The present study investigated predictive factors of literacy achievement in third-grade students identified as gifted in rural schools. The sample consisted of 180 identified students in a total of eight districts, three of which were randomly assigned to the treatment condition and five of which were randomly assigned to the control condition. Students in the treatment condition received instruction with a place-based folklore unit of the Challenge Leading to Engagement, Achievement, and Results (CLEAR) Curriculum, a language-arts based curriculum designed to challenge gifted learners, in addition to an intervention promoting an incremental mindset. Results of the present study indicated that prior achievement, mindset, and gender were all statistically and practically significant predictors of literacy achievement for students identified as gifted in rural areas. A stronger incremental mindset was associated with lower literacy achievement scores. Practical implications and recommendations, as well as limitations and directions for further research, were discussed.

Keywords: *Place-based curriculum, mindset intervention, rural gifted education*

Predictive Factors of Literacy Achievement in Young Gifted Children in Rural Schools

Contrary to the notion that giftedness is the manifestation of a stable trait (Mudrak, 2011), giftedness has more recently been presented as a developmental process (Hernández Finch, Speirs Neumeister, Burney, & Cook, 2014; Subotnik, Olszewski-Kubilius, & Worrell, 2011). In this conception, giftedness begins with potential, which transforms with time into accomplishments (Hernández Finch et al., 2014; Subotnik et al., 2011). In this view, exposure to certain individual-level or environmental-level factors likely helps students identified as gifted grow in their capacity. However, for some identified gifted students, their potential for such achievements does not get realized. Some researchers estimate that between five and fifty percent of identified gifted children never realize their full intellectual or creative potential (Morisano & Shore, 2010).

For identified gifted students who do not fulfill their potential—whose academic performance falls below that which is expected of them—the label of *gifted students* often changes into one of *gifted underachievers*, reflecting the discrepancy between their expected and actual performance (Abu-Hamour & Al-Hmouz, 2013; McCoach & Siegle, 2003). Seen as a waste of human potential (Abu-Hamour & Al-Hmouz, 2013), this underachievement is regarded as a significant problem that gifted children face (van der Meulen et al., 2014). Despite the fact that some identified gifted students can underachieve and still meet the standards set for their grade level, underachievement can turn into a pattern that may be difficult to break, leading underachievers to avoid or fail to succeed in advanced classes or even be more likely to drop out of high school (Renzulli & Park, 2000; Ritchotte, Rubenstein, & Murry, 2016; Zabloski & Milacci, 2012).

Concerns about gifted underachievement may be particularly salient in rural areas where

limited opportunities, coupled with a lack of student motivation and curriculum relevance, may serve as an obstacle to students fully developing their potential (Budge, 2006). One approach to remedying this situation is embodied in the movement toward place-based education, in which the curriculum incorporates elements of place and, consequently, a sense of personal relevance (Smith, 2002). In this way, the curriculum may encourage development of or interact with other factors commonly associated with achievement in identified gifted students, such as motivation (Lüftenegger et al., 2015; Mammadov, Cross, & Ward, 2018) or self-efficacy (Ritchotte, Matthews, & Flowers, 2014), to help identified gifted students in rural areas develop their potential and avoid underachievement.

Review of Relevant Literature

The following review of the literature focuses on factors associated with achievement in identified gifted students. These may be categorized as individual-level factors and environmental-level factors.

Motivation

Perhaps the most frequently cited individual-level factor in the literature linked to the development of gifted potential is the student's motivation to achieve (Abu-Hamour & Al-Hmouz, 2013; McCoach & Siegle, 2003; Ritchotte, Suhr, Alfurayh, & Graefe, 2016; Wellisch & Brown, 2013). Defined as "the processes that allow people to select appropriate goals and to pursue them successfully" (Lin-Siegler, Dweck, & Cohen, 2016), motivation has long been referenced by theorists in the field as a key element of giftedness (Csikszentmihalyi, Rathunde, & Whalen, 1997; Gagné, 2000; Sternberg, 2001). While the environment surrounding a student can help in the recognition and development of giftedness, a student's motivation can help initiate and sustain such talent development (Abu-Hamour & Al-Hmouz, 2013; Gagné, 1995).

For identified gifted students with different levels of achievement, motivation is a significant distinguishing factor, with higher motivation associated with greater academic achievement (Abu-Hamour & Al-Hmouz, 2013). The role of motivation may be especially important for gifted minority students as it may help them persevere against stereotypes and demonstrate high achievement in school (Coleman, Micko, & Cross, 2015).

Self-Efficacy

In order for individuals to attempt behaviors associated with desirable outcomes, they must have a sufficiently high efficacy expectation, or belief that they are capable of successfully executing the behavior (Bandura, 1977). The greater one's sense of self-efficacy, the more effort will be exerted in persisting in the face of difficulties and the more motivated the individual will be (Bandura, 1977; Pajares, Johnson, & Usher, 2007). The absence of high self-efficacy in a particular field may lead students to engage in fewer tasks in that domain and may consequently contribute to underachievement in identified gifted students (Ritchotte et al., 2014). In previous studies, identified gifted students have generally reported higher levels of self-efficacy in domains such as math when compared to their non-identified peers (Hong & Aqui, 2004). It is worth noting, however, that self-efficacy is best studied with regards to specific tasks or domains (Phan, 2012).

Mindset

Students with an incremental mindset believe that everyone can become smarter by working to improve his or her intellectual potential (Dweck, 2003; Dweck & Leggett, 1988). They are likely to pursue learning goals because they believe intelligence is malleable and can be increased (Dweck, 2003; Dweck & Leggett, 1988). However, students with an entity mindset believe that intelligence is fixed and use their performance to gauge their level of intelligence,

thus making them more likely to pursue performance goals (Dweck, 2003; Dweck & Leggett, 1988). Although mindset is often presented as a dichotomy between entity and incremental, such beliefs may exist on a continuum instead (Ablard & Mills, 1995).

Mindset has been linked to achievement in secondary and middle school populations (Romero, Master, Paunesku, Dweck, & Gross, 2014), but the connection has not been as consistent with early elementary school samples (Park, Gunderson, Tsukayama, Levine, & Beilock, 2016). It is also important to consider mindset as it relates specifically to identified gifted students. One challenge to such an endeavor is that work in elementary school may not be challenging enough for identified gifted students to elicit an observable impact of mindset on achievement and approaches to tasks (Park et al., 2016). Some researchers (Ablard, 2002; Guskin, Okolo, Zimmerman, & Peng, 1986; Kerr, Colangelo, & Gaeth, 1988) have indicated identified gifted students may possess incremental mindsets, while others (Mudrak, 2011; Snyder, Barger, Wormington, Schwartz-Bloom, & Linnenbrink-Garcia, 2013) have conducted research that indicates the opposite may be true.

Despite the inconsistencies regarding mindsets held by identified gifted students, interventions promoting an incremental mindset have shown positive results (e.g., Blackwell, Trzesniewski, & Dweck, 2007). Mindsets are implicit constructs, which researchers have found can be redirected with simple interventions (Schroder, Moran, Donnellan, & Moser, 2014), thus reducing negative beliefs about ability and improving student motivation and performance in school (Lin-Siegler et al., 2016).

Stereotype Threat

Stereotype threat, or “being at risk of confirming, as self-characteristic, a negative stereotype about one’s group” (Steele & Aronson, 1995, p. 797) is another individual-level factor

associated with student achievement and performance (Ambady et al., 2001; Clark, Eno, & Guadagno, 2011; Steele & Aronson, 1995). Increased stereotype threat is associated with holding an entity mindset (Callahan, 2012), pursuing performance goals (Aronson, Fried, & Good, 2002), and maintaining a tenuous sense of self-efficacy (Aronson & Inzlicht, 2004). In order for stereotype threat to be salient, individuals must identify with the group with which they are associated (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010; Aronson et al., 1999; Aronson & Steele, 2005; Steele, 1997). Additionally, the stronger an individual's entity mindset, the more likely he or she is to agree with social stereotypes (Levy, Stroessner, & Dweck, 1998). Finally, stereotype threat is most salient in environments that include the group being stereotyped along with a group that isn't (Steele, 1997). More recently, researchers have questioned how stereotype threat influences rural gifted learners (Azano, Callahan, Brodersen, & Caughey, 2017), particularly if such students are at risk of associating rurality with lower academic performance. It is worth noting, however, that the concept of stereotype threat has had limitations in research and replicability (Richwine, 2019).

Gender

Gender differences in math achievement have been well documented in the past (Benbow & Stanley, 1980), and although the gender achievement gap is shrinking when achievement is measured through classroom grades, the gender gap in math achievement persists on standardized tests (Schwery, Hulac, & Schweinle, 2016). Gender differences in English and language arts, which tend to favor girls, have also been documented (Brookings Institution, 2015). In addition to domain-specific gender gaps, distinctions between boys and girls also appear relative to motivation (Heller & Ziegler, 1996), self-efficacy (Dai, 2002; Junge & Dretzke, 1995; Olszewski-Kubilius & Turner, 2002; Preckel, Goetz, Pekrun, & Kleine, 2008), mindset (Bråten & Strømsø, 2004), and stereotype threat (Dai, 2002).

Among identified gifted students, gender gaps in performance may begin as early as grade three, with male gifted students outperforming their female counterparts in math (Olszewski-Kubilius & Turner, 2002) and in language arts (Pagnani, 2013). One potential cause for such gender gaps in achievement stems from conflicts between traditional notions of femininity and academic achievement (Freeman, 2003).

Curriculum

In addition to the individual-level factors explored above, numerous environmental-level factors have also been noted in association with student achievement. Challenge is important to intellectual growth (Callahan, 2012), but concerns have recently been expressed that the unique needs of identified gifted students are not being met in the classroom due to a lack of challenge (Bailey et al., 2012; Callahan, Moon, Oh, Azano, & Hailey, 2015). Although students identified as gifted have potential, if they are not challenged in the classroom, their potential may atrophy (Altintas & Ozdemir, 2015; Reis & Morales-Taylor, 2010; Ritchotte, Rubenstein, & Murry, 2016). A curriculum replete with "engaging, culturally relevant, appropriately challenging learning opportunities" (Jarvis, 2009, p. 234) can help potential evolve into talent.

CLEAR curriculum. One example of a model for curriculum designed to challenge identified gifted learners is the Challenge Leading to Engagement, Achievement, and Results (CLEAR) curriculum model (Azano, Tackett, Missett, & Callahan, 2017), based on five foundational elements: continual formative assessment, clear learning goals, data-driven learning experiences, authentic products, and rich curriculum (Callahan et al., 2015). The curriculum model incorporates elements from Tomlinson's (2001) philosophy of differentiation, Renzulli and Reis's (1985) Schoolwide Enrichment Model, and Kaplan's (2013) Depth and Complexity model. Because identified gifted learners spend a significant amount of time in classrooms being

exposed to what they already know, the units are designed to increase challenge by increasing the depth and complexity of the concepts presented in the standard curriculum, incorporating more abstract content, relying on more open-ended problem-solving, and providing opportunity for application of higher-level critical thinking skills (Callahan et al., 2015). Units based on the CLEAR curriculum were shown to be effective in increasing achievement of gifted students in a randomized control trial (Callahan, et al., 2015). For the purposes of this study, the third-grade folklore unit based on CLEAR served as the curricular intervention.

Geographic Rurality

The final factor that will be considered as a predictor of achievement in identified gifted students is geographic rurality. In 2001, the national high school dropout rate was estimated around 12%, although this number was closer to 20% in rural areas and is reported to be as high as 40% in the most remote areas (Hardre & Reeve, 2003). This pattern extends into college, with college enrollment rates lower in rural areas than in all others (Provasnik et al., 2007). Poverty further complicates the problems faced by rural schools (Hébert & Beardsley, 2001), with approximately 19% of children who live in rural areas living in poverty in 2011 (National Center for Educational Statistics, 2013). With more than half of the school districts and one-third of public schools nationwide residing in rural locations (National Center for Educational Statistics, 2013), addressing issues associated with rural education is an important undertaking.

Although it is difficult to define what rural is because of the diversity the term encompasses, rural places tend to be characterized by low population density, isolation, interdependence between the school and community, and an attachment to place (Budge, 2006; Burney & Cross, 2006). In a case study of a rural community, Budge (2006) found students were apathetic toward school, had limited educational goals, and didn’t see how education was

relevant to their lives. Furthermore, community leaders believed geographic isolation led to few quality or appropriately challenging experiences that would prepare students for lives after graduation, a concern that affects students' opportunities to develop their potential (Burney & Cross, 2006).

Sense of place. A unique aspect of rural communities is the powerful sense of place that is critical to citizens' identity development and quality of life (Budge, 2006). Therefore, separating education from sense of place can have a negative effect on students (Budge, 2006). Unfortunately, formal education has been associated with losing one's connection to the community in rural areas (Corbett, 2009), perhaps attributable to the lack of relevance in the curriculum to the students' own lives. Consequently, scholars in rural education have encouraged the incorporation of aspects of the community and relevant interests of its students into the curriculum of schools (Lockette, 2010) in an effort to increase the significance of the curriculum to students' own lived experiences and increase their motivation. In such a movement toward place-based education, the goal becomes to "ground learning in local phenomena and students' lived experience" (Smith, 2002, p. 586). A place-based education, by appealing to a sense of relevance, may benefit identified gifted students in rural areas (Azano, 2014).

Identified gifted students in rural America. Although identified gifted students in rural areas are less likely to feel stigmatized for being gifted, they are also less likely to have academic peers (Burney & Cross, 2006; Cross & Burney, 2005). Therefore, identified gifted students in rural areas are likely to feel like a big fish in a small pond (Hébert & Beardsley, 2001). The lack of appropriate opportunities for identified gifted students in rural schools may also be a risk factor for achievement (Cross & Burney, 2005). Specifically, if rural students identified as gifted aren't exposed to challenges in their youth, they may resent advanced courses and challenges in

later years, which may then impact their potential for success in college (Burney & Cross, 2006; Cross & Burney, 2005). Given their unique situation and needs, it is important to conduct studies aimed at better understanding how educators can support the achievement of identified gifted students in rural areas.

Research Question

The factors explored in the review of the literature have been associated with achievement in identified gifted students. However, few of them have been studied specifically among the population of identified elementary level gifted students in rural areas. Therefore, the following research question is the focus of this study: to what extent do the following factors predict literacy achievement of third-grade identified gifted students in rural areas: prior achievement, motivation, self-efficacy, mindset, stereotype threat, gender, and exposure to a unit based on the CLEAR curriculum model?

Method

Data for the present study were collected as part of an overarching and ongoing study, *Promoting PLACE (Place, Literacy, Achievement, Community, Engagement) in Rural Schools* (Project PLACE), a randomized control trial designed to investigate the effects of place-based curriculum on literacy achievement in rural identified gifted students.

Participants

Participating districts were designated by the National Center for Education Statistics as rural and at least 50% of the student population qualified for Free and Reduced Lunch according to the Virginia Department of Education Office of School Nutrition Programs. The three treatment districts consisted of greater ethnic and racial diversity, with 60.13% of students identifying as White (*SD* = 27.23) in treatment districts compared to 94.53% (*SD* = 3.43) in the

five control districts (Virginia Department of Education, 2016a; 2016b; 2017). Based on the pass rates on Virginia's Grade 3 English Standards of Learning test, students in the control districts (M = 74.2%, SD = 7.46) and treatment districts (M = 69.0%, SD = 5.0) reflected no statistically significant academic differences at the start of the study. Refer to Table 1 for information regarding the districts, including the service delivery model used in each one.

Identification measures and student selection. Second-grade students in all participating districts were identified to receive gifted services either according to the processes in place at their respective school district or by more inclusive strategies implemented by the research team of Project PLACE. Most districts screened students universally in the first or second grade, followed by administration of a general abilities or achievement test. A committee looked at the results, as well as parent and teacher checklists, to determine eligibility. Identification by the Project PLACE research team was based on results of the Cognitive Abilities Test-Verbal Battery Level 9 (CogAT-V; Lohman, 2012) and the motivation, creativity, and reading subscales of the Scales for Rating the Behavioral Characteristics of Superior Students (SRBCSS; Renzulli et al., 2010). Second-grade teachers in all districts participated in professional development training to increase the validity and reliability of SRBCSS ratings. After completion of the CogAT-V and SRBCSS and after school personnel had completed their own identification process, we held district identification meetings, in which we recommended the inclusion of additional students, who were added based on agreement about their potential and the district's view of acceptable numbers of gifted students to be served. It is worth noting that implementing a limit on the number of students to be served could yield differences in the samples representing each district, such as students with higher achievement or ability. The final sample consisted of 180 students in three treatment districts (N = 82) and five control districts (N

= 98).

Intervention

Students identified as gifted in the treatment districts received instruction during their third-grade year based on the folklore unit of the CLEAR Curriculum, which consists of twenty lessons aligned with state and national third-grade reading and writing standards. Additional information on the CLEAR Curriculum can be found in Callahan et al. (2015). Treatment teachers instructing with the CLEAR Curriculum participated in an introduction session to the curriculum and received ongoing support from the project team and from the teacher who piloted the intervention in the previous year. The unit typically took one semester to implement. During this time, students in the control districts received the instruction and services typically provided to them by their school. Project team members observed teachers in all schools using an observation tool reflecting standards of quality instruction for gifted students. To monitor fidelity to the CLEAR curriculum unit, observers used an observation log specific to Project PLACE; teachers also submitted logs for each lesson completed.

Students in treatment districts also received messages aimed at promoting an incremental mindset via specific references in the units themselves and a mindset intervention in the form of a WebQuest, which was developed by adapting the relevant components from the intervention used by Blackwell et al. (2007) to a younger age group. The WebQuest incorporates activities on how the brain works, the nature of intelligence, and overcoming stereotype threat.

Pre-Intervention Measures

In the fall of students' third grade year, we administered standardized assessments of achievement and measures of self-efficacy, mindset, and stereotype threat to all identified students in both treatment and control groups.

Achievement. To measure student achievement at the beginning of the study, we administered the Reading, Written Expression, and Vocabulary sections of Level 10 of the Iowa Assessments. Correct responses from the objectively scored subtests were summed to create a total achievement score for each participant. Using a sample of public and private schools, Dunbar and Welch (2015) found the reliability coefficient of the Iowa Assessment Level 10 for fourth grade to be .91 for all three subtests. To evaluate predictive validity, the developers calculated correlations between the Iowa Assessments and ACT Composite scores; results ranged from .82 to .87 (Dunbar & Welch, 2015).

Self-efficacy. "How I Feel About Reading and Writing" (HIFRW) was developed to gauge self-efficacy beliefs regarding language arts skills in third and fourth grade students. We adapted items from existing scales (e.g., Andrade, Wang, Du, & Akawi, 2009; Hidi, Berndorff, & Ainley, 2002; Pajares, 1996, 2003; Pajares, Miller, & Johnson, 1999; Shell, Colvin, & Bruning, 1995; Shell, Murphy, & Bruning, 1989) to reflect self-efficacy relating to skills that could be expected from the students. The scale underwent revisions based on expert feedback, cognitive interviews with third grade students, and two pilot studies. The overall reliability estimate for internal consistency of the 11-item Likert-type scale was .87 (N = 191).

Mindset. To measure mindset, we used the Implicit Theories of Intelligence Scale (Dweck, 2000). After revising items based on the results of an initial pilot test and cognitive interviews, we conducted a pilot test (N = 42) of the revised scale, renamed "How Does Your Brain Work?" Based on the results, we decided to use the 6-item scale Dweck (2000) recommended for children aged ten and older. The reliability estimates for the two sub-factors using the 6-item scale were .58 and .81. An entity mindset score was created by averaging the responses for the three entity mindset statements, while a similar process was used to create an

incremental mindset score. An overall mindset score was produced by averaging the original entity mindset values with reverse-coded incremental mindset values so higher values were more indicative of an incremental mindset.

Stereotype threat. The scale measuring stereotype threat, "Who I Am and How I Learn" (WIAHIL), was used to assess stereotype threat relative to gender, ethnicity, socioeconomic status, reading and writing, and living in a rural community. Items were revised from the Social Identities and Attitudes Scale (SIAS; Picho & Brown, 2011), and more items were added to capture other factors of interest (e.g., socioeconomic status). Following expert reviews and cognitive interviews, we conducted two pilot studies with gifted and high-achieving students. The resulting WIAHIL scale comprised 38 items with eight factors. Because stereotype threat is most likely to be felt in environments that include the group being stereotyped along with a group that isn't (Steele, 1997), we hypothesized that stereotype threat vulnerability with regard to rural identity would be less salient in the present study. However, given the gender gap in reading achievement (Brookings Institution, 2015), we chose to focus on stereotype threat with regard to gender. Toward this end, we averaged the gender identification factor (4 items; $\alpha = .69$) and the gender stigma consciousness factor (6 items; $\alpha = .83$) to create a single score for which larger values were indicative of greater stereotype threat vulnerability with regard to gender.

Post-Intervention Assessment

We designed the end-of-unit assessment to align with both Virginia's Standards of Learning (SOLs) for third-grade English and the corresponding learning objectives for the CLEAR Curriculum Folklore unit as students in all districts would be completing the assessment. We began by creating a table of specifications covering the eight objectives of the folklore unit. We then identified specific sub-standards of third grade SOLs 3.1, 3.2, 3.4, and 3.5 as relevant

standards that would be covered in the control schools. Project PLACE team members created questions that covered the material from those lessons and aligned with the SOLs, avoiding questions that could only be answered by students who received the folklore curriculum. Following independent reviews by project team members, the resulting items were sent to three external reviewers. The final unit assessment consisted of thirty multiple-choice questions and five reading passages.

Specification of Regression Models

We used Stata 14 to conduct a series of exploratory regression analyses with various predictive models incorporating varied selections of the identified predictors. We made no explicit predictions at the outset of the study. Therefore, we began the analysis with the following model consisting of all predictors:

$$achievement_i = \beta_0 + \beta_1 priorachievement_i + \beta_2 motivation_i + \beta_3 selfefficacy_i + \beta_4 mindset_i + \beta_5 stereotype_i + \beta_6 gender_i + \beta_7 curriculum_i + e_i$$

Achievement was student *i*'s quantitative score on the folklore post-assessment. Prior achievement was measured as a student's total score on the Iowa Assessment. Motivation was measured by a teacher's numeric rating of student motivation using the SRBCSS Motivation scale, while self-efficacy, mindset, and stereotype threat were measured by student responses to the relevant pre-test measures. Gender was a qualitative variable (coded 0 for male). Exposure to the folklore unit of the CLEAR Curriculum (the treatment condition) was also coded 0 for students in control schools. Additional dummy indicators for districts were included in each model. To control for missing values, binary missing indicators for each covariate were also included in each model. We tested additional models incorporating interactions that, based on the literature, may indicate differential impacts. Model fit was assessed using the root mean squared errors, R-squared values, and Bayesian Information Criteria (BIC; Burnham & Anderson, 2004).

Results

In order to maximize use of the available data, observations were classified as either complete if all covariate data points were present or incomplete if at least one data point was missing. Refer to Table 2 for descriptive statistics on the measures for the sample of complete observations and to Table 3 for a comparison of the complete and incomplete subgroups of observations. Refer to Table 4 for correlations between the pre-intervention measures used.

Pre-Intervention Measures

Based on scores from the present study, the internal consistency estimate for the overall mindset scale was .64, while the estimates for the entity and incremental subscales, when considered separately, were .77 and .73, respectively, which are higher, when averaged, than those from the pilot study, a possible result from the larger sample size. The internal consistency estimate for the self-efficacy scale was .87 while that for stereotype threat with regards to gender was .81. The internal consistency estimate for the folklore objective assessment was .59 across all items. Given that the assessment consisted of only 30 items and greater reliability has long been associated with longer tests, particularly those that are commercially prepared (Ebel, 1965; Frisbie, 1988), the internal consistency estimate was deemed to be acceptable. Additionally, the breadth of achievement outcomes measured, ranging from the comprehension level to deeper analysis questions, may have also contributed to a lower measure of overall consistency.

Cohen's D was calculated to determine effect sizes on each covariate between the treatment and control groups; this was done to determine the meaningful differences, if any, that existed between the two groups. The effect size was .70 for prior achievement on the Iowa Assessment (95% CI [.38, 1.0]), .08 for motivation (95% CI [-.22, .38]), .44 for self-efficacy beliefs (95% CI [.13, .75]), -.07 for mindset (95% CI [-.38, .24]), and -.13 for gender stereotype

threat (95% CI [-.44, .18]). For prior achievement and self-efficacy beliefs, students in the control group had higher scores than did students in the treatment group, indicating students in the control group may have been more academically advantaged at the start of the study than their treatment group counterparts. These differences were consistent across all subsections of the Iowa Assessment, as well: the students in the control group scored higher on the Reading subsection ($\mu = 28.60$, $\sigma = 7.45$) than their treatment group counterparts ($\mu = 24.58$, $\sigma = 8.21$), as well as on the Written Expression subsection ($\mu = 24.36$ and $\sigma = 8.57$ compared to $\mu = 19.58$ and $\sigma = 7.81$) and the Vocabulary subsection ($\mu = 25.22$ and $\sigma = 6.96$ compared to $\mu = 19.63$ and $\sigma = 7.26$).

Additive Regression Models

Results of the additive regression analyses can be found in Table 5; the curriculum variable was retained for all models because it represented the treatment condition and excluding it may have led to biased coefficients. Predictors were considered for retention in the regression models if their p-value was below .10.

Beginning with the main effects model, only prior achievement and mindset were statistically significant predictors of achievement on the folklore assessment ($p < .05$) and were therefore retained in the subsequent model. Gender was statistically significant at the $p < .10$ level, but because it has been associated in the literature with domain-specific achievement (Olszewski-Kubilius & Lee, 2011), we retained it for the second model, as well, but dropped it from the third model to adhere to a more conservative α-level. Finally, to test if prior achievement alone was enough to predict future achievement, we dropped mindset from the regression analysis in the fourth model. Given the predictive strength of prior achievement, it

was retained in all models as excluding it may have led to overestimations of the remaining coefficients.

Prior achievement was strongly predictive of achievement on the folklore assessment; for each increase of one standard deviation on the Iowa Assessments, students, on average, scored approximately two points higher (out of thirty) on the posttest, controlling for all other covariates. An increase in one standard deviation on the mindset scale (indicating a stronger incremental mindset) was associated with a decrease in roughly .90 points on the posttest in all models, controlling for all other covariates. This points to the potentially more complicated interpretation of mindset alluded to in the literature (Callahan, 2012) and the possible benefit of not only an incremental mindset, but also, in certain aspects, a fixed one. With regards to gender, after controlling for all other covariates, girls tended to outperform boys on the folklore assessment by nearly one point.

From the models in Table 5, we selected Model 2 to use as a base model because it retained the predictors that were either statistically significant ($p < .05$) or that were practically significant based on their implication, such as gender. Based on Model 2, students in the treatment group performed, on average, .51 points higher on the folklore assessment than did students in the control group, controlling for all other covariates. To test regression assumptions for this model, we began by checking if the residuals were normally distributed with a kernel density plot and a standardized normal probability (P-P) plot and both confirmed that the residuals were close to a normal distribution. Using White's test to check for heteroskedasticity, we retained the null hypothesis that the variance of the residuals was homogeneous ($p > .05$). After removing the missing indicator for gender (due to its perfect correlation with a gender value of "999"), the variance inflation factor for all covariates fell below ten, thereby supporting

the absence of multicollinearity in the data. Finally, after plotting the standardized residuals against each of the predictors, no issues of non-linearity arose.

Interactive Regression Models

Using Model 2 in Table 5 as a base model, we tested various interaction terms with both curriculum and motivation. Refer to Table 6 for the results of these regression analyses. None of the interaction terms proved to be statistically significant ($p < .05$), and all of them were consequently dropped.

Discussion

At the start of the study, students in the control group had notably higher prior achievement scores than their counterparts in the treatment group, and this difference was statistically significant ($p < .01$; refer to Table 2). However, by the end of the study, following exposure to the CLEAR Curriculum folklore unit and after receiving the intervention promoting an incremental mindset, students in the treatment group and students in the control group averaged the same score on their folklore objective assessment (23 out of 30). However, because the prior achievement assessment measured general English language skills and the folklore posttest was more topic-specific, these results should be interpreted with caution. Based on this observation, further investigation into the benefits of a place-based curriculum with high-level challenge, paired with a growth mindset intervention, should be considered. As with the curriculum variable, some of the covariates tested did not prove to be statistically significant, namely motivation, self-efficacy, and stereotype threat.

Prior Achievement

The importance of prior achievement as a factor promoting consequent literacy achievement is underscored in the results of the present study. Prior achievement, coupled with

the treatment variable, sufficiently explained approximately 87% of the variance in student scores on the folklore posttest. For students, then, who enter gifted programs with more limited prior knowledge and skills, such as English language learners or at-risk students, the importance of scaffolding instruction for their future success becomes critical (Siegle et al., 2016). This conclusion is heavily supported by the literature resulting from studies with students from a variety of age groups and nations (Hemmings & Kay, 2010). In one such study, prior achievement, even from three years prior, was capable of explaining roughly half of the variance in elementary student math scores (Basque & Bouchamma, 2016).

Another approach to understanding the significance of prior achievement can be seen in the reciprocal effects model (REM), in which academic self-concept is presumed to support academic achievement, which, in turn, further strengthens a student's academic self-concept (Seaton, Marsh, Parker, Craven, & Yeung, 2015). Although students' general academic self-concept was not within the scope of the present study, the modest correlation (r = .35) between reading and writing self-efficacy and prior achievement observed could warrant additional exploration into the applicability of REM to young identified gifted students in rural schools.

It is important, as well, to distinguish between the relationship between prior achievement and the outcome and the relationship between aptitude and the outcome. The correlation coefficient between the measure of prior achievement, the Iowa Assessment, and the measure of aptitude, the CogAT-V, was approximately .61. The correlation coefficient is moderately strong, but not strong enough to suggest these two measures assessed the same construct. In correlating each of these measures with the outcome, the folklore posttest, the results revealed a stronger correlation coefficient for the Iowa Assessment (r = .51) than for the CogAT-V (r = .40). Therefore, prior literacy achievement appears to be more strongly associated with future literacy

achievement than does a child's overall aptitude. This suggests that domain-specific accomplishments and achievements may better shape a child's future success than their aptitude, which may be indicative of the importance of environment in shaping aptitude into achievement in order to promote success.

Mindset

The results from the present study regarding the importance of prior achievement are perhaps not surprising, but the results regarding mindset may be perceived as more unexpected. In the present study, a stronger incremental mindset was associated with a decrease in score on the folklore posttest (see Table 5). Although this appears to be contrary to some of the literature that advocates an incremental mindset as a catalyst for academic achievement (e.g., King, 2012), it is not entirely without support from other researchers (e.g., Bahník & Vranka, 2017) and may point instead to the potential benefits to be gained from students adopting elements from both a fixed and incremental mindset.

There are several potential interpretations of the results of the present study concerning mindset as a factor promoting the development of gifted potential into achievement. The first concerns the potential complexity of our measurement of the mindset construct. For instance, some researchers (e.g., Sriram, 2014) have noted an individual's mindset may be mixed: an individual may possess an entity mindset in one domain but an incremental mindset in another. In the present study, the mindset scale was not domain-specific. Therefore, when reading items on the general mindset scale with no domain specificity, it would be impossible to know what context each student attributed to the question, and such contexts may not have been consistent across students. The lack of domain specificity, therefore, may have muddled the interpretation

of the results in the present study and overlooked the greater complexity behind the mindset construct.

Additionally, the results from the present study may indicate the possibility that six items are not sufficient for validly assessing a construct as complex as mindset. The wording used in the scale may also complicate matters. For instance, the items on the scale are all worded in terms of *change*, rather than *improvement*. For students who have just received the gifted label, they may interpret the idea of a change in how smart they are as a regression toward the mean for they may believe they are already as smart as they can possibly be. Further investigation into using a scale with more incremental-specific wording—for instance, "You can always greatly *improve* how smart you are"— would be warranted in better comprehending the construct of mindset, particularly if accompanied by cognitive interviews with students.

In addition to the potential complexity in our measurement of mindset, it is possible that our interpretation of the construct is similarly complicated. For instance, Callahan (2012) raised the question of the benefits of an entity mindset in certain situations; the results of the present study similarly challenge the notion that a fixed mindset is necessarily non-conducive to learning. For instance, in the present study, mindset was assessed at the start of students' third-grade year, their first year in their school's gifted program. In a study by Makel, Snyder, Thomas, Malone, and Putallaz (2015), they found students generally believed giftedness to be more fixed than intelligence. This might result from an internalization of the label they receive, believing it to be a stable characteristic about themselves. If this holds true for the students in the present study, then it is possible that upon being labeled as gifted, the students who identified more strongly with their new label tended toward more of a fixed mindset. Their fixed mindset might therefore be interpreted as a strong belief and conviction in their own abilities in the

classroom, which might be a positive force in favor of their achievement, thereby making a fixed mindset positively associated with achievement. If students believe their own giftedness to be fixed, they may also be emboldened to take academic risks when learning because they do not fear failure. Further exploration into this potential trajectory would require data beyond the scope of the present study.

Finally, we reran the regression analysis for the final model but replaced the mindset covariate with a separate incremental mindset variable and an entity mindset variable. The results revealed the statistical significance ($p < .05$) of the incremental mindset variable but not of the entity mindset variable. Although these results alone do not provide sufficient grounds to ascertain the idea that incremental and entity mindsets do not reside on the same scale, they do warrant further investigation in a future study to help establish the possible benefits of each type of mindset in promoting academic achievement.

Gender

The final statistically significant predictor was gender, with females outperforming their male counterparts by an average of nearly one point on the folklore posttest. While this finding is not surprising given the body of literature revealing the gender gap in performance in English and language arts (Brookings Institution, 2015), it is concerning that such differences continue to persist. Of further concern is the finding by the Brookings Institution (2015) that this gap tends to be widest in adolescence, thereby suggesting that the gender gap observed in the present study may be at risk of widening over time if not addressed.

Recommendations and Limitations

Based on the importance of prior achievement in promoting future achievement, a primary recommendation that stems from the present study is for schools to ensure sufficient

scaffolding is provided for students transitioning into a gifted program. Specifically, it is worth further investigating the possibility that exposure to the place-based elements of the CLEAR Curriculum unit provided sufficient connections to students' prior knowledge to bolster their formerly weaker performance relative to students in the control group.

Regarding mindset, we would also recommend that future studies investigate the nature of how students think about mindset, perhaps through more cognitive interviews than solely the administration of surveys. Such a qualitative approach could allow for greater insight to be made about how students are interpreting the construct of mindset, as well as how they may be benefitting from adopting both beliefs that are aligned with an incremental mindset and beliefs aligned with a fixed mindset. This is of particular importance as the results of the present study lead us to recommend exercising caution in assuming that promoting an incremental mindset alone is sufficient for promoting student achievement.

Additionally, given the correlation between prior achievement and mindset (r = .31), in studies investigating mindset, it would be important to control for prior achievement prior to drawing any conclusions about the nature of the relationship between an incremental mindset and academic achievement. Otherwise, researchers may be attributing positive benefits to mindset that are actually stemming from variations in prior achievement. Given its significance in predicting later academic achievement, prior achievement should be controlled in studies investigating predictors of academic achievement in order to attain more accurate coefficients and interpretations.

Some limits to the present study should be noted, including the relatively small sample size, a lack of control for treatment fidelity, and the exclusion of a teacher-level indicator in the regression models. Additionally, while this study was a quantitative one, an exploration into

some of the more qualitative variables that might be related to student achievement was also absent in this study.

Further Research

The results of the present study raise numerous questions that could be explored in future studies. First, how does mindset change with time after entrance into a gifted program? How do these patterns change according to academic settings (e.g., homogeneous grouping, mixed-ability, etc.), if at all? A qualitative study investigating these questions could be a vital contribution to the ongoing discussion about mindset and gifted students.

Additionally, examining the mindset construct itself would be a worthy endeavor. According to the present study, it appears to maintain significance in predicting achievement, but the process by which this occurs remains unclear. Are incremental and entity theories part of the same continuum? Or, are they two separate scales for which each individual has a measurable score, depending on the domain? In which situations might a fixed mindset be conducive to learning? A related question to explore would be an investigation into the degree to which the mindset indicated by a student on a scale aligns with the behavior they would exhibit when confronted with a challenge.

Finally, it is important to continue the exploration into the most significant predictors of student success, not only for the general population of students, but also for the sub-populations of students, such as identified gifted students in rural areas, who may easily be overlooked. Investigations relying on multiple factors are particularly worth undertaking as one factor alone typically is not sufficient to predict achievement, as evidenced from the present study. It is through a better understanding of how factors such as motivation, mindset, and self-efficacy

relate to stronger academic outcomes that educators can better prepare stronger students for greater success.

References

Ablard, K. E. (2002). Achievement goals and implicit theories of intelligence among academically talented students. *Journal for the Education of the Gifted, 25*, 215-232. doi: 10.1177/016235320202500302

Ablard, K. E., & Mills, C. J. (1995). Implicit theories of intelligence and self-perceptions of academically talented adolescents and children. *Journal of Youth and Adolescence, 25*, 137-148. doi: 10.1007/BF01537340

Abu-Hamour, B., & Al-Hmouz, H. (2013). A study of gifted high, moderate, and low achievers in their personal characteristics and attitudes toward school and teachers. *International Journal of Special Education, 28*(3), 5-15.

Alter, A. L., Aronson, J., Darley, J. M., Rodriguez, C., & Ruble, D. N. (2010). Rising to the threat: Reducing stereotype threat by reframing the threat as a challenge. *Journal of Experimental Social Psychology, 46*, 166-171. doi: 10.1016/j.jesp.2009.09.014

Altintas, E., & Ozdemir, A. S. (2015). The effect of developed differentiation approach on the achievements of the students. *Eurasian Journal of Educational Research, 61*, 199-216. doi: 10.14689/ejer.2015.61.11

Ambady, N., Shih, M., Kim, A., & Pittinsky, T. L. (2001). Stereotype susceptibility in children: Effects of identity activation on quantitative performance. *Psychological Science, 12*, 385-390. doi: 10.1111/1467-9280.00371

Andrade, H. L., Wang, X., Du, Y., & Akawi, R. L. (2009). Rubric-referenced self-assessment and self-efficacy for writing. *The Journal of Educational Research, 102*, 287-301. doi: 10.3200/JOER.102.4.287-302

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology, 38,* 113-125. doi: 10.1006/jesp.2001.1491

Aronson, J., & Inzlicht, M. (2004). The ups and downs of attributional ambiguity: Stereotype vulnerability and the academic self-knowledge of African American college students. *Psychological Science, 15,* 829-836. doi: 10.1111/j.0956-7976.2004.00763.x

Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When White men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology, 35,* 29-46. doi: 10.1006/jesp.1998.1371

Aronson, J., & Steele, C.M. (2005). Stereotypes and the fragility of human competence, motivation, and self-concept. In C. Dweck & E. Elliot (Eds.), *Handbook of Competence & Motivation* (pp. 436-456). New York, Guilford.

Azano, A. P. (2014). Gifted rural students. In J. Plucker & C. Callahan (Eds.). *Critical issues in gifted education: What the research says* (2nd ed., pp. 297-304). Waco, TX: Prufrock Press.

Azano, A. P., Callahan, C. M., Brodersen, A., & Caughey, M. (2017). Responding to the challenges of gifted education in rural communities. *Global Education Review, 4*(1), 1-16.

Azano, A. P., Tackett, M. E., Missett, T. C., & Callahan, C. M. (2017). The CLEAR curriculum model. In C. Callahan & H. L. Hertberg-Davis (Eds.). *Fundamentals of gifted education: Considering multiple perspectives* (2nd ed., pp. 293-309). New York: Routledge.

Bailey, R., Pearce, G., Smith, C., Sutherland, M., Stack, N., Winstanley, C., & Dickenson, M. (2012). Improving the educational achievement of gifted and talented students: A systematic review. *Talent Development and Excellence*, *4*(1), 33-48.

Bahník, S., & Vranka, M. A. (2017). Growth mindset is not associated with scholastic aptitude in a large sample of university applicants. *Personality and Individual Differences*, *117*, 139-143. doi: 10.1016/j.paid.2017.05.046

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191-215.

Basque, M., & Bouchamma, Y. (2016). Predictors of mathematics performance: The impact of prior achievement, socioeconomic status and school practices. International Studies in Educational Administration, 44(1), 85-104. Bell, A. (2007). Designing and testing questionnaires for children. *Journal of Research in Nursing*, *12*, 461–469. doi: 10.1177/17449871079616

Benbow, C. P., & Stanley, J. C. (1980). Sex differences in mathematical ability: Fact or artifact? *Science*, *210*, 1262-1264.

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*, 246-263. doi: 10.1111/j.1467-8624.2007.00995.x

Bråten, I., & Strømsø, H. I. (2004). Epistemological beliefs and implicit theories of intelligence as predictors of achievement goals. *Contemporary Educational Psychology*, *29*, 371-388. doi: 10.1016/j.cedpsych.2003.10.001

Brookings Institution. (2015). *The 2015 Brown Center report on American education: How well are American students learning?* Washington, DC: Tom Loveless.

Budge, K. (2006). Rural leaders, rural places: Problem, privilege, and possibility. *Journal of Research in Rural Education, 21*(13), 1-10.

Burney, V. H., & Cross, T. L. (2006). Impoverished students with academic promise in rural settings: 10 lessons from Project Aspire. *Gifted Child Today*, *29*(2), 14-21. doi: 10.4219/gct-2006-200

Burnham, K. P., & Anderson, D. R. (2004). Multimodel inference: Understanding AIC and BIC in model selection. *Sociological Methods Research, 33*, 261-304. doi: 10.1177/0049124104268644

Callahan, C. M. (2012). In closing. In R. F. Subotnik, A. Robinson, C. M. Callahan, & E. J. Gubbins (Eds.), *Malleable minds: Translating insights from psychology and neuroscience to gifted education* (pp. 267-269). Storrs, CT: National Research Center on the Gifted and Talented.

Callahan, C. M., Moon, T. R., Oh, S., Azano, A. P., & Hailey, E. P. (2015). What works in gifted education: Documenting the effects of an integrated curricular/instructional model for gifted students. *American Educational Research Journal*, *52*, 137-167. doi: 10.3102/0002831214549448

Clark, J. K., Eno, C. A., & Guadagno, R. E. (2011). Southern discomfort: The effects of stereotype threat on the intellectual performance of US southerners. *Self and Identity, 10*, 248-262. doi: 10.1080/15298861003771080

Coleman, L. J., Micko, K. J., & Cross, T. L. (2015). Twenty-five years of research on the lived experience of being gifted in school: Capturing the students' voices. *Journal for the Education of the Gifted*, *38*, 358-376. doi: 10.1177/0162353215607322

Corbett, M. (2009). Rural schooling in mobile modernity: Returning to the places I've been. *Journal of Research in Rural Education*, *24*(7), 1-13.

Cross, T. L., & Burney, V. H. (2005). High ability, rural, and poor: Lessons from Project Aspire and implications for school counselors. *The Journal of Secondary Gifted Education*, *16*, 148-156. doi: 10.4219/jsge-2005-483

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1997). *Talented teenagers: The roots of success and failure*. Cambridge, United Kingdom: Cambridge University Press.

Dai, D. Y. (2002). Are gifted girls motivationally disadvantaged? Review, reflection, redirection. *Journal for the Education of the Gifted*, *25*, 315-358. doi: 10.4219/jeg-2002-283

Dunbar, S., & Welch, C. (2015). *Iowa Assessments forms E and F: Research and development guide*. Orlando, FL: Houghton Mifflin Harcourt Publishing Company.

Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development*. Philadelphia, PA: Psychology Press.

Dweck, C. S. (2003). Beliefs that make smart people dumb. In R. J. Sternberg (Ed.), *Why smart people can be so stupid* (pp. 24-41). New Haven, CT: Yale University Press.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*, 256-273.

Ebel, R. L. (1965). *Measuring educational achievement*. Englewood Cliffs, NJ: Prentice-Hall.

Freeman, J. (2003). Gender differences in gifted achievement in Britain and the U.S. *Gifted Child Quarterly*, *47*, 202-211. doi: 10.1177/001698620304700304

Frisbie, D. A. (1988). Reliability of scores from teacher-made tests. *Educational Measurement, Issues and Practice, 7*(1), 25-35. doi: 10.1111/j.1745-3992.1988.tb00422.x

Gagné, F. (1995). From giftedness to talent: A developmental model and its impact on the language of the field. *Roeper Review, 18,* 103-111. doi: 10.1080/02783199509553709

Gagné, F. (2000) Understanding the complex choreography of talent development through DMGT-based analysis. In: K. A. Heller, F. J. Mönks, R. J. Sternberg, & R. F. Subotnik (Eds.) *International handbook of giftedness and talent* (pp. 67-80). Oxford, United Kingdom: Elsevier Science.

Guskin, S. L., Okolo, C., Zimmerman, E., & Peng, C.-Y. J. (1986). Being labeled gifted or talented: Meanings and effects perceived by students in special programs. *Gifted Child Quarterly, 30,* 61-65. doi: 10.1177/001698628603000203

Hardre, P. L., & Reeve, J. (2003). A motivational model for rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology, 95,* 347-356. doi: 1037/0022-0663.95.2.347

Hébert, T. P., & Beardsley, T. M. (2001). Jermaine: A critical case study of a gifted black child living in rural poverty. *Gifted Child Quarterly, 45,* 85-103. doi: 10.1177/001698620104500203

Heller, K. A., & Ziegler, A. (1996). Gender differences in mathematics and the sciences: Can attributional retraining improve the performance of gifted females? *Gifted Child Quarterly, 40,* 200-210. doi: 10.1177/001698629604000405

Hemmings, B., & Kay, R. (2010). Prior achievement, effort, and mathematics attitude as predictors of current achievement. *The Australian Educational Researcher*, *37*(2), 41-58. doi: 10.1007/BF03216921

Hernández Finch, M. E., Speirs Neumeister, K. L., Burney, V. H., & Cook, A. L. (2014). The relationship of cognitive and executive functioning with achievement in gifted

kindergarten children. *Gifted Child Quarterly, 58,* 167-182. doi: 10.1177/0016986214534889

Hidi, S., Berndorff, D., & Ainley, M. (2002). Children's argument writing, interest, and self-efficacy: An intervention study. *Learning and Instruction, 12,* 429-446. doi: 10.1016/S0959-4752(01)00009-3

Hong, E., & Aqui, Y. (2004). Cognitive and motivational characteristics of adolescents gifted in mathematics: Comparisons among students with different types of giftedness. *Gifted Child Quarterly, 48,* 191-201. doi:10.1177/001698620404800304

Jarvis, J. M. (2009). Planning to unmask potential through responsive curriculum: The "famous five" exercise. *Roeper Review, 31,* 234-241. doi: 10.1080/02783190903177606

Junge, M. E., & Dretzke, B. J. (1995). Mathematical self-efficacy gender differences in gifted/talented adolescents. *Gifted Child Quarterly, 39,* 22-26. doi: 10.1177/001698629503900104

Kaplan, S. (2013). Depth and complexity. In C. M. Callahan & H. L. Hertberg-Davis (Eds.), *Fundamentals of gifted education* (pp. 277–286). New York, NY: Routledge.

Kerr, B., Colangelo, N., & Gaeth, J. (1988). Gifted adolescents' attitudes toward their giftedness. *Gifted Child Quarterly, 32,* 245-247. doi: 10.1177/001698628803200201

King, R. B. (2012). How you think about your intelligence influences how adjusted you are: Implicit theories and adjustment outcomes. *Personality and Individual Differences, 53,* 705-709. doi: 10.1016/j.paid.2012.05.031

Levy, S. R., Stroessner, S. J., & Dweck, C. S. (1998). Stereotype formation and endorsement: The role of implicit theories. *Journal of Personality and Social Psychology, 74,* 1421-1436. doi: 10.1037/0022-3514.74.6.1421

Lin-Siegler, X., Dweck, C. S., & Cohen, G. L. (2016). Instruction interventions that motivate classroom learning. *Journal of Educational Psychology, 108,* 295-299. doi: 10.1037/edu0000124

Lockette, T. (2010). Tapping the power of place. *Education Digest*, *76*(4), 59-62.

Lohman, D. F. (2012). *Cognitive Abilities Test Form 7: Research and development guide.* Rolling Meadows, IL: The Riverside Publishing Company.

Lüftenegger, M., Kollmayer, M., Bergsmann, E., Jöstl, G., Spiel, C., & Schober, B. (2015). Mathematically gifted students and high achievement: The role of motivation and classroom structure. *High Ability Studies*, *26,* 227-243, doi: 10.1080/13598139.2015.1095075

Makel, M. C., Snyder, K. E., Thomas, C., Malone, P. S., & Putallaz, M. (2015). Gifted students' implicit beliefs about intelligence and giftedness. *Gifted Child Quarterly*, *59,* 203-212. doi: 10.1177/0016986215599057

Mammadov, S., Cross, T. L., & Ward, T. J. (2018). The Big Five personality predictors of academic achievement in gifted students: Mediation by self-regulatory efficacy and academic motivation. *High Ability Studies*, *29,* 111-133. doi: 10.1080/13598139.2018.1489222

McCoach, D. B., & Siegle, D. (2003). Factors that differentiate underachieving gifted students from high-achieving gifted students. *Gifted Child Quarterly*, *47,* 144-154. doi: 10.1177/001698620304700205

Morisano, D., & Shore, B. M. (2010). Can personal goal setting tap the potential of the gifted underachiever? *Roeper Review*, *32,* 249-258. doi: 10.1080/02783193.2010.508156

Mudrak, J. (2011). 'He was born that way': Parental constructions of giftedness. *High Ability Studies, 22,* 199-217. doi: 10.1080/13598139.2011.622941

National Center for Education Statistics (2013). *The status of rural education*. Retrieved from https://nces.ed.gov/programs/coe/pdf/Indicator_TLA/coe_tla_2013_07.pdf

Olszewski-Kubilius, P., & Lee, S.-Y. (2011). Gender and other group differences in performance on off-level tests: Changes in the 21st century. *Gifted Child Quarterly, 55,* 54-73. doi: 10.1177/0016986210382574

Olszewski-Kubilius, P., & Turner, D. (2002). Gender differences among elementary school-aged gifted students in achievement, perceptions of ability, and subject preference. *Journal for the Education of the Gifted, 25,* 233-268. doi: 10.1177/016235320202500303

Pagnani, A. R. (2013). Gifted male readers: Current understandings and suggestions for future research. *Roeper Review, 35,* 27-35. doi: 10.1080/02783193.2013.740600

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66,* 543-578. doi: 10.3102/00346543066004543

Pajares, F. (2003). Self-efficacy beliefs, motivation, and achievement in writing: A review of the literature. *Reading and Writing Quarterly, 19,* 139-158. doi: 10.1080/10573560390143085

Pajares, F., Johnson, M. J., & Usher, E. L. (2007). Sources of writing self-efficacy beliefs of elementary, middle, and high school students. *Research in the Teaching of English, 42,* 104-120.

Pajares, F., Miller, M. D., & Johnson, M. J. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology, 91,* 50-61. doi: 10.1037/0022-0663.91.1.50

Park, D., Gunderson, E. A., Tsukayama, E., Levine, S. C., & Beilock, S. L. (2016). Young children's motivational frameworks and math achievement: Relation to teacher-reported instructional practices, but not teacher theory of intelligence. *Journal of Educational Psychology, 108,* 300-313. doi: 10.1037/edu0000064

Phan, H. P. (2012). The development of English and mathematics self-efficacy: A latent growth curve analysis. *The Journal of Educational Research, 105,* 196-209. doi: 10.1080/00220671.2011.552132

Picho, K., & Brown, S. W. (2011). Can stereotype threat be measured? A validation of the Social Identities and Attitudes Scale (SIAS). *Journal of Advanced Academics, 22,* 374-411. doi: 10.1177/1932202x1102200302

Preckel, F., Goetz, T., Pekrun, R., & Kleine, M. (2008). Gender differences in gifted and average-ability students: Comparing girls' and boys' achievement, self-concept, interest, and motivation in mathematics. *Gifted Child Quarterly, 52,* 146-159. doi: 10.1177/0016986208315834

Provasnik, S., KewalRamani, A., Coleman, M. M., Gilbertson, L., Herring, W., & Xie, Q. (2007). Status of education in rural America (NCES 2007-040). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Reis, S. M., & Morales-Taylor, M. (2010). From high potential to gifted performance: Encouraging academically talented urban students. *Gifted Child Today, 33,* 28-38. doi: 10.1177/107621751003300408

Renzulli, J., & Park, S. (2002). *Giftedness and high school dropouts: Personal, family, and school-related factors* (RM02168). Storrs, CT: The National Research Center on the Gifted and Talented.

Renzulli, J. S., & Reis, S. M. (1985). *The Schoolwide Enrichment Model: A comprehensive plan for educational excellence*. Mansfield Center, CT: Creative Learning Press.

Renzulli, J. S., Smith, L. H., White, A. J., Callahan, C. M., Hartman, R. K., Westberg, K. L., … Sytsma Reed, R. E. (2010). *Scales for rating the behavioral characteristics of superior students: Technical and administration manual*. Waco, TX: Prufrock Press Inc.

Richwine, J. (2019, February 1). Another replication failure: 'Stereotype threat' is probably empty. *National Review*. Retrieved from https://www.nationalreview.com/

Ritchotte, J. A., Matthews, M. S., & Flowers, C. P. (2014). The validity of the achievement-orientation model for gifted middle school students: An exploratory study. *Gifted Child Quarterly, 58*, 183-198. doi:10.1177/0016986214534890

Ritchotte, J., Rubenstein, L., & Murry, F. (2016). Reversing the underachievement of gifted middle school students: Lessons from another field. *Gifted Child Today, 38,* 103-113. doi: 10.1177/1076217514568559

Ritchotte, J. A., Suhr, D., Alfurayh, N. F., & Graefe, A. K. (2016). An exploration of the psychosocial characteristics of high achieving students and identified gifted students: Implications for practice. *Journal of Advanced Academics, 27*, 23-38. doi: 10.1177/1932202X15615316

Romero, C., Master, A., Paunesku, D., Dweck, C. S., & Gross, J. J. (2014). Academic and emotional functioning in middle school: The role of implicit theories. *Emotion, 14*, 227–234. doi: 10.1037/a0035490

Schroder, H. S., Moran, T. P., Donnellan, M. B., & Moser, J. S. (2014). Mindset induction effects on cognitive control: A neurobehavioral investigation. *Biological Psychology, 103*, 27-37. doi: 10.1016/j.biopsycho.2014.08.004

Schwery, D., Hulac, D., & Schweinle, A. (2016). Understanding the gender gap in mathematics achievement: The role of self-efficacy and stereotype threat. *School Psychology Forum: Research in Practice*, 10, 386-396.

Seaton, M., Marsh, H. W., Parker, P. D., Craven, R. G., & Yeung, A. S. (2015). The reciprocal effects model revisited: Extending its reach to gifted students attending academically selective schools. *Gifted Child Quarterly, 59*, 143-156. doi: 10.1177/0016986215583870

Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology, 87*, 386-398. doi: 10.1037/0022-0663.87.3.386

Shell, D. F., Murphy, C. C., & Bruning, R. H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 81*, 91-100. doi: 10.1037/0022-0663.81.1.91

Siegle, D., Gubbins, E. J., O'Rourke, P., Langley, S. D., Mun, R. U., Luria, S. R., … Plucker, J. A. (2016). Barriers to underserved students' participation in gifted programs and possible solutions. *Journal for the Education of the Gifted, 39*, 103-131. doi: 10.1177/0162353216640930

Smith, G. A. (2002). Place-based education: Learning to be where we are. *Phi Delta Kappan, 83*, 584-594. doi: 10.1177/003172170208300806

Snyder, K. E., Barger, M. M., Wormington, S. V., Schwartz-Bloom, R., & Linnenbrink-Garcia, L. (2013). Identification as gifted and implicit beliefs about intelligence: An examination of potential moderators. *Journal of Advanced Academics, 24*, 242-258. doi: 10.1177/1932202X13507971

Sriram, R. (2014). Rethinking intelligence: The role of mindset in promoting success for academically high-risk students. *Journal of College Student Retention,* 15, 515-536. doi: 10.2190/CS.15.4.c

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist, 52*, 613-629. doi: 10.1037/0003-066X.52.6.613

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology, 69,* 797-811. doi: 10.1037/0022-3514.69.5.797

Sternberg, R. J. (2001). Giftedness as developing expertise: A theory of the interface between high abilities and achieved excellence. *High Ability Studies*, *12*, 159-179. doi: 10.1080/13598130120084311

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*, 3-54. doi: 10.1177/1529100611418056

Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms (2nd ed.).* Alexandria, VA: Association for Supervision and Curriculum Development.

van der Meulen, R. T., van der Bruggen, C. O., Spilt, J. L., Verouden, J., Berkhout, M., & Bögels, S. M. (2014). The pullout program day a week school for gifted children: Effects

on social-emotional and academic functioning. *Child Youth Care Forum*, *43*, 287-314. doi: 10.1007/s10566-013-9239-5

Virginia Department of Education (2016a). *2016-2017 Fall Membership by Division & Ethnicity* [Data file]. Retrieved from http://www.doe.virginia.gov/statistics_reports/enrollment/fall_membership/report_data.shtml

Virginia Department of Education (2016b). *School Year 2016-2017 National School Lunch Program (NSLP) Free and Reduced Price Eligibility Report* [Data file]. Retrieved from http://www.doe.virginia.gov/support/nutrition/statistics/free_reduced_eligibility/2016-2017/divisions/frpe_div_report_sy2016-17.pdf

Virginia Department of Education (2017). *2016-2017 Division Test-by-Test Percent Passing & Percent Advanced (8/15/2017)* [Data file]. Retrieved from http://www.doe.virginia.gov/statistics_reports/school_report_card/index.shtml

Wellisch, M., & Brown, J. (2013). Many faces of a gifted personality: Characteristics along a complex gifted spectrum. *Talent Development and Excellence*, *5*(2), 43-58.

Zabloski, J., & Milacci, F. (2012). Gifted dropouts: Phenomenological case studies of rural gifted students. *Journal of Ethnographic & Qualitative Research, 6,* 175-190.

Table 1

District-Level Details

Treatment Districts	Control Districts
District A: Rural, distant[a] 3,300 students 52% eligible for FRPL[d] CLEAR Curriculum offered via pull-out	District D: Rural, distant 2,500 students 47% eligible for FRPL Services offered in general education classroom with no cluster grouping
District B: Rural, remote[b] 5,200 students 68% eligible for FRPL CLEAR Curriculum offered via pull-out and general classroom without cluster grouping	District E: Town, distant 6,000 students 57% eligible for FRPL Services offered via pull-out once a week
District C: Rural, remote 1,300 students 65% eligible for FRPL CLEAR Curriculum offered via general classroom with cluster grouping	District F: Rural, fringe[c] 3,500 students 62% eligible for FRPL Services offered via pull-out once a week
	District G: Rural, remote 1,500 students 62% eligible for FRPL Services offered via pull-out (once per month) and in general education classroom with no cluster grouping
	District H: Rural, remote 2,800 students 69% eligible for FRPL Services offered via after-school enrichment once per month

[a] Rural, distant: A Census-defined rural territory located between five and 25 miles from an urbanized area or between 2.5 and ten miles from an urban cluster.
[b] Rural, remote: A Census-defined rural territory further than 25 miles from an urbanized area and more than ten miles from an urban cluster.
[c] A Census-defined rural territory located no further than five miles from an urbanized area or no further than 2.5 miles from an urban cluster.
[d] Free and reduced-price lunch.

Table 2

Descriptive Statistics of Sample

	Treatment	Control
N	66	69
Number of districts	3	5
Average age in years[a]	7.88 (.57)	7.97 (.38)
% Male	42.42	55.07
Prior Achievement	64.58 (19.37)	81.64 (18.69)
Motivation	57.05 (7.09)	56.88 (8.76)
Self-Efficacy	3.80 (.83)	4.14 (.71)
Mindset	3.91 (.82)	3.94 (1.11)
Stereotype Threat	2.87 (.90)	2.87 (.74)
Folklore Posttest	20.93 (8.39)	21.00 (8.67)

Note: Standard deviations in parentheses.
[a] Age calculated at beginning of third-grade school year (September) for participants in Cohort 2.

Table 3

Comparison of Means Between Observations with Complete and Incomplete Covariate Data

	Complete	Incomplete
Prior Achievement	73.30 (20.80)	62.77 (24.27)
Motivation	56.96 (7.95)	57.41 (8.79)
Self-Efficacy	3.97 (.79)	4.04 (.71)
Mindset	3.92 (.98)	3.60 (1.03)
Stereotype Threat	2.87 (.82)	3.06 (.86)
Folklore Posttest	23.79 (3.81)	22.92 (4.28)

Note: Standard deviations in parentheses.

Table 4

Correlations Between Pre-Intervention Measures

	1	2	3	4	5
1. Prior Achievement	–				
2. Motivation	.35***	–			
3. Self-Efficacy	.35***	.00	–		
4. Mindset	.31***	.17*	.12	–	
5. Stereotype Threat	-.03	-.01	-.14	.10	–

Note: $N = 180$.
* $p < .10$
** $p < .05$
*** $p < .01$

Table 5

Regression of Literacy Achievement on Standardized Pre-Intervention Measures

	Model 1	Model 2	Model 3	Model 4
Prior Achievement	2.06***	2.23***	2.19***	2.00***
	(.37)	(.35)	(.36)	(.37)
Motivation	.28			
	(.27)			
Self-Efficacy	.14			
	(.21)			
Growth Mindset	-.89***	-.90***	-.93***	
	(.31)	(.30)	(.31)	
Gender Stereotype	-.16			
Threat Vulnerability	(.29)			
Female	.82*	.87*		
	(.46)	(.45)		
Curriculum	.44	.51	.38	.38
	(.79)	(.76)	(.71)	(.74)
Constant	22.92***	22.91***	23.36***	23.41***
	(.67)	(.66)	(.58)	(.64)
Indicators for District[a]	X	X	X	X
Indicators for Missing[b]	X	X	X	X
N	180	180	180	180
R^2	.88	.88	.88	.87
RMSE	3.11	3.10	3.11	3.19
BIC	993.97	980.47	973.81	974.14
p value	.00	.00	.00	.00

Note: Huber-White robust standard errors in parentheses.
[a]Dummy indicators for each district. "X" indicates presence in model.
[b]Binary indicators (present/missing) for each covariate. "X" indicates presence in model.
* $p < .10$
** $p < .05$
*** $p < .01$

Table 6

Regression of Literacy Achievement on Standardized Pre-Intervention Measures and Interaction Terms

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Prior Achievement	2.20***	2.12***	2.27***	2.01***	2.06***	2.14***	2.06***
	(.36)	(.37)	(.36)	(.38)	(.38)	(.36)	(.38)
Motivation		.37		.39	.36	.46	.34
		(.31)		(.27)	(.28)	(.34)	(.30)
Self-Efficacy				.17			
				(.21)			
Growth Mindset	-1.01***	-.89***	-.91***	-.92***	-.88***	-.89***	-.86***
	(.32)	(.30)	(.30)	(.30)	(.30)	(.30)	(.30)
Gender Stereotype Threat Vulnerability							-.11
							(.32)
Female	.00	.85*	.34	.83*	.88*	.88*	.88*
	(.00)	(.46)	(.71)	(.45)	(.45)	(.45)	(.47)
Curriculum	.17	.17	.61	.36	.28	.17	.14
	(.72)	(.74)	(.94)	(.74)	(.74)	(.75)	(.70)
Curriculum x Growth Mindset	.19						
	(.50)						
Curriculum x Motivation		-.24					
		(.33)					
Curriculum x Female							
Control x Female			1.00				
			(1.02)				
Motivation x Self-Efficacy				.07			
				(.05)			
Motivation x Growth Mindset					.11		
					(.10)		
Motivation x Female						-.41	
						(.52)	
Motivation x Gender Stereotype Threat Vulnerability							.07
							(.08)
Constant	23.62***	23.23***	23.08***	23.28***	23.28***	23.27***	23.33***
	(.59)	(.63)	(.70)	(.64)	(.63)	(.63)	(.62)

Indicators for District[a]	X	X	X	X	X	X	X
Indicators for Missing[b]	X	X	X	X	X	X	X
N	180	180	179[c]	180	180	180	180
R^2	.88	.88	.88	.89	.88	.88	.88
RMSE	3.13	3.11	3.11	3.10	3.10	3.11	3.11
BIC	983.75	989.35	980.26	992.94	988.77	989.15	993.61
p value	.00	.00	.00	.00	.00	.00	.00

Note: Huber-White robust standard errors in parentheses.
[a]Dummy indicators for each district. "X" indicates presence in model.
[b]Binary indicators (present/missing) for each covariate. "X" indicates presence in model.
[c]One observation was dropped from the analysis in Model 3 due to its status as a singleton indicator: it was the only observation for which the student was in the control group with missing data for gender.
* $p < .10$
** $p < .05$
*** $p < .01$