Article

Mindset Misconception? Comparing Mindsets, Perfectionism, and Attitudes of Achievement in Gifted, Advanced, and Typical Students

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Abstract

The study compared mindset beliefs, perfectionism, and achievement attitudes among gifted, advanced, and typical students in Grades 6 to 8 (N = 416) and explored the relationship between these variables. Welch's F tests revealed no statistically significant difference in growth or fixed mindset beliefs about intelligence among groups. Gifted and advanced students scored higher on Personal Standards (gifted, d = .68; advanced, d = .62) and Academic Self-Perception (gifted, d = .72; advanced, d = .58) compared with typical students. In hierarchical regression models, giftedness was a statistically significant predictor for Concern over Mistakes (β = .20) and Personal Standards (β = .27); both gifted (β = .31) and advanced (β = .17) status were statistically significant predictors for Academic Self-Perception. Various models showed a positive association between growth mindset and Positive Strivings Perfectionism and achievement attitudes and a positive association between fixed mindset and Evaluative Concerns Perfectionism. Findings suggest that gifted students are not more vulnerable to develop fixed mindsets.

Keywords

gifted, mindset, perfectionism, achievement attitudes, achievement motivation, implicit theories of intelligence, conceptions of ability

Introduction

In gifted education, much of our attention focuses on shaping potential into achievement. For talent to be realized, ability is necessary, but not sufficient. Other factors, including motivation, mindset, opportunity, creativity, task commitment, interest, and passion, are associated with outstanding achievement (Subotnik, Olszewski-Kubilius, & Worrell, 2011). Cognitive and psychosocial factors not only matter in talent development, they are also *malleable* in talent development. Therefore, it is imperative to study the variables that can either impede or progress potential and to examine the facility of developing contexts that shape these abilities, beliefs, and skills. In doing so, practitioners can guide students to follow a trajectory toward outstanding achievement. Among these variables of influence, implicit theories of intelligence (Dweck & Leggett, 1988; Elliott & Dweck, 1988) are important determinants to positive achievement strivings. How one views intelligence and effort can influence important behaviors, including how one responds to challenges, approaches goals, and reacts to setbacks. Accordingly, these motivations and behaviors relate to perfectionism and can impede achievement when manifested through procrastination, compulsive behaviors, fear of failing, and avoidance of challenges (Enns & Cox, 2002; Foster, 2007). So then, what do gifted students think and believe about their abilities, particularly their intelligence, and how might these thoughts and beliefs affect realization of potential? How do these beliefs and attitudes differ from other students, and what are the implications of these differences? How do these variables relate to one another? In the following literature review, we present an overview of how mindsets, perfectionism, and attitude toward achievement relate to conceptions of intelligence in gifted students.

Mindsets

Dweck's work on self-theories proposed that individuals hold implicit beliefs about abilities (Dweck & Leggett, 1988): They are either fixed (entity theory) or changeable (incremental theory). In several studies, Dweck's self-theories have been found to influence achievement and motivation (e.g.,

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Ahmavaara & Houston, 2007; Blackwell, Trzesniewski, & Dweck, 2007; Dweck & Leggett, 1988; Grant & Dweck, 2003). Self-theories were later extended to the concepts of fixed and growth mindsets, which include beliefs about effort and challenges (Dweck, 2006). Those with fixed mindsets believe that basic qualities, such as their intelligence, are fixed traits, whereas those with growth mindsets hold the incremental view that ability can change with effort and hard work. Individuals with a growth mindset value new challenges, learning, and even failure, viewing their abilities as a starting point to achieving success. On the contrary, those with a fixed mindset avoid changes and challenges, believing that talent alone creates success. Furthermore, they internalize their ability as a measure of self-worth and avoid tasks that may refute or challenge their abilities.

Mindsets are shaped, in part, by messages presented about ability (Kamins & Dweck, 1999; Mueller & Dweck, 1998). In a given classroom, students are likely to receive praise based on ability —"Look what you did! You are so smart!" Such person-centered praises have been linked to the development of entity/fixed beliefs (Mueller & Dweck, 1998). Given their high abilities, it is surmised that gifted students may especially be vulnerable to receive praise based on intelligence, influencing a potential preoccupation with maintaining a smart identity and avoiding challenges that threaten such identity (Dweck, 2012). Following, it has been argued that the gifted label itself is a form of intelligence praise and could influence challenge-avoidant behaviors (Mueller & Dweck, 1998). However, such arguments are based on implications of studies (e.g., Mueller & Dweck, 1998) that did not specifically examine samples of gifted students or the impact of the gifted label. When referring to her praise studies and fixed mindsets, Dweck (2012) explains, ". . . praising students for their intelligence puts them in this mindset, with all of its vulnerabilities. This research can help us understand why so many students labeled gifted are so fragile and at risk of not achieving their potential" (p. 16). Because Dweck's work has become mainstream, books, blogs, and other media have portrayed assertions to imply that the label of "giftedness" influences fixed mindsets (e.g., Boaler, 2018, 2016; Matthews & Foster, 2013; Ricci, 2013; Scott, 2013); yet such assertions are not based on empirical evidence aimed to study this specific link.

On the contrary, many studies with samples of gifted students indicate that gifted students hold beliefs about effort, challenge, and malleability aligned with incremental theory in various domains (e.g., Alexander, 1985; Esparza, Shumow, & Schmidt, 2014; Feldhusen & Dai, 1997; Guskin, Okolo, Zimmerman, & Peng, 1986; Makel, Snyder, Thomas, Malone, & Putallaz, 2015). For example, Feldhusen and Dai (1997) found that gifted adolescents participating in a gifted summer program held incremental beliefs about personal abilities and expressed preference for challenging academic opportunities. In a more recent study, Esparza et al. (2014) found that gifted middle school students were more likely than nongifted students to agree that intelligence is malleable (incremental) on pretests that were administered prior to receiving an intervention to promote growth mindset in the science content area. Worrell (2012) offered an explanation for patterns of growth mindset beliefs among gifted by hypothesizing,

> Students who are classified as gifted are already benefiting from the appropriate mindsets . . . the superior performance that resulted in the gifted classification is the result of multiple variables coalescing (Simonton, 2001), including a malleable conception of ability . . . (p. 154)

Furthermore, it has been suggested that gifted students may be able to hear entity messages about intelligence without it negatively affecting their view of its role in talent development, especially when the role of effort is emphasized with ability (Siegle, Rubenstein, Pollard, & Romey, 2010).

Snyder, Barger, Wormington, Schwartz-Bloom, and Linnen brink-Garcia (2013) examined the link between identified giftedness and implicit beliefs of intelligence finding that higher ability college students who had been identified as gifted held slightly higher entity beliefs than lower ability college students. However, no differences were found between higher ability students who had been given the gifted label at any time and those who had not. Though it might be tempting to interpret these findings to mean that gifted identification is associated with entity views, Snyder et al. (2013) were careful to emphasize,

> there were no observable differences between identified and nonidentified students in the current study and only a small interaction effect between identification status and academic ability was detected. This is consistent with prior research in that gifted students seem to largely endorse incremental beliefs . . . (p. 252)

When looking at the construct of giftedness, not just intelligence, some research has implied that gifted students interpret giftedness as a fixed trait. Seventy-two percent of the participating adolescent gifted students in a 1994 study reported that they believed giftedness to be stable (Manaster, Chan, Watt, & Wiehe, 1994). Still, others have shown that gifted students do not see giftedness as a fixed trait (Kerr, Colangelo, & Gaeth, 1988), rather something that relates to effort. More recently, Makel et al. (2015) worked with participants at a summer program to investigate adolescent gifted students' beliefs regarding giftedness and intelligence. The authors noted that because implicit beliefs about a construct tend to be domain specific, it is common to have an entity view of one construct and an incremental view of another. Accordingly, it is possible to have an incremental belief about either intelligence or giftedness and an entity belief concerning the other construct. It is also, thus, important to assess domains separately in order to yield accurate findings concerning students' implicit beliefs about a given

construct, whether intelligence, giftedness, or an academic subject area (Dweck, Chiu, & Hong, 1995; Makel et al., 2015; Quihuis, Bempechat, Jimenez, & Boulay, 2002). For example, in Makel and colleagues' (2015) study, gifted students reported stronger fixed beliefs about giftedness compared with the general intelligence domain; intelligence was generally viewed as more malleable than giftedness.

In sum, most studies support the notion that gifted students endorse incremental beliefs about intelligence as a separate construct (general intelligence domain); however, once conceptions of giftedness are introduced, the results are not as decisive. More studies are needed to study the mindsets of gifted students in school settings, not just residential summer programs or among college students. Comparative studies are also needed to further examine mindset orientations between gifted samples and other groups (Worrell, 2012). It is also important to further explore how mindset beliefs about intelligence may relate to other variables that may interfere with achievement, such as perfectionism and attitude toward achievement, especially if shifts in mindsets can accordingly alter maladaptive thoughts and attitudes.

Perfectionism

Achieving personal goals and high standards of performance are deemed desirable for many gifted students. As such, perfectionism is often linked with giftedness (Mofield & Parker Peters, 2015a; Schuler, 2002; Silverman, 1997; Speirs Neumeister, 2007; Speirs Neumeister & Finch, 2006), though much of the literature suggests that gifted students display only higher rates of adaptive/healthy perfectionism than nongifted comparisons (LoCicero & Ashby, 2000; Shaunessey, Suldo, & Friedrich, 2011; Vandiver & Worrell, 2002) or suggests that there are no differences in levels of perfectionism between the groups (Parker & Mills, 1996; Parker, Portesova, & Stumpf, 2001). While research is not conclusive on the rates or amount at which gifted students experience perfectionism, it is difficult to argue that perfectionism does not have a presence among gifted students. Perfectionism is associated with giftedness as gifted students are often capable of achieving high standards of excellence, even perfection. Second, gifted students are valued for their high performance, often equating self-worth with performance (Sowa, McIntire, May, & Bland, 1994). Third, gifted students may strive for perfection as a means to challenge themselves in response to nonchallenging curriculum, as a lack of challenge has been noted as a contributor to the manifestation of perfectionism (Speirs Neumeister, Williams, & Cross, 2009). Finally, their heightened intellectual and emotional intensities in the form of over excitabilities may contribute to the manifestation of perfectionism in some gifted students (Cross, 1997; Mofield & Parker Peters, 2015b) though it is acknowledged that not all gifted students exhibit over excitabilities, and recent work has supported understanding this construct within the five-factor concept of openness (Vuyk, Krieshok, & Kerr, 2016).

Most definitions of perfectionism relate the construct to striving for excessively high standards; however, different motivations, behaviors, and outcomes are associated with how these high goals are approached. Hamachek (1978), an early theorist of perfectionism, differentiated two types: neurotic and normal perfectionists. Neurotic perfectionists engage in harsh self-criticism and experience shame and guilt when evaluating their behaviors against high standards, whereas normal perfectionists can enjoy their work and experience joy in the striving toward excellence. The idea of a multidimensional theory of perfectionism was continued by others (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991).

A series of studies have been conducted with gifted populations to validate typologies of healthy, unhealthy, and nonperfectionists (Chan, 2007, 2009; Mofield & Parker Peters, 2015a; Parker & Mills, 1996; Schuler, 2000). Most recently, Speirs Neumeister (2016) has recommended that gifted education research implement the common language of perfectionism used in studies outside our field (e.g., Gaudreau & Thompson, 2010; Stoeber & Otto, 2006). By deconstructing typologies into two factors (Positive Strivings and Evaluative Concerns), the field can be more consistent with measurement and have a finer focus when addressing perfectionism with students.

Evaluative Concerns Perfectionism and Positive Strivings Perfectionism manifest from varied motivations and can lead to positive or negative outcomes. If one's striving for perfection is motivated out of a fear of failure or to maintain a sense of self-worth, achievement behaviors are likely to be associated with avoiding challenging tasks. This maladaptive type of perfectionism is defined by the negative evaluative concerns of the individual (Evaluative Concerns; Stoeber & Rambow, 2007) and has been associated with eating disorders (Bardone-Cone et al., 2007), depression (Brown & Beck, 2002), anxiety (Kawamura, Hunt, Frost, & DiBartolo, 2001), and avoidance coping (Dixon, Lapsley, & Hanchon, 2004; Mofield, Parker Peters, & Chakraborti-Ghosh, 2016). However, if one's achievement strivings are rooted from a hope of success and the need to fulfill internal needs of mastery and personal growth, behaviors are associated with positive outcomes such as conscientiousness, life satisfaction, achievement, and active coping (Positive Strivings; Chan, 2007; Slade & Owens, 1998; Stoeber & Otto, 2006; Stoeber & Rambow, 2007). On the other hand, if high adaptive perfectionism coexists with high levels of maladaptive perfectionism, individuals continue to experience the negative affect associated with maladaptive perfectionism, such as lower sense of security, poor self-image, and dysfunctional coping (Dixon et al., 2004). This is concerning since an individual may mask negative self-critical tendencies behind the pursuit of seemingly healthy standards of excellence (Mofield et al., 2016).

Among a sample of gifted adolescents, Evaluative Concerns Perfectionism has been found to be associated with avoidance orientations away from an academic stressor (e.g., getting a B), whereas Positive Strivings Perfectionism has been associated with constructively approaching a stressor (Mofield et al., 2016). For those who avoid challenges, behaviors such as choosing not to take an honors course for fear of getting a B demonstrates the avoidance of risking "failure," resulting in missed opportunities for learning, critical feedback, and challenge, all necessary components for actualizing achievement. Therefore, these missed opportunities may translate to underachievement, the discrepancy between potential and performance (Whitmore, 1980). This goes hand in hand with Dweck's self-theories, as formerly discussed. For students who endorse entity beliefs, challenges threaten one's belief that he or she is competent, so challenges are avoided. Given that these factors can potentially inhibit achievement, it is important to study entity beliefs, avoidance orientations, and maladaptive perfectionism as they relate to giftedness.

A number of studies demonstrate that types of perfectionism are linked to entity or incremental beliefs. Shih (2011) studied perfectionism among Taiwanese eighth grade students (not necessarily gifted), revealing that adaptive perfectionism was positively associated with incremental beliefs, positive emotions, and behavioral self-regulation, whereas, maladaptive perfectionism was positively related with entity beliefs, negative emotions, self-handicapping, and contingent self-worth. A similar pattern was found among gifted Chinese students in Grades 5 to 12; gifted students classified as healthy perfectionists scored highest on happiness and life satisfaction compared with unhealthy perfectionists and nonperfectionists; they also earned higher scores on growth mindset measures compared with nonperfectionists (Chan, 2012). Accordingly, gifted students classified as unhealthy perfectionists scored highest on the measure of fixed mindset.

Dweck's work on self-theories has shown that those who adopt incremental beliefs about intelligence are more likely to adopt mastery goals, whereas, those who adopt entity beliefs are more likely to adopt performance goals (Dweck & Leggett, 1988). Using the trichotomous goal orientation model (mastery, performance approach, performance avoidance; Elliot & Harackiewicz, 1996), Speirs Neumeister and Finch (2006) found that gifted college students who score highly on socially prescribed (maladaptive) perfectionism adopted either performance approach goals, reflecting a desire to appear competent to others, or performance avoidance goals, showing a desire to avoid something in which they may appear incompetent to others. Self-oriented (adaptive) perfectionists adopted more mastery or performance approach goals.

Overall, these findings show a clear association between perfectionism and beliefs about intelligence, effort, goals, and approaches to challenge among adolescent populations and populations of gifted students (including college students). Self-theories (entity vs. incremental beliefs) have an impact on achievement strivings, including the striving toward perfection.

Attitudes Toward Achievement

As we pose the question, "What do gifted students think and believe about their intelligence and how might these thoughts and beliefs affect realization of potential?" it is important to examine variables beyond mindsets and perfectionism, including those associated with underachievement. Specifically, these variables target *attitude toward achievement* and include five psychological factors: academic self-perceptions, motivation/self-regulation, goal valuation, attitude toward school, and attitude toward teacher (McCoach & Siegle, 2003).

Gifted underachievers are often described as having low academic self-concepts (see Reis & McCoach, 2000; Whitmore, 1980), though McCoach and Siegle (2003) found that self-concepts, measured as academic self-perception, did not differentiate gifted achievers from gifted underachievers (underachievers defined as students with a severe discrepancy between expected achievement and actual achievement). Self-concept includes beliefs about one's abilities, competence, and associated self-worth, and academic self-concept can influence how one persists in challenges and activities (Ames, 1990). So then, is entity theory related to low academic self-perception, and is incremental theory related to high academic self-perception? Though the relationship between self-theories and academic self-perception has not been explored in research among gifted students, self-perceptions and social comparisons are thought to influence achievement. Relevant to self-theories, when a student is concerned about being perceived as dumb or not good enough, it is a threat to self-worth; therefore, opportunities that rest on ability-based performance might be avoided, resulting in underachievement (Byrne, 1996; Covington, 1992).

Additionally, motivation and self-regulation are intertwined factors that influence achievement (McCoach & Siegle, 2003). Self-regulation involves the active participation of one's own learning and pursuit of goals, but students must be motivated to use such self-regulatory strategies (Pintrich & DeGroot, 1990). Furthermore, motivation has been found to be highly related to attitude toward school and achievement goals (Abu-Hamour & Al-Hmouz, 2013; See Tan, Kian Tan, & Surendran, 2016), and significant differences were found between gifted achievers and gifted underachievers on a measure of motivation/self-regulation (McCoach & Siegle, 2003).

When studying samples of gifted achievers and gifted underachievers, McCoach and Siegle (2003) found that goal valuation and motivation/self-regulation substantially differentiated gifted achievers from gifted underachievers. Gifted underachievers set lower goals (McCoach & Siegle, 2003;

Mofield et al., 2016) and are less motivated to put forth effort in achieving these goals. Goal valuation is relevant to motivation because when one is committed to achieving a goal, he or she is more likely to approach the task with intentions to complete it (McCoach & Siegle, 2003; Pintrich & DeGroot, 1990). Furthermore, when individuals believe that a task is of value *and* believe that they will find success, motivated behavior occurs (Clinkenbeard, 2012). It follows then that those who do well in school are more likely to be interested in what they are learning (Weiner, 1992).

While it is important to note that gifted students are known to generally have high self-concepts (Hoge & Renzulli, 1993; Neihart, 1999; Neihart, Pfeiffer, & Cross, 2016) and have high intrinsic motivation (Olszewski-Kubilius, Kulieke, & Krasney, 1988), it would be valuable to explore if and how gifted students differ from comparison groups (advanced and typical students) on all five of the psychological factors relating to underachievement. This would help us understand if gifted students show specific areas of vulnerability compared with other groups. Additionally, it is worth exploring if implicit beliefs about intelligence relate to these attitudes. Understanding if and how risk factors for underachievement (academic self-perception, attitude toward teacher, attitude toward school, motivation, and goals) relate to entity or incremental views can potentially offer direction and support for targeted intervention.

Gifted Identification and Labeling

This conversation regarding conceptions of intelligence and achievement cannot be complete without mentioning the impact of the gifted label. Historically, there has been an argument that there are social–emotional impacts that stem from labeling a child as gifted (Berlin, 2009; Cross, 1997; Hertzog, 2003). There is research to support the use of the gifted label, associating the label as a means to appropriate programming (Berlin, 2009; Ford, 1978; Hickey & Toth, 1990; Kerr et al., 1988; Moulton, Moulton, Housewright, & Bailey, 1998) also leading to positive self-concepts and enjoyment of prestige (Feldhusen & Dai, 1997; Hotter, 1986). Additionally, however, there is a base demonstrating that the label sends gifted students negative messages, including assumptions, stereotypes (Berlin, 2009; Fox, 1976; Halpern & Luria, 1989; Hertzog, 2003), and elitism (National Association for Gifted Children, 2009; Quart, 2006). As mentioned previously, some contend that the term *gifted* is itself a form of intelligence praise (Mueller & Dweck, 1998). The label conveys ability as a gift, implying the child did not work for this ability or talent. Thus, it is not a far stretch for some to argue that gifted students may be more likely to hold a fixed mindset about their abilities. Dweck (2000) has stated,

> The term "gifted" conjures up an entity theory. It implies that some entity, a large amount of intelligence, has been magically bestowed upon students, making them special. Thus, when students are so labeled, some may be overconcerned with justifying that label and less concerned with seeking challenges that enhance their skills. . . . They may also begin to react more poorly to setbacks, worrying that mistakes, confusions, or failures mean that they don't deserve the coveted label. If being gifted makes them special, then losing the label may mean to them that they are "ordinary" and somehow less worthy. (p. 122)

Indeed, it can be concerning if a gifted student avoids challenges to protect oneself from failure; thus, it would benefit the field to know if gifted students adopt entity views more than other groups of students.

Rationale

Those working with gifted students need to be aware of variables that thwart a child from achieving his or her potential. The field would benefit from understanding how these variables manifest within the gifted population compared with other populations. Dweck's (2006) self-theories provide a theoretical framework for exploring mindsets and related constructs, such as perfectionism and achievement attitudes, in the context of talent development (Subotnik et al., 2011). Examining such factors advance our understanding and prevention of underachievement. Given the presence of ability-focused praise gifted children are likely to hear along with the pressure to perform to maintain a "smart" identity (Dweck, 2012), it would benefit the field to know how beliefs about ability (particularly intelligence) and effort might interfere with achievement among the gifted. While other researchers have explored implicit theories of intelligence among gifted populations using college students (e.g., Siegle et al., 2010; Snyder et al., 2013; Snyder, Malin, Dent, & Linnenbrink-Garcia, 2014), students who attend residential summer programs (e.g., Feldhusen & Dai, 1997; Guskin et al., 1986; Makel et al., 2015), or students from other cultures (Chan, 2012), very little research has been done with gifted adolescents in American schools (cf., Esparza et al., 2014). Additionally, the most recent studies have focused only on implicit theories of intelligence (incremental vs. entity beliefs of intelligence; Esparza et al., 2014; Siegle et al., 2010; Snyder et al., 2013; Snyder et al., 2014) rather than on the broader aspects of mindsets (e.g., intelligence beliefs along with beliefs about challenge, hard work, and mistakes) with the exception of Chan's (2012) study.

The field is in need of comparative studies with students in gifted and talented programs and students in regular education (Worrell, 2012). We found only one study comparing mindsets between gifted and regular education students (i.e., Esparza et al., 2014) and no studies that include K-12 "advanced" students who are not labeled as "gifted" as a comparison group. Including the advanced cohort as a comparison would provide insight as to whether these students believe that their abilities are limited because they do not

meet criteria for the gifted program. The present study explored the following questions: What do gifted students believe about abilities (specifically intelligence) and effort, and how does this compare to other populations? Are gifted students more likely to adopt fixed mindsets about intelligence and display higher levels of perfectionism? What variables differentiate gifted learners from other student populations regarding achievement attitudes (academic self-perception, goal valuation, motivation/self-regulation, etc.)? How do the constructs of mindset, perfectionism, and attitude toward achievement relate to one another? An understanding of how mindset, perfectionism, achievement attitudes, and giftedness relate to one another can guide practitioners to develop interventions to address accordingly social emotional issues (e.g., perfectionism) through the cultivation of psychosocial skills.

Purpose of the Study

The purpose of the present study was to compare mindset beliefs (about intelligence), perfectionism, and achievement attitudes (e.g., academic self-perception, attitude toward school, attitude toward teacher, goal valuation, and motivation regulation) among gifted, advanced, and typical students. We hypothesized that there would be differences among the three groups on mindset scores, perfectionism, and achievement attitudes, testing 11 hypotheses (for subscores of mindset, perfectionism, and achievement attitudes).

A secondary purpose of the study was to conduct a series of analyses to explore (1) if and to what extent giftedness is associated with mindset beliefs about intelligence and (2) if and to what extent mindsets, group status, and their interactions are associated with perfectionism and achievement attitudes. We hypothesized that the associations between gifted status and mindset beliefs about intelligence would be consistent with results from the comparison tests. Second, we hypothesized that the independent variables (mindset, group status, and their interactions) would be useful for explaining variance in perfectionism and achievement attitude subscales and that significant contributors within the models would be consistent with effects found in our comparison tests. Specifically, we hypothesized that growth mindset beliefs about intelligence would be positively associated with Positive Strivings Perfectionism and all five attitudes of achievement. Fixed mindset beliefs about intelligence would be positively associated with Evaluative Concerns Perfectionism and negatively associated with Positive Strivings Perfectionism and all five attitudes of achievement.

Method

Participants

The sample was drawn from a suburban school district in southeast United States. All gifted students from 11 middle schools (Grades 6 to 8) were invited to participate. In addition, 22 classrooms were selected for comparison groups. These classrooms were chosen by randomly selecting regular education teachers from a pool of all district teachers who teach both advanced language arts or math classes and non-advanced language arts or math classes. To qualify for an advanced class, students had to earn "advanced" scores on the state language arts or math assessments. In the advanced classes, the pace is faster, and students may go deeper into content. It is important to note that advanced classes include students who are identified gifted as well as other students who are not identified as gifted. If gifted students were also in advanced classes, they were only included in the gifted sample (giftedness overrides advanced for sample selection). Advanced students who are not identified as gifted have demonstrated high levels of academic achievement but have not been formally identified as gifted and, accordingly, have not received the gifted label or participated in services for gifted students. These differences were important and of interest to the researchers desiring to establish any apparent differences.

A total of 416 students participated in the study (49% males, 51% females, 87% White, 3.6% African American, 3.6% Asian, 5.8% Hispanic, and 1.2% Other). This included 264 gifted, 66 advanced, and 86 typical students. The response rate from the gifted sample was 59%. Twenty-two classrooms were randomly selected for participation of advanced and typical students. Unfortunately, 9 classroom teachers chose not to distribute consent forms. Of the remaining 13 classrooms (7 typical, 6 advanced), overall response rates for typical and advanced students were 57% and 63%, respectively.

To be eligible for gifted services, students must meet state requirements that include criteria for achievement, creativity, and cognition scores. Students must meet one of the three options: (1) high intelligence quotient (IQ; 130 or higher) and another component (96th percentile or above on one standardized test composite score or 90% or higher on two composite scores; (2) IQ of 123 to 129, two composite scores above 95 percentile or three composite scores above 90th percentile, and academic performance and/or creative thinking; or (3) IQ 118 to 122, three composite areas above 95th percentile or four composite areas above 90th percentile, and academic performance and/or creative thinking. Students must also demonstrate that their high intellectual functioning presents an adverse effect in the regular classroom without individualized support. All identified gifted students in this district are served with an Individual Education Plan since gifted services are part of special education in the state where the study was conducted. Gifted students attend a gifted pull-out class in place of one of two related arts classes (e.g., computer, health, art, etc.). In the gifted pull-out class, gifted students are with other gifted peers and have opportunities to investigate in-depth topics, apply problem solving to various real-world issues, and pursue independent projects.

Procedures

Students in participating classrooms (gifted pullout, advanced, and regular classes) were given an oral explanation about involvement in the research study. They were told that the purposes of the study were to explore the relationships between goals, work habits, mindset, and achievement of students. Students were given consent forms for parents to sign, which were returned to the teacher, who administered the surveys. Participating students were given three surveys: Mindset Assessment Profile Tool (2012), The Goals and Work Habits Survey (GWHS; Schuler, 1994), and The SAAS-R (School Attitudes Assessment Survey–Revised; McCoach, 2000). The questions were presented in this order to all groups of students (mindset measures, perfectionism, and school achievement attitudes). Teachers were asked to check surveys for completion and ask students to fill in any missed items.

Measures

Mindset. The Mindset Assessment Profile Tool (2012) measures a student's belief about the malleability of intelligence, attitude toward effort, attitude toward mistakes, and belief about the importance of learning. It consists of eight questions, four of which relate to growth mindset beliefs with parallel statements that reflect fixed mindset beliefs. The participants indicate the extent to which they agree or disagree with the statement using a 6-point scale (1 = *disagree a lot* and 6 = *agree a lot*). A subscore on growth mindset (Cronbach's α = .84, 95% confidence interval [CI] [.81, .86]) was determined by adding the four growth mindset questions, while the subscore on fixed mindset (Cronbach's α = .80, 95% CI [.77, .83]) was determined by adding the four fixed mindset questions. Growth mindset beliefs were measured by items such as "No matter how much intelligence you have, you can always change it a good deal" and "When something is hard, it just makes me want to work harder on it, not less." Fixed mindset beliefs were measured by items such as "You can learn new things but you cannot really change your basic level of intelligence" and "I like my work best when I can do it really well without much trouble." Scale scores were calculated by calculating the mean of scored items.

Perfectionism. Perfectionism was measured by the GWHS (Schuler, 1994), a modified version of Frost's Multidimensional Perfectionism Scale (Frost et al., 1990). For purposes of the current study, only four of six dimensions were assessed (Concern over Mistakes, Doubt of Action, Personal Standards, and Organization). The other two dimensions, Parental Criticism and Parent Expectations, were not measured since they measure students' experiences with their parents rather than their individual personal expectations. The GWHS has been used in previous studies on perfectionism in the field of gifted education (e.g., Chan, 2009; Mofield & Chakraborti-Ghosh, 2010; Mofield & Parker Peters, 2015a, 2015b; Schuler, 2000, 2002). The survey includes 25 questions in which the participants respond on a Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). It includes eight items measuring one's Concern over Mistakes with items such as "people will probably think less of me if I make a mistake." Four items measured Doubt of Action with statements such as "Even when I try to do something carefully, I often feel that it is not right." Cronbach's alpha coefficients were calculated for each subscale: Concern over Mistakes (α = .84, 95% CI [.82, .86]), Doubt of Action (α = .67, 95% CI [.62, .72]), Personal Standards (α= .75, 95% CI [.71, .78]), and Organization (α = .91, 95% CI [.90, .92]). This internal consistency is somewhat consistent with previous findings. Frost and colleagues (1990) reported internal consistency ranging from .77 to .93 on subscales (.88 for Concern over Mistakes, .83 for Personal Standards, .84 for Doubt of Action, and .93 for Organization) while Stumpf and Parker (2000) found internal consistency ranging from .67 to .90 (.83 for Concern over Mistakes, .74 for Personal Standards, .67 for Doubt of Action, .90 for Organization). High scores for Concern over Mistakes and Doubt of Action are associated with Evaluative Concerns Perfectionism, while high scores for Personal Standards and Organization are associated with Personal Strivings Perfectionism (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; Stoeber & Otto, 2006; Stumpf & Parker, 2000), although high Personal Standards along with high Concern over Mistakes and Doubt of Action can also be associated with maladaptive perfectionism when interpreting typologies (Dixon et al., 2004; Hawkins, Watt, & Sinclair, 2006; Mofield & Parker Peters, 2015b). Scale scores were calculated by calculating the mean of scored items.

Achievement Attitudes. Students' achievement attitudes were measured using the SAAS-R (McCoach, 2000). Participants responded to 35 statements on a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*). The scale was developed to assess a student's vulnerability to underachievement through five subscales: academic self-perceptions (Cronbach's α = .90, 95% CI [.89, .91] e.g., "I am intelligent;" "I am capable of getting straight A's") attitude toward teachers (Cronbach's α = .91, 95% CI [.90, .92]; e.g., "My classes are interesting;" "I like my teachers"), attitude toward school (Cronbach's α = .95, 95% CI [.94, .96]; e.g., "This school is a good match for me;" "I am proud of this school"), goal valuation (Cronbach's α = .86, 95% CI [.84, .88]; e.g., "Doing well in school is one of my goals;" "I want to do my best in school"), and motivation/self-regulation (Cronbach's α = .88, 95% CI [.86, .90]; e.g., "I work hard at school;" "I put a lot of effort into my school work"). Scale scores were calculated by calculating the mean of scored items.

Table 1. Missing Data per Subscale.

Subscale	Number of participants with imputed mean subscale scores for missing mean scores	Number of participants excluded from subscale analysis[a]	Total participants included in analyzed sample of subscale (total participants = 416)
Growth mindset	2	0	416
Fixed mindset	2	0	416
Concern over Mistakes	4	3	413
Doubt of Action	1	6	410
Personal Standards	4	4	412
Organization	10	2	414
Academic self-perception	6	2	414
Attitude toward teacher	5	2	414
Attitude toward school	2	2	414
Goal valuation	5	2	414
Motivation/self-regulation	2	7	409

[a]Missing more than half of items in subscale.

Results

Mean Differences

Data were analyzed using StatView statistical software. For subscale scores, mean scores were calculated and reported. In the case of missing data, if a participant answered most of the items (more than half of items within a subscale), the researchers entered the sample mean subscale score for the participant's missing mean subscale score. If participants did not complete more than half of the items within a subscale, the missing means were not calculated within the analysis for that subscale. Table 1 shows how missing data and substituted mean scores affected analyzed sample sizes per subscale. Table 2 shows mean scores and standard deviations for all subscale scores as well as correlations between them. To decrease the likelihood of Type 1 error via multiple comparisons and tests, we set an alpha level to .01 to test our null hypotheses that there would not be differences between groups on mindsets, perfectionism, and achievement attitudes among gifted, advanced, and typical students.

Although the assumption for homogeneity of variances was met, the sample included unequal sample sizes between three groups (gifted, advanced, typical students); therefore, a Welch's adjusted F ratio was used to examine the group differences on mindset beliefs, perfectionism, and achievement attitudes. Researchers examined the total subscores on growth mindset beliefs (total score of four items) and fixed mindset beliefs (total score of four items). At an alpha level set at .01, there was not a statistically significant effect of group membership on growth mindset beliefs about intelligence, Welch's $F(2, 413) = 3.52$, $p = .03$. Table 3 shows mean differences among groups (gifted, advanced, and typical). There was no statistically significant effect of group membership on fixed mindset beliefs, Welch's $F(2, 413) = 1.74$, $p = .18$. Table 4 shows Cohen's d effect sizes and 95% confidence intervals for differences between all groups.

No statistically significant effect was found for group membership on Concern over Mistakes scores. Consistent with the literature that gifted students have higher adaptive perfectionism (LoCicero & Ashby, 2000; Shaunessey et al., 2011; Vandiver & Worrell, 2002), there was a statistically significant effect of group membership on Personal Standards, Welch's $F(2, 409) = 15.84$, $p < .0001$, estimated $\omega^2 = .06$, where 6% of the variance in Personal Standards is accounted for by group membership. Games-Howell post hoc analyses showed that both gifted ($M = 3.74$, $SD = 0.64$) and advanced ($M = 3.69$, $SD = 0.60$) students have higher Personal Standards than typical students ($M = 3.33$, $SD = 0.57$) at the $p < .0001$ and $p < .001$ levels, respectively. Cohen's d effect size values of .68, 95% CI [.53, .82] between gifted and typical and .62, 95% CI [.47, .76] between advanced and typical both suggest moderate practical significance. These findings were expected since the high standards are indicative of achievement that must be demonstrated to achieve gifted status (through state criteria) or participate in an advanced class. Additionally, there was a statistically significant effect on Organization, Welch's $F(2, 411) = 4.85$, $p = .009$, estimated $\omega^2 = .02$, where 2% of the variance in Organization is due to group membership. Gifted students ($M = 3.84$, $SD = 0.92$, $d = -.45$, 95% CI [−.59, −.31]) had statistically significant lower Organization scores compared with advanced students ($M = 4.31$, $SD = 1.16$), and advanced students had statistically significant higher Organization scores compared with typical students ($M = 3.84$, $SD = 0.93$, $d = .45$, 95% CI [.31, .58]). Both the comparisons suggest only small practical significance.

Finally, a Welch's F test was used to compare three groups on five subscales of achievement attitudes. A significant effect was found only for Academic Self-Perception, Welch's $F(2, 411) = 14.77$, $p < .001$, estimated $\omega^2 = .06$, where 6% of the variance in Academic Self-Perception is accounted for in group membership. Games-Howell post hoc comparisons

Table 2. Correlation Matrix for Dimensions of Perfectionism, Achievement Attitudes, and Mindset.

Factors	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Concern over Mistakes (−)	2.47	0.79	1.00	.49**	.31**	.01	−.07	−.24	−.30**	.00	−.14*	.31**	−.19**
2. Doubt of Action (−)	2.74	0.80		1.00	−.02	−.08	−.30**	−.21**	−.20**	−.08	−.23**	.25**	−.20**
3. Personal Standards (+)	3.64	0.64			1.00	0.38**	.53**	.22**	.15*	.38**	.48**	−.03	.37**
4. Organization (+)	3.91	0.98				1.00	.20**	.17*	.11	.28**	.46**	−.03	.23**
5. Academic self-perception	5.80	0.91					1.00	.48**	.39**	.41**	.63**	−.19*	.46**
6. Attitude toward teacher	5.42	1.13						1.00	.69**	.50**	.61**	−.18*	.49**
7. Attitude toward school	5.62	1.40							1.00	.37**	.48**	−.17*	.38**
8. Goal valuation	6.59	0.62								1.00	.57**	−.05	.33**
9. Motivation/self-regulation	5.71	0.88									1.00	−.21**	.50**
10. Fixed score	3.64	0.94										1.00	−.35**
11. Growth score	4.32	0.90											1.00

Note. (−) = Evaluative Concerns (maladaptive perfectionism); (+) = Positive Strivings (adaptive perfectionism).
*$p < .01$. **$p < .001$.

revealed that gifted students ($M = 5.96$, $SD = 0.82$, $d = .72$, 95% CI [.57, .86]) had moderately higher scores on Academic Self-Perception when compared with typical students ($M = 5.27$, $SD = 1.09$). Advanced students ($M = 5.81$, $SD = 0.74$) also had moderately higher scores compared with typical students, $d = .58$, 95% CI [.44, .72]. It is not surprising that gifted and advanced students reported higher Academic Self-Perception scores than typical students given that gifted and advanced students had also demonstrated higher academic achievement (by identification).

Hierarchical Regression Series

A series of multiple regression analyses was conducted to test if and to what extent group status (dummy coded: gifted, advanced, or typical) explains variance in mindset beliefs about intelligence and to test if and to what extent mindset beliefs, group status, and their interactions explain variance in perfectionism and achievement attitudes. We dummy coded by using two columns in the data set: one in which we assigned 1 for gifted and 0 to advanced and typical; the other we assigned 1 for advanced and 0 for gifted and typical.

Mindset scores were centered to account for any multicollinearity issues, especially since fixed mindsets and growth mindsets were correlated ($r = -.35$). First, we conducted a regression analysis to test the main effects of group membership on fixed and growth mindsets. Consistent with findings from Welch's F tests, neither model was statistically significant at the .01 alpha level (see Table 5).

Next, we tested a series of hierarchical models to explore the association between a number of independent variables (giftedness, mindsets, and their interactions) and the dependent variables of perfectionism and achievement attitudes. Hierarchical regression allowed us to further determine if one or more of the predictor variables (mindset, group status, and their interactions) are useful for explaining variability in the criterion variables (perfectionism and achievement attitude subscores; see Tables 6 and 7). One might argue that perfectionism or achievement attitudes could serve as the predictor variable with mindset as the criterion variable. We acknowledge that the reversal of variables is possible, but we chose for mindset beliefs to serve as the predictor variable because, according to Dweck's implicit theory of intelligence (Dweck & Leggett, 1988; Elliott & Dweck, 1988), it is one's belief about ability that influences other attitudes, goals, and behaviors. We emphasize that these regression models are exploratory in nature. Overall, these models produced small to moderate effect sizes (adjusted R^2 values between .04 and .30).

First, the main effects of growth and fixed mindset scores were entered to test their contribution to the variance in perfectionism and achievement attitudes. Several statistically significant models emerged (see Tables 6 and 7 for F values for each model and adjusted R^2 effect sizes). Fixed mindset was positively related to Evaluative Concerns Perfectionism. Specifically, fixed mindset ($\beta = .27$, $p < .0001$) was a statistically significant predictor for Concern over Mistakes, producing a small effect. The overall model explained a small amount of variance (10%) in Concern over Mistakes ($R^2 = .10$; adjusted $R^2 = .10$). In a weaker model ($R^2 = .08$; adjusted $R^2 = .08$), fixed mindsets yielded a small statistically significant main effect for Doubt of Action ($\beta = .21$, $p < .0001$).

Growth mindset beliefs were positively related to Positive Strivings Perfectionism. Specifically, growth mindset was a statistically significant predictor for Personal Standards ($\beta = .41$, $p < .0001$), with a moderate influence in an overall model explaining 15% of the variance in Personal Standards ($R^2 = .15$; adjusted $R^2 = 14$). Growth mindset also emerged as a statistically significant predictor for Organization ($\beta = .23$, $p < .0001$), a moderate influence in a weaker model explaining only 5% of variance in Organization ($R^2 = .05$; adjusted $R^2 = .04$). Fixed mindset was not statistically significantly related to any of the five achievement attitudes. However, growth mindset was positively related to all achievement attitudes, producing statistically significant beta weights with moderate effects (.36-.50) (academic

Table 3. Comparisons of Mean Differences Among Gifted, Advanced, and Typical Students.

Subscale	Gifted *M (SD)*	Advanced *M (SD)*	Typical *M (SD)*	*F*	Statistically significant differences[a]
Mindset					
Growth score	4.37 (0.88)	4.42 (0.89)	4.10 (0.87)	3.52	G = A = T
Fixed score	3.58 (0.96)	3.80 (0.89)	3.69 (0.91)	1.74	G = A = T
Perfectionism					
Concern over Mistakes (−)	2.53 (0.80)	2.52 (0.82)	2.26 (0.70)	4.66	G = A = T
Doubt of Action (−)	2.72 (0.81)	2.86 (0.77)	2.70 (0.78)	1.11	G = A = T
Personal Standards (+)	3.74 (0.64)	3.69 (0.60)	3.33 (0.57)	15.84**	G > T, A > T
Organization (+)	3.84 (0.92)	4.31 (1.16)	3.84 (0.94)	4.85*	A > G, A > T
Achievement attitudes					
Academic self-perception	5.96 (0.82)	5.81 (0.74)	5.27 (1.09)	14.77**	G > T, A > T
Attitude toward teacher	5.41 (1.09)	5.37 (1.23)	5.48 (1.17)	.20	G = A = T
Attitude toward school	5.69 (1.31)	5.36 (1.71)	5.58 (1.36)	1.18	G = A= T
Goal valuation	6.59 (0.62)	6.63 (0.51)	6.56 (0.69)	.28	G = A = T
Motivation/self-regulation	5.74 (0.88)	5.81 (0.75)	5.55 (0.97)	1.81	G = A = T

Note. (−) = Evaluative Concerns (maladaptive perfectionism); (+) = Positive Strivings (adaptive perfectionism).
[a]Statistically significant comparisons using Games-Howell post hoc analyses ($p < .01$) abbreviated by G = gifted; A = advanced; T = typical.
*$p < .01$. **$p < .001$.

Table 4. Cohen's *d* Effect Sizes and Confidence Intervals of Effect Sizes of Differences Between Groups.

Subscale	Gifted versus advanced *d* [95% CI]	Gifted versus typical *d* [95% CI]	Advanced versus typical *d* [95% CI]
Mindset			
Growth score	−.06 [−.19, .08]	.31 [.17, .45]	.36 [.23, .50]
Fixed score	−.24 [−.37, –.10]	−.12 [−.25, .02]	.11 [−.02, .25]
Perfectionism			
Concern over Mistakes (−)	.01 [−.12, .15]	.36 [.22, .50]	.34 [.20, .48]
Doubt of Action (−)	−.18 [−.31, −.04]	.03 [−.11, .16]	.21 [.07, .34]
Personal Standards (+)	.08 [−.06, .22]	.68 [.53, .82]	.62 [.47, .76]
Organization (+)	−.45 [−.59, −.31]	.00 [−.14, .14]	.45 [.31, .58]
Achievement attitudes			
Academic self-perception	.19 [.05, .33]	.72 [.57, .86]	.58 [.44, .72]
Attitude toward teacher	.03 [−.10, .17]	−.06 [−.20, .07]	−.09 [−.23, .05]
Attitude toward school	.22 [.08, .35]	.08 [−.05, .22]	−.14 [−.28, .01]
Goal valuation	−.07 [−.21, .07]	.05 [−.09, .18]	.12 [−.02, .25]
Motivation/self-regulation	−.09 [−.22, .05]	.20 [−.07, .34]	.30 [.16, .44]

Note. (−) = Evaluative Concerns (maladaptive perfectionism); (+) = Positive Strivings (adaptive perfectionism).

Table 5. Regression Analysis Predicting Mindset From Group Status.

Predictor	*B*	*SE B*	β	*t*	*p*	R^2	Adjusted R^2
				Growth			
Gifted	1.10	.44	.15	2.49	.01		
Advanced	1.31	.58	.13	2.26	.02	.02	.01
				Fixed			
Gifted	−.48	.46	.06	−1.03	.31		
Advanced	.40	.61	.04	.66	.52	.01	.01

Note. The models are not significant with an alpha set at .01.

self-perception, β = .45, $p < .0001$; attitude toward teacher, β = .50, $p > .0001$; attitude toward school, β = .37, $p < .0001$; goal valuation, β = .36, $p < .0001$; motivation/self-regulation, β = .48, $p < .0001$). The overall models for attitude toward teacher (adjusted $R^2 = .25$) and motivation/self-regulation (adjusted $R^2 = .26$) were strongest. These adjusted R^2 values are considered moderate effect sizes, explaining 25% and 26% of the variance in attitude toward teacher and motivation/self-regulation, respectively.

Then, in Step 2, we added the interaction of growth mindsets and fixed mindsets for each dependent variable. Adding

Table 6. Regression Models for Predicting Perfectionism From Mindsets and Group Status.

Steps	Predictor Variable	*B*	*SE B*	β	*t*	R^2	Adjusted R^2	ΔAdjusted R^2	*F*
				Concern over Mistakes					
Step 1						.10	.10		23.00**
	Growth	−.08	.05	−.09	−.1.86				
	Fixed	.23	.04	.27	5.46**				
Step 2						.11	.10	.00	16.92**
	Growth	−.06	.05	−.06	−1.23				
	Fixed	.56	.18	.71	3.30*				
	Growth × Fixed[a]	−.08	.04	−.44	−2.09				
Step 3						.13	.12	.02	14.96**
	Growth	−.10	.04	−.11	−2.26				
	Fixed	.23	.04	.27	5.53**				
	Gifted	.33	.09	.20	3.55*				
	Advanced	.27	.12	.13	2.23				
Step 4						.13	.11	−.01	7.51**
	Growth	−.09	.10	−.10	−.90				
	Fixed	.21	.10	.25	2.18				
	Gifted	.33	.10	.20	3.48*				
	Advanced	.28	.13	.13	2.21				
	Gifted × Growth	−.02	.12	−.02	−.20				
	Gifted × Fixed	.04	.11	.04	.33				
	Advanced × Growth	.06	.15	.03	.39				
	Advanced × Fixed	−.06	.14	−.03	−.43				
				Doubt of Action					
Step 1						.08	.08		17.43**
	Growth	−.12	.05	−.13	−2.54				
	Fixed	.18	.04	.21	4.10**				
Step 2						.10	.10	.02	15.35**
	Growth	−.08	.05	−.09	−1.69				
	Fixed	.78	.19	.89	4.10**				
	Growth × Fixed	−.13	.04	−.68	−3.22*				
Step 3						.11	.10	.00	9.82**
	Growth	−.08	.05	−.09	−1.69				
	Fixed	.78	.19	.92	4.21**				
	Growth × Fixed	−.14	.04	−.72	−3.37*				
	Gifted	.05	.10	.56	.57				
	Advanced	.21	.13	.10	1.65				
Step 4						.11	.10	.00	5.70**
	Growth	−.14	.10	−.15	−1.31				
	Fixed	.73	.20	.85	3.64*				
	Growth × Fixed	−.14	.04	−.75	−3.46*				
	Gifted	.06	.10	.04	.64				
	Advanced	.20	.13	.09	1.54				
	Gifted × Growth	.03	.12	.03	.27				
	Gifted × Fixed	.08	.11	.07	.67				
	Advanced × Growth	.18	.15	.08	1.22				
	Advanced × Fixed	.12	.15	.06	.84				
				Personal Standards					
Step 1						.15	.14		35.14**
	Growth	.29	.04	.41	8.36**				
	Fixed	.08	.03	.12	2.35				
Step 2						.15	.14	.00	23.43**
	Growth	.29	.04	.40	7.93**				
	Fixed	.03	.14	.04	.17				
	Growth × Fixed[a]	.01	.03	.08	.38				

(continued)

Table 6. (continued)

Steps	Predictor Variable	*B*	*SE B*	β	*t*	R^2	Adjusted R^2	ΔAdjusted R^2	*F*
Step 3						.19	.19	.05	24.32**
	Growth	.28	.04	.38	8.00**				
	Fixed	.08	.03	.12	2.45				
	Gifted	.35	.07	.27	4.83**				
	Advanced	.27	.10	.16	2.82				
Step 4						.20	.18	−.01	12.37**
	Growth	.31	.08	.43	3.93*				
	Fixed	.14	.08	.21	1.90				
	Gifted	.35	.07	.26	4.71**				
	Advanced	.28	.10	.16	2.91*				
	Gifted × Growth	−.02	.09	−.02	−.20				
	Gifted × Fixed	−.06	.09	−.07	−.66				
	Advanced × Growth	−.15	.11	−.08	−1.31				
	Advanced × Fixed	−.08	.11	−.04	−.67				
		Organization							
Step 1						.05	.04		10.50**
	Growth	.26	.06	.23	4.55**				
	Fixed	.06	.05	.05	1.03				
Step 2						.05	.04	.00	7.17**
	Growth	.24	.06	.22	4.17**				
	Fixed	−.11	.23	−.10	−.47				
	Growth × Fixed[a]	.04	.05	.16	.72				
Step 3						.08	.07	.03	8.40**
	Growth	.24	.06	.22	4.37**				
	Fixed	.04	.05	.04	.69				
	Gifted	−.09	.12	−.05	−.79				
	Advanced	.36	.16	.14	2.31				
Step 4						.08	.06	−.01	4.34**
	Growth	.24	.06	.22	4.37**				
	Fixed	.04	.05	.04	.69				
	Gifted	−.09	.12	−.05	−.79				
	Advanced	.36	.16	.14	2.31				
	Gifted × Growth	−.02	.04	−.04	−.40				
	Gifted × Fixed	−.02	.04	−.05	−.44				
	Advanced × Growth	.01	.05	.02	.27				
	Advanced × Fixed	.01	.05	.02	.14				

[a]Since the interaction of growth and fixed mindset scores was not significant, it was removed from the subsequent models.
*$p < .01$. **$p < .001$.

this interaction increased the amount of variance explained in the overall model for Doubt of Action by 2%, producing a relatively large effect (β = −.68, $p = .001$) (see Table 6). This interaction did not statistically significantly contribute to the variance of all other dependent variables. With the exception of Doubt of Action, this interaction was excluded in subsequent models for the other subscales, given it did not produce statistically significant effects.

In Step 3, we added the dummy coded variables of group status membership into the models for each dependent variable. When mindsets were accounted for, adding gifted and advanced status explained 2% of additional variance for the overall model for Concern over Mistakes. This model accounted for 13% of explained variance ($R^2 = .13$; adjusted $R^2 = .12$) on Concern over Mistakes. Gifted status was a statistically significant predictor for Concern over Mistakes, producing a small influence (β = .20, $p = .0004$) on the overall model. The addition of gifted and advanced status explained an additional 5% of variance for Personal Standards. Gifted status was statistically significantly related to Personal Standards (β = .27, $p < .0001$), producing a small-moderate effect when mindset beliefs were accounted for. This overall model explained a small to moderate amount of variance in Personal Standards (adjusted $R^2 = .19$). The

Table 7. Regression Models for Predicting Achievement Attitudes From Mindsets and Group Status.

Steps	Predictor Variable	*B*	*SE B*	β	*t*	R^2	Adjusted R^2	ΔAdjusted R^2	*F*
				Academic self-perception					
Step 1						.22	.21		70.49**
	Growth	.47	.05	.45	9.74**				
	Fixed	−.03	.05	−.03	−.69				
Step 2						.23	.22	.01	40.07**
	Growth	.44	.05	.42	8.84**				
	Fixed	−.51	.20	−.52	−2.55				
	Growth × Fixed[a]	.11	.04	.49	2.45				
Step 3						.28	.28	.06	40.30**
	Growth	.44	.05	.43	9.55**				
	Fixed	−.03	.04	−.03	−.67				
	Gifted	.61	.10	.32	6.19**				
	Advanced	.43	.13	.18	3.73*				
Step 4						.30	.28	.00	21.16**
	Growth	.54	.11	.52	5.03**				
	Fixed	−.18	.10	−.18	−1.70				
	Gifted	.57	.10	.31	5.84**				
	Advanced	.43	.13	.17	3.32*				
	Gifted × Growth	−.02	.03	−.05	−.56				
	Gifted × Fixed	.05	.03	.18	1.84				
	Advanced × Growth	.03	.04	.05	.78				
	Advanced × Fixed	−.06	.04	−.10	−1.60				
				Attitude toward teacher					
Step 1						.25	.25		68.18**
	Growth	.63	.06	.50	10.89**				
	Fixed	−.02	.06	−.01	−.30				
Step 2						.25	.25	.00	45.72**
	Growth	.65	.06	.48	10.28**				
	Fixed	−.24	.24	−.20	−.97				
	Growth × Fixed[a]	−.05	.05	.18	.93				
Step 3						.26	.25	.00	35.20**
	Growth	.65	.06	.51	11.07**				
	Fixed	−.01	.06	−.01	−.21				
	Gifted	−.21	.12	−.09	−1.68				
	Advanced	−.29	.16	−.10	−1.80				
Step 4						.27	.25	.00	16.20**
	Growth	.69	.14	.54	5.10**				
	Fixed	−.17	.27	−.14	−.64				
	Gifted	−.21	.13	−.09	−1.69				
	Advanced	−.35	.17	−.11	−2.11				
	Gifted × Growth	.04	.05	.16	.78				
	Gifted × Fixed	−.14	.16	−.09	−.91				
	Advanced × Growth	.10	.19	.03	.53				
	Advanced × Fixed	.11	.19	.04	.60				
				Attitude toward school					
Step 1						.15	.15		37.16**
	Growth	.59	.08	.37	7.75**				
	Fixed	−.07	.07	−.05	−.10				
Step 2						.16	.15	.00	24.98**
	Growth	.58	.80	.36	7.27**				
	Fixed	−.33	.32	−.22	−1.02				
	Growth × Fixed[a]	.06	.07	.17	.83				

(continued)

Table 7. (continued)

Steps	Predictor Variable	*B*	*SE B*	β	*t*	R^2	Adjusted R^2	ΔAdjusted R^2	*F*
Step 3						.16	.15	.00	19.81**
	Growth	.61	.08	.38	7.89**				
	Fixed	−.05	.07	−.04	−.74				
	Gifted	−.02	.16	−.01	−.13				
	Advanced	−.38	.21	−.10	−1.79				
Step 4						.18	.16	.01	11.00**
	Growth	.85	.18	.54	4.82**				
	Fixed	.12	.17	.08	.72				
	Gifted	−.07	.16	−.02	−.40				
	Advanced	−.46	.22	−.12	−2.15				
	Gifted × Growth	−.11	.05	−.21	−2.08				
	Gifted × Fixed	−.07	.05	−.15	−1.44				
	Advanced × Growth	−.03	.06	−.03	−.44				
	Advanced × Fixed	.01	.06	.01	.21				
		Goal valuation							
Step 1						.12	.11		26.96**
	Growth	.25	.04	.36	7.28**				
	Fixed	.05	.03	.08	1.51				
Step 2						.12	.11	.00	18.13**
	Growth	.26	.04	.37	7.21**				
	Fixed	.15	.15	.23	1.04				
	Growth × Fixed[a]	−.02	.03	−.16	−.72				
Step 3						.12	.11	.00	13.43**
	Growth	.25	.04	.36	7.21**				
	Fixed	.05	.03	.07	1.49				
	Gifted	−.01	.07	−.01	−.16				
	Advanced	.00	.10	.00	.00				
Step 4						.13	.11	.00	7.20**
	Growth	.23	.08	.33	2.83				
	Fixed	.17	.08	.26	2.19				
	Gifted	−.01	.08	−.01	−.13				
	Advanced	.01	.10	.01	.10				
	Gifted × Growth	.01	.02	.03	.32				
	Gifted × Fixed	−.04	.02	−.18	−1.68				
	Advanced × Growth	−.03	.03	−.08	−1.72				
	Advanced × Fixed	.01	.03	.01	.21				
		Motivation/self-regulation							
Step 1						.26	.26		70.49**
	Growth	.48	.05	.48	10.56**				
	Fixed	−.05	.04	−.06	−1.20				
Step 2						.27	.26	.00	48.81**
	Growth	.46	.05	.46	9.88**				
	Fixed	−.43	.19	−.46	−2.28				
	Growth × Fixed[a]	.09	.04	.41	2.08				
Step 3						.26	.25	−.01	35.50**
	Growth	.48	.05	.48	10.56**				
	Fixed	−.05	.04	−.06	−1.20				
	Gifted	.09	.10	.05	.91				
	Advanced	.14	.13	.06	1.06				
Step 4						.27	.26	.01	18.71**
	Growth	.67	.11	.67	6.35**				
	Fixed	.07	.10	.08	.72				
	Gifted	.06	.10	.03	.59				
	Advanced	.12	.13	.05	.90				
	Gifted × Growth	−.19	.12	−.15	−1.59				
	Gifted × Fixed	−.15	.12	−.13	−1.31				
	Advanced × Growth	−.37	.15	−.15	−2.45				
	Advanced × Fixed	−.09	.15	−.04	−.59				

[a]Since the interaction of growth and fixed mindset scores was not significant, it was removed from the subsequent models.
*$p < .01$. **$p < .001$.

influence of gifted status on these models is of particular interest, especially given that advanced status did not produce statistically significant main effects.

The addition of gifted and advanced status contributed to an additional 3% of variance to the overall model for Organization, though no new statistically significant main effects emerged beyond growth mindset beliefs. Finally, for Academic Self-Perception, gifted and advanced status added in Step 3 explained an additional 6% of variance to an overall model explaining a moderate amount of variance in Academic Self-Perception (adjusted $R^2 = .28$). Gifted status yielded a moderate effect, producing a statistically significant main effect for Academic Self-Perception ($\beta = .32$, $p < .0001$). Advanced status was also a statistically significant predictor in the model, though it had a much smaller effect ($\beta = .18$, $p = .0008$). In sum, these results reveal a similar pattern as the Welch's F tests, specifically showing the relationship of gifted status and high Concern over Mistakes, Personal Standards, and Academic Self-Perception.

Finally, in Step 4, we tested the main effects of mindset, group status, as well as the interaction of group membership and mindset (gifted × growth, gifted × fixed, advanced × growth, advanced × fixed) for each dependent variable. The added interactions produced no additional statistically significant effects among all subscales of perfectionism and achievement attitudes. Only in the case of Attitude Toward Teacher and Motivation/Self-Regulation did the variability in the models increase, each by 1%. The most robust overall models for Step 4 were those explaining 30% of variance in Academic Self-Perception ($R^2 = .30$; adjusted $R^2 = .28$) and 27% of variance in Motivation/Self-Regulation ($R^2 = .27$; adjusted $R^2 = .26$). Growth mindset ($\beta = .52$; $p < .0001$), gifted status ($\beta = .31$, $p < .0001$), and advanced status ($\beta = .31$, $p = .001$) produced statistically significant moderate main effects for Academic Self-Perception. There was a relatively large statistically significant main effect for growth mindset beliefs ($\beta = .67$, $p < .0001$) on Motivation/Self-Regulation.

Discussion

Our study contributes to the literature on achievement motivation and talent development by comparing gifted, advanced, and typical students on variables that are potential barriers to achievement (mindset beliefs about intelligence, perfectionism, and achievement attitudes) and by exploring the relationship of mindset beliefs and group status on perfectionism and achievement attitudes. The study provides comparisons among three groups within school-age populations in a public school district, whereas most research on self-theories among gifted students includes populations from college-age or residential summer program populations with no comparisons. In sum, the results of our study show no statistically significant differences between groups on fixed or growth mindset beliefs about intelligence and highly favorable comparisons for Personal Standards and Academic Self-Perception for gifted (and advanced) students. Gifted students exhibited higher Concern over Mistakes, Personal Standards, and Academic Self-Perception than typical students. Models also reveal insight as to how mindset beliefs about intelligence relate to perfectionism and achievement attitudes.

Mindset Beliefs

While it has been theorized that gifted students may be more at risk for developing fixed mindsets (Dweck, 2000, 2012), results of the present study do not support this assertion. It has been argued that the gifted label and associated praise for academic ability (Dweck, 2000, 2012; Mueller & Dweck, 1998) may promote challenge-avoidant beliefs and behaviors; this idea is discussed widely in popular media (Boaler, 2018, 2016; Matthews & Foster, 2013; Schulten, 2010; Scott, 2013). Our data indicate that gifted students do not display higher fixed mindset beliefs (valuing entity views of intelligence) compared with other groups. On the contrary, our descriptive findings show that gifted students as a group display a mean score reflecting agreement toward growth mindset beliefs ($M = 4.37$, $SD = 0.88$; 1 = *disagree a lot* and 6 = *agree a lot*), though there is still variability in these scores. Our results are somewhat consistent with other studies that have shown that gifted students endorse incremental beliefs about intelligence, enjoy academic challenges, and value hard work (e.g., Alexander, 1985; Esparza et al., 2014; Feldhusen & Dai, 1997; Guskin et al., 1986; Makel et al., 2015; Snyder et al., 2013). Responses associated with growth mindsets go hand in hand with many classic characteristics of giftedness, including intrinsic interest in challenges, intense curiosity, and intellectual drive (e.g., Ward, 1961).

It was also important to compare gifted students with advanced students because some have implied that students who do not qualify for a gifted program may be likely to adopt fixed mindsets (e.g., Boaler, 2016; Ricci, 2013). Our data do not support this idea since advanced students' fixed mindset scores were not significantly higher than either typical or gifted students. Overall, our findings suggest that group status (gifted vs. advanced vs. typical) does not relate to a vulnerability for developing fixed mindset beliefs.

Perfectionism

Similar to other studies (LoCicero & Ashby, 2000; Shaunessey et al., 2011; Vandiver & Worrell, 2002), our data show that both gifted and advanced students have moderately higher Personal Standards than typical students. Our results also indicate positive associations of growth mindset beliefs about intelligence with Positive Strivings Perfectionism and fixed mindset beliefs with Evaluative Concerns Perfectionism, a pattern consistent with other findings (e.g., Chan, 2012; Shih, 2011). Additionally, hierarchical models revealed that

giftedness and growth mindset beliefs about intelligence were moderate predictors for Personal Standards. Because growth mindset beliefs about intelligence positively relate to high standards, this finding further supports the construct of an "adaptive"-type of perfectionism. Those adopting incremental beliefs about intelligence are not concerned with maintaining an identity of being smart but are more concerned with mastery goals (Dweck & Leggett, 1988), which can translate into a positive striving toward excellence. When Positive Strivings Perfectionism can exist without negative self-critical tendencies, these goal-oriented beliefs and behaviors might be further cultivated to help students move toward meeting high goals and accomplishment.

When mindsets were accounted for in hierarchical regression, gifted status was a predictor (β = .20) for Concern over Mistakes, while advanced status was not. We acknowledge that this yielded a small effect in an overall model explaining only 10% of variance, but the effect is important to note. A close examination of the statements on the GWHS for Concern over Mistakes, such as "If I fail at school/work, I am a failure as a person" and "I should be upset if I make a mistake," reveal self-worth contingency on performance (Crocker & Wolfe, 2001). This illuminates that the motivation to achieve is rooted in a fear of failure rather than in a goal to reach success (Slade & Owens, 1998; Stoeber & Rambow, 2007). Given that fixed mindset beliefs were positively related to Concern over Mistakes, students who have Evaluative Concerns Perfectionism may internalize personal ability (e.g., intelligence) as a measure of self-worth.

Our data also show that high fixed mindset scores with low growth mindset scores relate to doubting one's actions. Though we must be cautious in interpreting relationships within regression models explaining only a small amount of variance (e.g., Step 4, adjusted R^2 = .11 for Concern over Mistakes, adjusted R^2 = .10 for Doubt of Action), understanding the association between entity beliefs and Evaluative Concerns Perfectionism can possibly shape intervention efforts to address the fear of failure within some gifted students. If a student's belief about intelligence can change from the belief that intelligence is static to the belief that intelligence is malleable, he or she may be more concerned about improving ability rather than proving ability (Dweck & Leggett, 1988). Mistakes are no longer a measurement of self-worth but are considered feedback that can be used to readjust a strategy to meet a set goal.

Altogether, our findings continue to support the notion that self-theories (entity/fixed vs. incremental/growth) relate to the motivation toward types of perfectionism. Understanding the fixed or growth orientation associated with perfectionism tendencies can help practitioners guide students toward healthy achievement strivings. Additionally, the comparisons between groups about perfectionism reveal a consistent pattern with previous studies (LoCicero & Ashby, 2000; Shaunessey et al., 2011; Vandiver & Worrell, 2002), especially that gifted students have higher adaptive perfectionism compared with typical students.

Achievement Attitudes

We examined students' achievement attitudes to better understand gifted students' vulnerability on various underachievement factors. Our results showed that gifted students and advanced students have substantially higher academic self-perceptions than typical students, while there were no differences between the three groups on attitude toward school, attitude toward teacher, goal valuation, and motivation/self-regulation. Given that gifted students and advanced students display high achievement (to be identified as "gifted" or "advanced"), it is not surprising that they would have high perceptions of their abilities.

Overall, the gifted sample in our study demonstrated high confidence in their skills and abilities as revealed by academic self-perception, an aspect of academic self-concept found to be linked to academic achievement (Marsh, Chessor, Craven, & Roche, 1995; McCoach & Siegle, 2003). As exhibited by the positive association to growth mindsets, academic self-perception is significant to motivational processes within gifted students: "The perceptions students have about their skills influence the types of activities they select, how much they challenge themselves at those activities, and the persistence they exhibit once they are involved in those activities" (McCoach & Siegle, 2003, p. 416). Many of the statements on the SAAS-R (McCoach, 2000) relate to how a student perceives his or her ability (e.g., "I am smart at school" and "I am intelligent"). An interesting pattern emerges: While gifted students in our study view themselves as intelligent, they are not more vulnerable to developing fixed mindset beliefs, which is contrary to the concerns portrayed about the gifted label being linked to entity views (Boaler, 2018; Dweck, 2000, 2012). Our results are consistent with research that shows gifted students adopt healthy academic self-concepts (Hoge & Renzulli, 1993; Neihart, 1999; Neihart et al., 2016). Though our results must be interpreted in light of the study's limitations, findings imply that gifted students are not more vulnerable to the underachievement factors compared with other groups.

Correlations showed that growth mindset beliefs about intelligence were positively related to all attitude toward achievement, and fixed mindsets were negatively related (though the latter relationships are weak). We should note that the strongest models in our hierarchical analyses revealed growth mindset beliefs about intelligence as predictors for Academic Self-Perception ((β = .52; adjusted R^2 = 28 for overall model in Step 4) and Motivation/Self-Regulation (β = .67; adjusted R^2 = .26 for overall model in Step 4) with moderate to large effects. This positive relationship continues to support the idea that an incremental view about intelligence relates to beliefs about effort (as measured by Motivation/Self-Regulation); for the hallmark of incremental theory is the belief that ability grows from effort (Dweck, 2000). Similarly, Ommundsen, Haugen, and Lund (2005) found that implicit theories of intelligence and academic self-concept are positively related to motivation among

college students. Their findings imply the importance of strengthening academic self-concept and fostering an incremental view of intelligence to prevent self-handicapping (Ommundsen et al., 2005). Our data also indicate a positive relationship between academic self-perceptions and growth mindset beliefs ($r = .46$) and a slightly negative relationship with fixed mindset beliefs ($r = -.19$). This finding is consistent with research by Schmidt, Shumow, and Kackar-Cam (2017) who found that ninth grade students who participated in growth mindset training had higher perceptions of their academic skills as compared with a control group that did not receive the mindset intervention. Additionally, among college students who participated in growth mindset training, Wiersema et al. (2015) found that the students reported greater knowledge about mindset's affect on their abilities to learn and greater beliefs that they could understand more content in their most difficult courses. Overall, our findings show that one's perception of ability, challenge, and effort relates to one's perception about academic performance. If one believes that intelligence is malleable and challenges are embraced, then it logically follows that he feels confident in his abilities to pursue such challenges.

Context

Our findings must be interpreted in light of the context of gifted programming. In exploring the question regarding how gifted students differ from advanced and typical students, we cannot conclude it is the gifted label that creates these differences. Rather, these differences may result from other factors, including internal dispositions of gifted learners or the educational context (Makel et al., 2015). In the present study, students attend a gifted pull-out class that allows them to be challenged beyond what is offered in the regular classroom and to interact with like-ability peers. Interestingly, even though they receive grades for the gifted class (contrary to emphasizing the value of process over performance), this did not seem to negatively affect beliefs about challenging work and effort. It is important to note that gifted students in the present study have Individual Education Plans that appropriate specialized services and intervention; gifted education teachers also collaborate with teachers of advanced classes to suggest and implement challenging lessons and assignments. It is likely that the attention to individual needs and the provision of special services are contributors to the positive differences found. Additionally, having a safe place to be smart in an educational context might foster a positive sense of self-concept and belongingness to the intellectual group. Since some have proposed that a talent development model is more likely to protect students from the pitfalls of fixed mindsets (e.g., Good, 2012; Renzulli, 2012), it is important to note that the gifted program in the present study does not adopt a specific *talent* model. The program is guided by the state eligibility requirement that students' needs cannot be met in the regular classroom. In sum, it appears that gifted identification and programming in the present context do not influence an adoption of fixed mindset or negative achievement attitudes. Rather, our findings imply that gifted classes can be used to guide students to appreciate their unique abilities and characteristics while also promoting positive achievement motivation (Siegle, 2012).

Implications and Future Directions

Many assume that the gifted label promotes challenge avoidance (Dweck, 2000, 2012; Matthews & Foster, 2013; Mueller & Dweck, 1998; Ricci, 2013), but our findings suggest that gifted students are not more vulnerable to adopting fixed mindsets (about general intelligence) than other groups. Using the assumption that the gifted label or ability grouping promotes fixed mindsets, some have made sweeping conclusions to eliminate separate gifted classes, formal identification, and ability grouping (e.g., Boaler, 2016; Matthews & Foster, 2013; Scott, 2013). The unintended consequence for gifted students might mean fewer services and less access to challenging curricula beyond what is offered in the regular classroom. Exemplary practices such as ability grouping with differentiated instruction for gifted learners (Fiedler, Lange, & Winebrenner, 2002; Kulik, 1992; Steenbergen-Hu, Makel, & Olszewski-Kubilius, 2016; Tieso, 2003) should not be called to question simply because of the assumption that fixed mindset beliefs result from gifted labeling or services. Our findings in the present sample clarify the association of giftedness and fixed mindsets about general intelligence by indicating no evidence of such vulnerability. Nevertheless, Dweck's work clearly affirms that gifted students need to be appropriately challenged so that they experience productive struggle in the learning process (VanTassel-Baska, 2012). It is imperative that rigorous work is provided early on so that gifted students can develop positive attitude toward effort and making mistakes (Speirs Neumeister, 2016; Speirs Neumeister et al., 2009).

Gifted students' beliefs about abilities and effort are likely influenced by the messages conveyed to them. Of course, educators, parents, and practitioners must be mindful of the effects of ability praise and excessive use of the word "gifted;" but perhaps, they can orient gifted students to a self-understanding of their high abilities while also emphasizing that abilities are further developed from effort (Siegle et al., 2010). Snyder and colleagues (2014) found that when college female students heard an entity-focused message about giftedness—"A lot of research suggests that giftedness is strongly fixed through genetics. It's either something you have or you don't have" (p. 233)—versus an incremental-focused message about giftedness—"We've found that achieving at such a high level like you have requires not just high ability but also hard work and persistence . . . effort is still important, even for gifted students like you" (p. 234), the students claimed handicaps such as test anxiety, fatigue, and

illness when failure occurred to protect their self-worth. Self-handicapping was not seen in female students who were given incremental messages. Future studies could determine the effects of giving explicit messages of giftedness with entity and incremental messages to determine if their results are generalizable to school-age populations. For gifted students to understand the dynamic qualities of their abilities and even giftedness, Siegle (2012) suggests, "the key is to distinguish between recognition of talent with the recognition of how the talent came to fruition, with the latter being crucial" (p. 235). Those working with gifted students should be very clear in their message that achievement requires effort, but they should also not be afraid to explain that giftedness is not just a function of effort (Silverman, 2011). Since the students in the present study were labeled as gifted but were no more vulnerable to fixed mindsets about intelligence than other groups, they might already perceive dynamic qualities of giftedness. Future studies should examine how various messages about giftedness affect mindsets (in varied domains) and related variables more so than the label itself. Undoubtedly, the conveyed message must be that intellectual giftedness is further developed through task commitment and persistence through challenges (Subotnik et al., 2011).

Educators and practitioners should continue to be concerned with any underlying factor that might play a role in the failure of a gifted student to reach his or her potential. Our findings reveal that Evaluative Concerns Perfectionism could be an issue for some gifted students (though the association between giftedness and Concern over Mistakes was small). This type of perfectionism can impede creativity, motivation, and risk taking, all of which are involved in quality learning (Adelson & Wilson, 2009; Speirs Neumeister, 2016). Those working with maladaptive perfectionists should help them develop self-awareness regarding how they internalize pressure to perform (from self-expectations or from others). In line with fostering growth mindset, students should be guided to value mistakes as opportunities to learn and grow. Additionally, bibliotherapy, goal setting, approach-oriented problem solving, self-awareness, and relaxation techniques are evidence-based approaches that have been shown to be successful in decreasing Concern over Mistakes in a treatment versus control group study (Mofield & Chakraborti-Ghosh, 2010). Since our findings are not consistent with previous studies regarding the prevalence of Evaluative Concerns Perfectionism, we recommend similar comparison studies with larger and broader samples to uncover if perfectionism trends are changing in light of excessive pressures to perform in high-stakes school climates (Mofield & Parker Peters, 2015a).

The field must continue to view gifted children as individuals and not overlook the range of variabilities among the population. "Gifted children do not fall into a single pattern but into an infinite variety of patterns" (Terman & Oden, 1947, p. 57). *Some* gifted students adopt a fixed mindset. *Some* gifted students display unhealthy perfectionism. *Some* gifted students are at risk for underachieving, but we must be cautious not to overgeneralize. Furthermore, many individuals have a mixture of fixed and growth mindsets (Ablard & Mills, 1996; Dweck, 2015); and so, different educational contexts may produce different beliefs about intelligence, challenge, effort, and mistakes among varied academic domains.

As in any comparative study, we cannot infer direct cause–effect relationships between independent (group) and dependent variables (mindset, perfectionism, and achievement attitudes). It is unclear whether the gifted label, gifted programming, or inherent traits of giftedness explain the equalities and differences between groups. Comparing gifted students with other cohorts among samples in which gifted programming is different would offer insight into how educational context might play a role in shaping mindset beliefs about intelligence, healthy strivings toward excellence, and positive achievement attitudes. Though our study and other studies examined mindsets as a general domain of intelligence (e.g., Chan, 2012; Shih, 2011; Snyder et al., 2013), future studies on mindsets with gifted students should consider exploring conceptions of ability through specific domains (e.g., creativity, math, musical talent, science, giftedness, etc.).

Limitations

While we contribute important findings regarding the achievement motivation processes of gifted students compared with other cohorts, our findings must be interpreted in light of limitations. Since we did not randomly assign individuals to groups, causal inferences cannot be implied. Our sample is not culturally diverse; the external generalizability of our findings is limited only to samples with similar demographics. Because nine teachers chose not to distribute consent forms for participation in the study, comparisons were made between three unequal groups. This increased sampling error and compromised the representation of regular and advanced students. Though statistical procedures were used to account for these differences, findings should be interpreted with caution. We should also note that the internal reliability of some of the scales, particularly Doubt of Action ($\alpha = .67$) and Personal Standards ($\alpha = .75$) weakens inferences that can be made about our data. Furthermore, results from the hierarchical regression analyses must be interpreted cautiously as they produced only small to moderate effect sizes (adjusted R^2 values were between .04 and .30). Since implicit beliefs about intelligence (entity vs. implicit views) are theorized to influence beliefs and behaviors relating to the fear of mistakes and avoidance of challenges (Dweck & Leggett, 1988), we tested mindsets as the independent variable explaining the variance in the dependent variables of perfectionism and achievement attitudes; however, it is possible that perfectionism or achievement attitudes could have explained the variance in mindset

beliefs. Though our approach was guided by theory, readers must be aware that the direction of our regression models may work in the reverse direction as well.

Students were presented the questions in the order of mindset beliefs, perfectionism, and school achievement attitudes. This could have established an ordering effect in which students were more careful in their responses at the beginning of the survey and more lackadaisical toward the end of the survey questions; thus, beliefs may not be accurately reflected in the collected data. Additionally, to decrease the likelihood of Type I error, we established an alpha level of .01. Still, because we tested 11 dependent variables and used multiple statistical tests, we must be cautious in inferring that differences were not due to chance.

Readers should also keep in mind that implicit theories of intelligence are applicable across specific domains, though our study only measured implicit beliefs concerning general intelligence. Since students were not prompted to think about ability/intelligence within a specific domain (e.g., creativity, math, science, psychomotor skills, etc.), this could have influenced the results of our study. As alluded to previously, the results could have also been influenced by the educational context of the district's gifted programming. Caution must be taken in generalizing beyond the present sample to students served in other types of gifted services and talent models.

Finally, our data relied solely on self-reported measures. Social desirability and concern over self-presentation could have influenced the student responses. Student responses on the surveys may reflect a "false growth mindset," claiming a growth mindset without producing the actions to reflect it (Dweck, 2015), akin to social desirability. Certainly, beliefs noted on a survey instrument may not be reflected in real behaviors; perhaps, this is why a contrast exists between studies done in a laboratory setting (Mueller & Dweck, 1998; Snyder et al., 2014) and those done with surveys (Snyder et al., 2013). Observations and qualitative follow-up would enhance our understanding of whether attitudes translate into actions.

Conclusion

Because psychosocial factors such as motivation and mindset are critical in talent development (Subotnik et al., 2011), it is important to know what gifted students think about their intelligence and how this affects the realization of potential. While some argue that the gifted label and associated praise may make gifted students susceptible to adopting fixed mindsets, this may be a misconception. Educators may not need to be overly concerned about this vulnerability in most gifted students, especially fixed mindset beliefs about intelligence. Our findings showed no significant differences between groups on fixed or growth mindset. This suggests that educators may be able to orient gifted students to a self-understanding of their high abilities without a fear of promoting entity views, especially if they emphasize that abilities are further developed from effort. Our data also reveal that gifted students (and advanced students) have high confidence in their abilities (compared with typical students), while no differences were found for other risk factors relating to underachievement (i.e., attitude toward school, attitude toward teacher, goal valuation, and motivation/self-regulation). Given that our findings suggest that giftedness is associated with Concern over Mistakes (to a small degree), efforts should be made to identify the students who are most vulnerable in order to address unhealthy aspects of perfectionism and associated psychological distress. Because our models revealed that growth mindset beliefs are positively associated with Positive Strivings Perfectionism and constructive attitudes of achievement, practitioners might explore the value of promoting growth mindset as a means to promote healthy strivings toward high standards of excellence. By nurturing the incremental belief that intelligence is something that can change and grow, one's focus is reframed from upholding a smart identity (i.e., performance goals) to a focus on learning and improvement (i.e., mastery goals). In this reframing, students still strive for their personal best, but the ultimate goal and drive fueling the students' efforts change. When we provide challenges that necessitate sustained effort and rechannel the fear of failure toward a passionate pursuit of learning, we can shift the trajectory of talent development to elevated heights.

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