5), 486-496. doi: 10.1353/csd.0.0032.
- Konstantopoulos, S., Modi, M., & Hedges, L. V. (2001). Who are America's gifted? *American Journal of Education, 109*(3), 344-382.
- Kovach, K., & Wilgosh, L. R. (1999). Learning and study strategies and performance anxiety in postsecondary students with learning disabilities: A preliminary study. *Developmental Disabilities Bulletin, 27*, 46-57.
- Kozina, A., & Mlekuž, A. (2014). The predictive power of attribution styles for PISA 2012 achievement: International and national perspective. *Solsko Polje, 25*(5/6), 101-120.
- Kramer, R. (1991). *Ed school follies: The miseducation of America's teachers*. New York: Free Press.
- Kulas, H. (1996). Locus of control in adolescence: A longitudinal study. *Adolescence, 31*(123), 721-729.

- Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology*, 68(3), 518-530.
- Marland, S. P. (1972). *Education of the gifted and talented. Volume 1: Report to the U.S. Congress by the U.S. Commissioner of Education*. Washington, DC: U.S. Government Printing Office.
- Marsh, H. W., & O'Mara, A. O. (2008). Reciprocal effects between academic self-concept, self-esteem, achievement, and attainment over seven adolescent years: Unidimensional and multidimensional perspectives of self-concept. *Personality and Social Psychology Bulletin*, 34(4), 542-552. doi: 10.1177/0146167207312313
- Marsh, H. W., Parada, R. H., Yeung, A. S., & Healey, J. (2001). Aggressive school troublemakers and victims: A longitudinal model examining the pivotal role of self-concept. *Journal of Educational Psychology*, 93, 411-419. doi: 10.1037/0022-0663.93.2.411
- Mash, E. J., & Wolfe, D. A. (2005). *Abnormal child psychology*. Belmont, CA: Wadsworth.
- McCallum, R. S., Bell, S. M., Coles, J. T., Miller, K. C., Hopkins, M. B., & Hilton-Prillhart, A. (2013). A model for screening twice-exceptional students (gifted with learning disabilities) within a response to intervention paradigm. *Gifted Child Quarterly*, 57(4), 209-222. doi: 10.1177/0016986213500070
- Meinz, E. J., & Hambrick, D. Z. (2010). Deliberate practice is necessary but not sufficient to explain individual differences in piano sight-reading skill: the role of working memory capacity. *Psychological Science*, 21(7), 914-919. doi: 10.1177/0956797610373933
- Monroe, J. (2002). Gifted learning disabled students. *Australian Journal of Learning Disabilities*, 7(2), 20-30. doi: 10.1080/19404150209546698
- Morin, A. J. S., Mañano, C., Marsh, H. W., Nagengast, B., & Janosz, M. (2013). School life and adolescents' self-esteem trajectories. *Child Development*, 84(6), 1967-1988.
- Morningstar, M. E., Kurth, J. A., & Johnson, P. E. (2017). Examining national trends in educational placements for students with significant disabilities. *Remedial and Special Education*, 38(1), 3-12. doi: 10.1177/0741932516678327
- Mruk, C. J. (2013a). Defining self-esteem as a relationship between competence and worthiness: How a two-factor approach integrates the cognitive and affective dimensions of self-esteem. *Polish Psychological Bulletin*, 44(2), 157-164. doi: 10.2478/ppb-2013-0018
- Mruk, C. J. (2013b). *Self-esteem and positive psychology*, (4th ed.). New York, NY: Springer Publishing Company.

- National Association for Gifted Children, The Council of State Directors of Programs for the Gifted. (2009). *2008-2009 State of the states in gifted education: National policy and practice data*. Washington, DC: National Association for Gifted Children.
- National Center for Education Statistics. (2013). *The Nation's Report Card: Trends in American Progress 2012*. Institute of Education Sciences, U.S. Department of Education: Washington, D.C.
- National Center for Education Statistics. (1997). *Profiles of Students with Disabilities as Identified in NELS:88*. Institute of Education Sciences, U.S. Department of Education: Washington, D.C.
- National Defense Education Act (NDEA), Pub. L. No. 85-864, 72 Stat. 1580 (1958).
- Neihart, M. (2000). Gifted children with Asperger's Syndrome. *Gifted Child Quarterly*, 44(4), 222-230. doi: 10.1177/001698620004400403
- Neihart, M. (2003). Gifted children with attention deficit hyperactivity disorder (ADHD). *Eric Clearinghouse on Disabilities and Gifted Education*, 1-7.
- Neumeister, K. S. (2015). Perfectionism in gifted students. In M. Neihart, S. I. Pfeiffer, & T. L. Cross (Eds.), *Social and emotional development of gifted children* (2nd ed., pp. 29-40). Waco, TX: Prufrock Press.
- Ng, T. W. H., Sorensen, K. L., & Eby, L. T. (2006). Locus of control at work: a meta-analysis. *Journal of Organizational Behavior*, 27, 1057-1087. doi: 10.1002/job.416
- Nicpon, M. F. (2015). The social and emotional development of twice-exceptional children. In M. Neihart, S. I. Pfeiffer, & T. L. Cross (Eds.), *Social and emotional development of gifted children* (2nd ed., pp. 103-118). Waco, TX: Prufrock Press.
- Nicpon, M. F., & Pfeiffer, S. I. (2011). High ability students: New ways to conceptualize giftedness and provide psychological services in the schools. *Journal of Applied School Psychology*, 27(4), 293-305. doi: 10.1080/15377903.2011.616579
- Nielsen, E., Higgins, D. H., & Hammond, A. (1995). *Twice exceptional learners: Gifted students with disabilities*. Albuquerque: University of New Mexico.
- No Child Left Behind Act of 2004 (NCLB), Pub. L. No 107-110 (Title IX, Part A, Definitions (22) (2002); 20 U.S.C. Sec 7802 (22) (2004).
- Now, the California task force to promote self-esteem. (1986, October 11). *New York Times*. Retrieved from <http://www.nytimes.com/1986/10/11/us/now-the-california-task-force-to-promote-self-esteem.html>

- Olenchak, F. R. (1995). Effects of enrichment on gifted/learning-disabled students. *Journal for the Education of the Gifted*, 18(4), 385-398. doi: 10.1177/016235329501800403
- Olenchak, F. R. (2009). Effects of talents unlimited counseling on gifted/learning disabled students. *Gifted Education International*, 25(25), 144-164.
- Orth, U., & Robins, R. W. (2014). The development of self-esteem. *Current Directions in Psychological Science*, 23(5), 381-387. doi: 10.1177/0963721414547414
- Orth, U., Robins, R. W., & Widaman, K. F. (2011). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, 102(6), 1271-1288. doi: 10.1037/a0025558
- Orth, U., Trzesniewski, K. H., & Robins, R. W. (2010). Self-esteem development from young adulthood to old age: a cohort-sequential longitudinal study. *Journal of Personality and Social Psychology*, 98(4), 645-658. doi: 10.1037/a0018769
- Paulhus, D. L., Robins, R. W., Trzesniewski, K. H., & Tracy, J. L. (2004). Two replicable suppressor situations in personality research. *Multivariate Behavioral Research*, 39(2), 303-328. doi: 10.1207/s15327906mbr3902_7
- Perleth, C., & Heller, K. A. (1994). The Munich longitudinal study of giftedness. In R. F. Subotnik & K. D. Arnold (Eds.), *Beyond Terman: Contemporary longitudinal studies of giftedness and talent* (pp. 77-114). Norwood, NJ: Ablex Publishing Corporation.
- Perry, R. P., Hechter, F. J., Menec, V. H., & Weinberg, L. E. (1993). Enhancing achievement motivation and performance in college students: An attributional retraining perspective. *Research in Higher Education*, 34(6), 687-723.
- Pfeiffer, S. I. (2008). *Handbook of giftedness in children: Psychoeducational theory, research, and best practices*. New York: Springer.
- Pfeiffer, S. I. (2012). Current perspectives on the identification and assessment of gifted students. *Journal of Psychoeducational Assessment*, 30(1), 3-9. doi: 10.1177/07342829114281923
- Pfeiffer, S. (2013). *Serving the gifted: Evidence-based clinical and psycho-educational practice*. New York: Routledge.
- Pfeiffer, S. I., & Burko, J. (2015). Counseling the gifted. In M. Neihart, S. I. Pfeiffer, & T. L. Cross (Eds.), *Social and emotional development of gifted children* (2nd ed., pp. 29-40). Waco, TX: Prufrock Press.
- Pfeiffer, S. I., & Foley Nicpon, M. (2017). Knowns and unknowns about students with disabilities who also happen to be intellectually gifted. In S. B. Kaufan (Ed.), *Celebrating Twice Exceptionality*. New York: Oxford University Press.

- Pfeiffer, S. I., Valler, E., Burko, J., Yarnell, J., Branagan, A., Smith, S. M., ... Saintil, M. (2016). Focusing on strengths of the heart in understanding success and psychological well-being of high-ability students. *Austin Child & Adolescent Psychiatry, 1*(1), 1002.
- Plomin, R., Shakeshaft, N. G., McMillan, A., & Trzaskowski, M. (2013). Nature, nurture, and expertise. *Intelligence*. Retrieved from: <http://dx.doi.org/10.1016/j.intell.2013.06.008>
- Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent growth curve modeling*. Thousand Oaks, CA: Sage Publications.
- Pruessner, J. C., Baldwin, M. W., Dedovic, K., Renwick, R., Khalili Mahani, N., Lord, C., Meaney, M., & Lupien, S. (2005). Self-esteem, locus of control, hippocampal volume, and cortisol regulation in young and old adulthood. *NeuroImage, 28*(4), 815-826. doi: 0.1016/j.neuroimage.2005.06.014
- Reaser, A., Prevatt, F., Petscher, Y., & Proctor, B. (2007). The learning and study strategies of college students with ADHD. *Psychology in the Schools, 44*(6), 627-638. doi: 10.1002/pits.20252
- Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly, 44*(3), 152-170. doi: 10.1177/001698620004400302
- Reis, S. M., & Renzulli, J. S. (2010). Is there still a need for gifted education? An examination of current research. *Learning and Individual Differences, 20*, 308-317.
- Reitz, A. K., Motti-Stefanidi, F., & Asendorpf, J. B. (2016). Me, us, and them: Testing sociometer theory in a socially diverse real-life context. *Journal of Personality and Social Psychology, 110*(6), 908-920. doi: 10.1037/pspp0000073
- Renzulli, J. S. (1978). What makes giftedness? Reexamining a definition. *The Phi Delta Kappan, 60*(3), 180-184.
- Renzulli, J. S. (2000). The identification and development of giftedness as a paradigm for school reform. *Journal of Science Education and Technology, 9*(2), 95-114.
- Renzulli, J. S. (2011a). More changes needed to expand gifted identification and support. *The Phi Delta Kappan, 92*(8), 61.
- Renzulli, J. S. (2011b). Theories, actions, and change: An academic journey in search of finding and developing high potential in young people. *Gifted Child Quarterly, 55*(4), 305-308. doi: 10.1177/0016986211421875
- Riaz, Z., Shahzad, S., Ahmad, S., & Khanam, S. J. (2013). Psychological adjustment among intellectually gifted secondary school children. *Pakistan Journal of Psychology, 44*(2), 23-34.

- Rimm, S. (2002). Peer pressures and social acceptance of gifted students. In M. Neihart, S. M. Reis, N. M. Robinson, & S. M. Moon (Eds.), *The social and emotional development of gifted children* (pp. 13-18). Waco, TX: Prufrock Press.
- Rinn, A. N., Reynolds, M. J., & McQueen, K. S. (2011). Perceived social support and the self-concepts of gifted adolescents. *Journal for the Education of the Gifted*, 34(3), 367-396.
- Robertson, I., & Cooper, C. L. (2013). Resilience. *Stress and Health*, 29(3), 175-176. doi:10.1002/smi.2512
- Robertson, S. G., Pfeiffer, S. I., & Taylor, N. (2011). Serving the gifted: A national survey of school psychologists. *Psychology in the Schools*, 48(8), 786-799. doi: 10.1002/pits
- Roebers, C. M., Cimeli, P, Röthlisberger, M, & Neuenschwander, R. (2012). Executive functioning, metacognition, and self-perceived competence in elementary school children: an explorative study on their interrelations and their role for school achievement. *Metacognition and Learning*, 7, 151-173. doi: 10.1007/s11409-012-9089-9
- Rosenberg, M. (1965). *Society and the adolescent child*. Princeton, NJ: Princeton University Press.
- Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.
- Rosenberg, M, Schooler, C., & Schoenbach, C. (1989). Self-esteem and adolescent problems: Modeling reciprocal effects. *American Sociological Review*, 54(6), 1004-1018.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts, different outcomes. *American Sociological Review*, 60(1), 141-156.
- Ross, C. E., & Broh, B. A. (2000). The roles of self-esteem and the sense of personal control in the academic achievement process. *Sociology of Education*, 73(4), 270-284.
- Rothman, H. R., & Cosden, M. (1995). The relationship between self-perception of a learning disability and achievement, self-concept and social support. *Learning Disability Quarterly*, 18(3), 203-212.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1-28. doi: 10.1037/h0092976
- Ruban, L. M., McCoach, B., McGuire, J.M., & Reis, S. M. (2003). The differential impact of academic self-regulatory methods on academic achievement among university students with and without learning disabilities. *Journal of Learning Disabilities*, 36(3), 270-286.

- Ruthsatz, J., Ruthsatz-Stephens, K., & Ruthsatz, K. (2014). The cognitive bases of exceptional abilities in child prodigies by domain: Similarities and differences. *Intelligence*. Retrieved from: <http://dx.doi.org/10.1016/j.intell.2014.01.010>
- Ryon, H. S., & Gleason, M. E. J. (2014). The role of locus of control in daily life. *Personality and Social Psychology Bulletin*, 40(1), 121-131. doi: 10.1177/0146167213507087
- Saadat, M., Ghasemzadeh, A., Karami, S., & Soleimani, M. (2012). Relationship between self-esteem and locus of control in Iranian university students. *Social and Behavioral Sciences*, 31, 530-535. doi: 10.1016/j.sbspro.2011.12.099
- Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: Exploring the universal and culture-specific features of global self-esteem. *Journal of Personality and Social Psychology*, 89(4), 623-642. doi: 10.1037/0022-3514.89.4.623
- Sciabarra, C. M. (2015). Assessing the legacy of Nathaniel Branden. *Journal of Ayn Rand Studies*, 15(1), 1-2.
- Shavinina, L. V. (2010). What does research on child prodigies tell us about talent development and expertise acquisition? *Talent Development & Excellence*, 2(1), 29-49.
- Shechtman, Z., & Silektor, A. (2012). Social competencies and difficulties of gifted children compared to nongifted peers. *Roeper Review*, 34, 63-72. doi: 10.1080/02783193.2012.627555
- Shepherd, S., Fitch, T. J., Owen, D., & Marshall, J. L. (2006). Locus of control and academic achievement in high school students. *Psychological Reports*, 98, 318-322. doi: 10.2466/PRO.98.2.3 18-322
- Sherman, A. C., Higgs, G. E., & Williams, R. L. (1997). Gender differences in the locus of control construct. *Psychology & Health*, 12(2), 239-248. doi: 10.1080/08870449708407402
- Shogren, K. A., Bovaird, J. A., Palmer, S. B., & Wehmeyer, M. L. (2010). Locus of control orientations in students with intellectual disability, learning disabilities, and no disabilities: A latent growth curve analysis. *Research and Practice for Persons with Severe Disabilities*, 26(3-4), 80-92.
- Sim, J. J., Goyle, A., McKedy, W., Eidelman, S., & Correll, J. (2014). How social identity shapes the working self-concept. *Journal of Experimental Social Psychology*, 55, 271-277. doi: 10.1016/j.jesp.2014.07.015

- Sinclair, S., Blais, M. A., Gansler, D. A., Sandberg, E., Bistis, K., & LoCicero, A. (2010). Psychometric properties of the Rosenberg Self-Esteem Scale: Overall and across demographic groups living within the United States. *Evaluation and the Health Professions, 33*(1), 56-80. doi: 10.1177/0163278709356187
- Smith, S. R. (2009). A dynamic ecological framework for differentiating the primary curriculum. *Gifted and Talented International, 24*(2), 9-20.
- Sousa, D. A. (2009). *How the gifted brain learns, (2nd ed)*. Thousand Oaks, CA: Corwin.
- Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin, 139*(1), 213-240. doi: 10.1037/a0028931
- Sternberg, R. J., & Grigorenko, E. L. (2004). Intelligence and culture: How culture shapes what intelligence means, and the implications for a science of well-being. *The Royal Society, 359*(1449), 1427-1434. doi: 10.1098/rstb.2004.1514
- Sternberg, R. J., & Zhang, L-F. (1995). What do we mean by giftedness? A pentagonal implicit theory. *Gifted Child Quarterly, 39*(2), 88-94. doi: 10.1177/001698629503900205
- Subban, P. (2006). Differentiated instruction: A research basis. *International Education Journal, 7*(7), 935-947.
- Subotnik, R. F., Olszewski-Kubilius, P., & Worrell, F. C. (2011). Rethinking giftedness and gifted education: A proposed direction forward based on psychological science. *Psychological Science in the Public Interest, 12*(1), 3-54. doi: 10.1177/1529100611418056
- Swann, W. B., Jr., Chang-Schneider, C., & McClarty, K. L. (2007). Do people's self-views matter? Self-concept and self-esteem in everyday life. *American Psychologist, 62*(2), 84-94. doi: 10.1037/0003-066X.62.2.84
- Swanson, H. L., & Ching-Ju, H. (2009). Reading disabilities in adults: A selective meta-analysis of the literature. *Review of Educational Research, 79*(4), 1362-1390. doi: 10.3102/0034654309350931
- Swiatek, M. A., & Dorr, R. M. (1998). Revision of the social coping questionnaire: Replication and extension of previous findings. *Journal of Secondary Gifted Education, 10*, 252-259.
- Tabachnick, B.G., & Fidell, L. S. (2007). *Using Multivariate Statistics (5th ed., pp. 73)*. Boston, MA: Pearson Education.
- Tannenbaum, A. J. (1983). *Gifted children: Psychological and educational perspectives*. New York: Macmillan.

- Tannenbaum, A. J. (1997). The meaning and making of giftedness. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 27-42). Boston: Allyn and Bacon.
- Trail, B. A. (2011). *Twice-exceptional gifted children: Understanding, teaching, and counseling gifted students*. Waco, TX: Prufrock Press, Inc.
- Trainin, G., & Swanson, H. L. (2005). Cognition, metacognition, and achievement of college students with learning disabilities. *Learning Disability Quarterly*, 28(4), 261-272.
- Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., & Caspi, A. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology*, 42, 381-390. doi: 10.1037/0012-1649.42.2.381
- U.S. Department of Education, National Center for Education Statistics, *National Education Longitudinal Study, 1988 (NELS:88); Base-Year, First, and Second Follow-up Surveys*.
- Usborne, E., & Taylor, D. M. (2010). The role of cultural identity clarity for self-concept clarity, self-esteem, and subjective well-being. *Personality and Social Psychology Bulletin*, 36(7), 883-897. doi: 10.1177/0146167210372215
- Utts, J. M., & Heckard, R. F. (2015). *Mind on Statistics* (5th ed., pp. 36). Stamford, CT: Cengage Learning.
- Van Boxtel, H. W., & Mönks, F. J. (1992). General, social, and academic self-concepts of gifted adolescents. *Journal of Youth and Adolescence*, 21(2), 169-186.
- Verma, J. P. (2016). *Repeated measures design for empirical researchers*. Hoboken, NJ: John Wiley & Sons.
- Vespi, L., & Yewchuk, C. (1992). A phenomenological study of the social/emotional characteristics of gifted learning disabled children. *Journal for the Education of the Gifted*, 16(1), 55-72. doi: 10.1177/016235329201600107
- Vialle, W., Heaven, P. C. L., & Ciarrochi, J. (2005). The relationship between self-esteem and academic achievement in high ability students: Evidence from the Wollongong Youth Study. *Australasian Journal of Gifted Education*, 14(2), 39-45.
- Wai, J. (2014). What does it mean to be an expert? *Intelligence*. Retrieved from: <http://dx.doi.org/10.1016/j.intell.2014.02.001>
- Wang, Z., & Su, I. (2013). Longitudinal factor structure of general self-concept and locus of control among high school students. *Journal of Psychoeducational Assessment*, 31(6), 554-565. doi: 10.1177/0734282913481651
- Ward, S. (1996). Filling the world with self-esteem: A social history of truth-making. *The Canadian Journal of Sociology*, 21(1), 1-23. doi: 10.2307/3341430

- Webb, J. T., Amend, E. R., Webb, N. E., Goerss, J., Beljan, P., & Olenchak, R. (2004). *Misdiagnosis and dual diagnosis of gifted children and adults: ADHD, bipolar, OCD, Asperger's, depression, and other disorders*. Scottsdale: Great Potential Press.
- Wei, X., & Marder, C. (2012). Self-concept development of students with disabilities. *Remedial and Special Education, 33*(4), 247-257. doi: 10.1177/0741932510394872
- Weiner, B. (2010). The development of an attribution-based theory of motivation: A history of ideas. *Educational Psychologist, 45*(1), 28-36. doi: 10.1080/00461520903433596
- Weitlauf, A. S., & Cole, D. A. (2012). Cognitive development masks support for attributional style models of depression in children and adolescents. *Journal of Abnormal Child Psychology, 40*, 849-862. doi: 10.1007/s10802-012-9617-8
- Yan, K., & Haihui, Z. (2005). A decade comparison: Self-concept of gifted and non-gifted adolescents. *International Education Journal, 6*(2), 224-231.
- You, S., Hong, S., & Ho, H.-Z. (2011). Longitudinal effects of perceived control on academic achievement. *The Journal of Educational Research, 104*(4), 253-266. doi: 10.1080/00220671003733807
- Zeigler-Hill, V. (2011). The connections between self-esteem and psychopathology. *Journal of Contemporary Psychotherapy, 41*(3), 157-164. doi: 10.1007/s10879-010-9167-8
- Zeigler-Hill, V., Myers, E. M., & Clark, B. (2010). Narcissism and self-esteem reactivity: The role of negative achievement events. *Journal of Research in Personality, 44*, 285-292. doi: 10.1016/j.jrp.2010.02.005
- Zerega, W. D., Jr., Tseng, M. S., & Greever, K. B. (1976). Stability and concurrent validity of the Rotter internal-external locus of control scale. *Educational and Psychological Measurement, 36*(2), 473-475.
- Zhang, Z., & RiCharde, R. S. (1999, April). *Freshman academic achievement: A structural equation model*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada.
- Zirkel, P. A. (2004). The case law on gifted education: A new look. *Gifted Child Quarterly, 48*(4), 309-314. doi: 10.1177/001698620404800405

BIOGRAPHICAL SKETCH

Lori Best is a doctoral candidate in the Combined Counseling Psychology and School Psychology Ph.D. program in the Department of Educational Psychology and Learning Systems in the College of Education at Florida State University. She completed her pre-doctoral internship at Texas A&M University's Student Counseling Service in 2013. She is a current member of APA Division 17 (Counseling). Lori's clinical experiences primarily include community and college counseling centers, correctional and forensic settings, public schools, and private practice. Her theoretical orientation in the provision of clinical services most closely aligns to interpersonal therapy, with an integrative and flexible approach to treatment.

Lori's teaching and research interests include identity development, adjustment, and theories of cognitive aptitude and intelligence. She is particularly interested in adolescent and college student populations. Her teaching experiences include undergraduate courses in General Psychology, and Personal and Social Adjustment, as well as graduate-level courses in Psychological Assessment and Group Counseling as a Teaching Assistant. Her research publications relating to college students with attention disorders, and academic coaching, appear in the *Journal of Attention Disorders*.

An unexpected opportunity led to transitioning from educational and mental health settings to the corporate environment. Lori now works for a non-profit company as a Project Portfolio Manager. Core components of her role include data analysis and reporting, facilitating the governance and oversight of corporate initiatives, aligning specific initiatives to the overall enterprise strategy, and facilitating planning processes that drive daily activities.