True Grit: Trait-level Perseverance and Passion for Long-term Goals Predicts Effectiveness and Retention among Novice Teachers

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Abstract

Background/Context

Surprisingly little progress has been made in linking teacher effectiveness and retention to factors observable at the time of hire. The rigors of teaching, particularly in low-income school districts, suggest the importance of personal qualities that have so far been difficult to measure objectively.

Purpose/Objective/Research Question/Focus of Study

In this study, we examine the predictive validity of personal qualities not typically collected by school districts during the hiring process. Specifically, we use a psychological framework to explore how biographical data on grit, a disposition toward perseverance and passion for long-term goals, explains variance in novice teachers' effectiveness and retention.

Research Design

In two prospective, longitudinal samples of novice teachers assigned to schools in low-income districts (N = 154 and N = 307, respectively), raters blind to outcomes followed a 7-point rubric to rate grit from information on college activities and work experience extracted from teachers' résumés. We used independent-samples t-tests and binary logistic regression models to predict teacher effectiveness and retention from these grit ratings as well as from other information (e.g., SAT scores, college GPA, interview ratings of leadership potential) available at the time of hire.

Conclusions/Recommendations

Grittier teachers outperformed their less gritty colleagues and were less likely to leave their classrooms mid-year. Notably, no other variables in our analysis predicted either effectiveness or retention. These findings contribute to a better understanding of what leads some novice teachers to outperform others and remain committed to the profession. In addition to informing policy decisions surrounding teacher recruitment and development, this investigation highlights the potential of a psychological framework to explain why some individuals are more successful than others in meeting the rigorous demands of teaching.

True Grit: Trait-level Perseverance and Passion for Long-term Goals Predicts Effectiveness and Retention among Novice Teachers

Research has demonstrated that some teachers are dramatically more effective than others, and further, that teacher effectiveness is the most important in-school factor affecting student learning (Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004; Sanders & Rivers, 1996). Unfortunately, less effective teachers are disproportionately concentrated in the neediest schools and districts, making students from low-income communities less likely to be exposed to high quality instruction than their peers in higher-income communities (Darling-Hammond, 1995; Krei, 1998; Lankford, Loeb, & Wyckoff, 2002). To exacerbate matters, about half of all teachers leave the profession in the first five years, and these rates are nearly a third higher in urban districts (Ingersoll & Smith, 2003). Unfortunately, very little progress has been made in linking teacher retention and effectiveness with factors observable at the time of hire (Hanushek, 1997; Rockoff, Jacob, Kane, & Staiger, 2008).

In the present study, we set out to examine whether teacher retention and effectiveness among novice teachers in their first and second year of teaching can be predicted by differences in grit, defined as perseverance and passion for long-term goals, measured at the time of hire. Previous research has indicated that gritty individuals tend to work diligently towards very challenging, long-term goals, sustaining commitment when confronted with setbacks and adversity (Author, 2007). It seems logical that because teaching is extremely challenging work, grit may have an important salutary impact on teacher performance. One prior investigation has demonstrated that grit prospectively predicts effectiveness among novice teachers in low-income public schools (Author, 2009b). However, this study relied upon self-report questionnaire

measures of grit, a method whose validity outside the low-stakes context of a confidential research study is questionable.

In the current investigation, we collected biographical data from two samples of novice teachers in low-income schools. Specifically, coders blind to outcomes reviewed teachers' résumés and assigned each a grit score based on objective evidence of perseverance and passion in college activities and work experience. We then used grit scores to predict teacher retention through the academic year and, among those who stayed, effectiveness measured in terms of students' one-year academic gains. We compared the predictive validity of grit scores to that of other variables available at the time of hire, including academic credentials such as college GPA, interviewer ratings of leadership experience, and demographic variables. Our results indicate that grittier teachers were more likely to complete the school year and also outperformed their less gritty colleagues. Notably, no other predictors included in our analyses predicted either retention or effectiveness.

Literature Review

In recent years, a significant body of research has demonstrated that teacher effectiveness is the single most important in-school influence on student progress (Rivkin et al., 2005; Rockoff, 2004; Sanders & Rivers, 1996). Ensuring that all children have access to high quality instruction proves challenging, however, since there is considerable variability in teacher effectiveness and, indeed, more variation in effectiveness among teachers in a given school than between schools (Johnson, Berg, & Donaldson, 2005; McCaffrey, Han, & Lockwood, 2008). Of course, a teacher must "show up," as Woody Allen might put it, to have any effect at all on students ("Secret of Success," 1989). Unfortunately, younger, less experienced teachers leave teaching within the first five years at an alarming rate of over 40% and these rates are even

higher in urban areas (Ingersoll & Smith, 2003), creating a revolving door of inexperienced teachers in the nation's neediest schools.

Prior research has examined how *in situ* motivational states influence teacher performance. For instance, commitment to teaching, defined as teachers' dedication to their work, and self-efficacy, which captures teachers' belief in their ability to impact students, are both associated with concurrently measured performance and persistence in the face of challenge (Ashton & Webb, 1986; Gu & Day, 2007; Ebmeier, 2003; Goddard, Hoy, & Woolfolk Hoy, 2004).Additionally, engagement, which characterizes teachers' vigor and absorption in their daily activities, has been shown to be an important indicator of intrinsic motivation and subsequent sense of job satisfaction (Schaufeli, Bakker, & Salanova, 2006). A growing body of empirical literature has demonstrated that these states are influenced by context (e.g., teachers' need for autonomy, the quality of professional community, and perceptions of student motivation) (Collie, Shapka, & Perry, 2012; Klassen, Perry, & Frenzel,2012).

An important omission in the research literature, however, concerns identifiable personal teacher characteristics *prior* to entering into the classroom that may influence their subsequent engagement, commitment, and ultimately, performance. This paper uses a psychological framework to predict teacher performance from theoretically relevant personal qualities that are somewhat stable over time and situation, albeit far from fixed, and which are theorized to interact with contextual factors to determine motivational states and performance. Our findings suggest that biographical evidence of grit, the disposition to pursue challenging goals with sustained passion and perseverance, predicts effectiveness and retention among novice teachers in low-income districts. In addition to informing policy and practice surrounding teacher

selection, the current investigation supports qualitative evidence on the rigors of teaching as a profession and suggests fruitful possibilities for professional development.

Research on predictors of teacher effectiveness and retention prior to entry into the classroom

The evidence associating teacher characteristics that are traditionally available at the time of hire and their subsequent performance in the classroom has been mixed (Greenwald, Hedges, & Laine, 1996; Hanushek, 1997; Palardy & Rumberger, 2008). For instance, whereas some scholars have contended that teacher certification strongly predicts student achievement (Darling-Hammond, 2000), others have questioned the validity of this evidence (Ballou & Podgursky, 2000). In their systematic review, Wayne and Youngs (2003) concluded that the impact of certification and degrees on student achievement is inconclusive at best, with the exception of advanced degrees in mathematics predicting gains in students' math achievement (Goldhaber & Brewer, 2000).

Likewise, while some studies have found that teachers with higher standardized test scores (e.g., ACT scores) are slightly more likely to produce greater student learning gains (Clotfelter, Ladd, & Vigdor, 2007; Ferguson & Ladd, 1996), other research has suggested that teachers with higher cognitive ability are more likely to transfer to higher performing schools or leave the classroom entirely (Guarino, Santibañez, Daley, & Brewer, 2004; Lankford, et al., 2002).

What non-traditional measures might forecast the eventual commitment and performance of a potential teaching hire? One logical possibility, suggested almost a half-century ago by Getzels and Jackson (1963) is that "the personality of the teacher is a significant variable. Indeed some would argue it is the most significant variable" (p. 506). Personality traits are an attractive target of study because they demonstrate both stability and change over the life course. That is, while over very short time intervals individuals are unlikely to shift radically how they typically

act, think, and feel, personality traits are far from immutable. On the contrary, estimates of the rank-order stability of personality traits do not plateau until after age 50 – and even then at about .74, a level far from unity and "not high enough to infer a complete lack of change" (Roberts & DelVecchio, 2000, p. 20). In young adulthood, when most teachers are most likely to enter the profession, estimates of rank-order stability are even more modest, and it is also during this developmental epoch when mean-level changes in personality are most dramatic (Roberts & Mroczek, 2008). Thus, identifying personality traits of successful teachers should provide useful information not only for recruitment and hiring processes, but also for targeted professional development.

In a comprehensive review of the extant literature on the personality traits of successful teachers, Getzels and Jackson (1963) summarized research associating teacher performance to cheerfulness, friendliness, sociability, and a varied list of other traits included in omnibus inventories of personality in popular use at that time. They noted several limitations common to the dozens of empirical studies in their review, including the reliance on subjective ratings (e.g., by students) of teacher effectiveness, measures which in their view failed to demonstrate adequate reliability and validity. Their sobering conclusion was that notwithstanding "prodigious research effort, very little is known for certain about the nature and measurement of teacher personality, or about the relation between teacher personality and teaching effectiveness" (p. 574). More recently, many districts have adopted the practice of requiring prospective teachers to complete commercially available self-report questionnaires. Unfortunately, convincing evidence for the predictive validity of these and similar commercial instruments is lacking (Rockoff et al., 2008).

While contemporary research has examined the effect of teacher personality traits on classroom management styles (Martin, Yin, & Baldwin, 1998) and perceptions of classroom environment (Kent & Fisher, 1997), to our knowledge, only one investigation has examined associations between personality traits and teacher effectiveness. Specifically, Rockoff et al. (2008) administered an extensive battery of self-report questionnaires to a sample of novice math teachers in New York City, assessing a wide variety of so-called "non-cognitive" traits, including personality traits, feelings, and attitudes. In cross-sectional analyses, the full set of non-cognitive measures demonstrated a statistically significant, albeit modest, relationship with students' academic gains on a standardized math test. However, not a single measured personality trait was on its own significantly associated with teacher effectiveness.

In our view, the relatively disappointing associations documented in Rockoff et al. (2008) should not be taken as evidence that teachers' personalities are irrelevant to their performance. On the contrary, we agree with Getzels and Jackson (1963) that the single greatest limitation of research linking teacher personality to performance is "simply that research in this field is conducted in a theoretical vacuum" (p. 575). Similarly, the recommendations from the Committee on the Criteria of Teacher Effectiveness of the American Education Research Association (Barr et al., 1952) are as relevant today as when they were issued in the mid-twentieth century. Put succinctly, the study of any teacher characteristic should first be justified on theoretical grounds. A strictly bottom-up empirical approach, in which a vast array of personality traits is considered without consideration of why they might be relevant to teaching, is unlikely to be successful. Rather, personality traits of special relevance to the demands of the teaching profession should be thoughtfully considered before subjecting them to empirical test.

Grit as a theoretically relevant predictor of teacher effectiveness and retention

Theoretically, which aspects of personality should we expect to enhance teaching effectiveness and retention? Teaching is by all accounts an extraordinarily demanding profession. In a national survey, 86% of new teachers claimed that given the challenges inherent in their work, only those with "a true sense of calling" should pursue teaching as a profession. Teachers in this same study identified enthusiasm, effort, and energy as among the most critical qualities for success in the classroom (Farkas, Johnson, & Foleno, 2000). Indeed, despite its many rewards, the unrelenting challenges and uncertainties of teaching can be demoralizing. Thompson (1991), in a letter to a fellow young teacher, observed that "the most disheartening and discouraging" aspect of teaching is "the fact that results are intangible and unobservable" (p. 104). Learning their trade largely by trial and error, new teachers often take part in "sink or swim" induction processes that can lead to feelings of isolation and ineffectiveness. Initial socialization into the profession is marked by a certain "abruptness with which full responsibility is assumed," as the beginning teacher is expected to perform the same tasks as experienced veterans, and oftentimes, receives an even more challenging teaching load (Lortie, 1975, p. 59). In low-income districts, novice teachers sometimes leave the classroom mid-year because they feel overwhelmed with the sense of responsibility and challenge (Johnson & Birkeland, 2003).

The exceptional demands of teaching suggest the relevance of one personality trait in particular: grit. Defined as the tendency to sustain perseverance and passion for challenging long-term goals, grit can be measured using self-report questionnaires, with respondents endorsing positively-scored items such as "I finish whatever I begin" and reverse-scored items such as "New ideas and projects sometimes distract me from previous ones" (Author, 2007; Author, 2009a). Like most other personality traits, grit is largely unrelated to talent, and in models that include measures of cognitive ability, grit provides incremental predictive validity

for achievement outcomes. Prior studies show that grit predicts success in a variety of challenging domains, including retention at West Point Military Academy and final ranking in the National Spelling Bee (Author, 2007; Author, 2009a).

Conceptually, grit is distinct from resilience, a term defined differently across authors but generally accepted to be a multidimensional construct describing successful adaptation to overwhelming adversity and stress. While popular measures of resilience often include perseverance as a component, they also tend to include other elements as well, such as equanimity and a balanced perspective on life (e.g., Wagnild & Young, 1993). Moreover, grit entails consistency of interests and goals over time, whereas the construct of resilience is agnostic on the stability of an individual's interests. Grit is also different than leadership potential insofar as the arenas in which gritty individuals demonstrate their stamina need not be those that entail organizing and managing other people. Likewise, grit can be distinguished from conscientiousness, a multi-dimensional family of personality traits that encompasses perseverance but also includes tendencies toward responsibility, self-control, orderliness, and traditionalism (Roberts et al., 2005). While correlated with conscientiousness, grit provides incremental predictive validity for achievement outcomes, particularly in settings of high challenge (Author, 2007).

One prior study has shown that grit predicts teaching effectiveness (Author, 2009b). In this longitudinal study, 390 novice teachers in low-income districts completed self-report questionnaires assessing grit, as well as optimism and life satisfaction, prior to the school year. Optimism was operationalized as the tendency to attribute life events to changeable, specific causes rather than unchangeable, global causes, and life satisfaction was defined as an overall subjective evaluation of well-being. All three traits prospectively predicted teacher effectiveness

as indexed by academic gains made by students over the course of the school year. In mediation analyses, the predictive validity of optimism was explained entirely by grit and life satisfaction, suggesting that a bias toward optimistic causal attributions in this sample of novice teachers promoted both grit and life satisfaction, each of which independently predicted their effectiveness in the classroom. Separate research shows that individuals can learn to be more optimistic by following a set of exercises similar to those used in cognitive psychotherapy (Seligman, 2006), and professional development materials targeting teachers in particular have already been developed (Seligman et al., 2009).

Previous studies suggest that the effect of grit on outcomes is through cumulative effort: gritty individuals tend to work harder than their peers, and they remain committed to chosen pursuits over a sustained period of time. For instance, in a study of student performance in a national spelling bee, grittier competitors completed more hours of effortful, deliberate practice (Author, 2010). Following this logic, we would expect gritty teachers to remain in the classroom (rather than drop out mid-year) and to work harder, and more deliberately, toward producing academic gains in their students.

Current Investigation

The current investigation includes two separate longitudinal studies designed to test the hypothesis that novice teachers who have demonstrated grit prior to entering the teaching profession are more likely to persist though the school year and to produce academic gains with their students. In both studies, we compared the effect of grit on teacher performance to that of more traditionally assessed characteristics observable at the time of hire (e.g., SAT score, college GPA).

Our approach in this investigation was informed by three major limitations of prior research. First, personality traits have almost invariably been assessed with self-report questionnaires. Within a low-stakes research context, this method may be valid. However, in a high-stakes recruitment and selection process, participants may be motivated to portray themselves in a falsely positive light. Second, while teacher retention is relatively straightforward to measure, only a handful of studies examining teachers' personality traits have operationalized teaching effectiveness in terms of the actual progress of students. Finally, there is the problem of selection bias. Teachers with the strongest qualifications disproportionately take better-paying jobs in higher-performing districts (Sanders & Rivers, 1996). Thus, if schools with high achieving students choose teachers with positive traits, observed associations between student performance and these traits will be spuriously inflated.

The current investigation was designed to address all three of these limitations. Rather than rely on questionnaires, we used biographical data collected from teachers' résumés to assess grit. As described in more detail below, trained coders blind to outcomes used a rubric to assign grit scores based on evidence of continued involvement and advancement in college activities and work experience. Because biodata is limited to verifiable objective events, it is less easily faked than self-report personality questionnaires (Mael, 1991). Second, like Rockoff et al. (2008), we avoided subjective ratings of teacher effectiveness and instead used ratings based on evidence of student academic gains and content mastery. Finally, the teacher training organization from which we drew our sample centrally placed its new teachers. As such, teachers did not select the schools where they taught; rather, administrators of teacher training organizations matched them to schools based on their content expertise and available vacancies.

While not entirely random, the process increased the likelihood that grittier teachers were equitably distributed across schools with different performance records.

Study 1

Participants

Participants in this study were novice teachers in their first and second year in the classroom recruited by a national teacher training organization and assigned to low-income districts during the 2006-2007 school year. Teachers in this organization take part in summer training, including student teaching as well as coursework on classroom management and teaching pedagogy among other topics. During the school year, they also enroll in an alternative certification program in partnership with a local university.

The organization used stratified random sampling to select participants for this study, oversampling less effective (defined in detail below) and resigned teachers to increase statistical power for finding group differences. Specifically, they provided résumés for an initial sample of 220 teachers, representing approximately 50% effective teachers, 25% ineffective teachers, and 25% resigned teachers. However, 66 of the original 220 résumés were discarded for incomplete information, most commonly the omission of dates of participation for activities. There were no significant differences in terms of demographics, teaching assignment, retention, or effectiveness between participants in the final sample and those who were excluded because of incomplete information on résumés.

In the final sample of $N = 154$ teachers, 52% were effective, 27% were less effective, and 21% resigned mid-year before effectiveness ratings were determined. About 61% of teachers were White, 77% were female, 51% were in their second year of teaching (as opposed to their first year), and 92% had applied to this organization directly out of college. The sample

comprised more elementary school (42%) and middle school (42%) teachers than high school teachers (16%).

Procedures and Measures

The teacher training organization de-identified teacher résumés (i.e., stripped of names, addresses, and any other unique identifying information). These résumés were originally collected during the application process and included information on college extracurricular activities and work experience. To avoid bias, coding of résumés was completed without knowledge of teacher performance or any other information about teachers. After résumés were coded, the teacher training organization provided all other data used in this study, including teacher effectiveness and retention data.

Ratings of grit from résumés. Two trained research assistants under the supervision of the first author separately coded all résumés for evidence of grit in college activities and work experience. We created a 7-point grit rubric to measure sustained perseverance and passion in college activities by adapting a rubric previously used to quantify the same in high school seniors (Willingham, 1985). Specifically, twenty years prior to our research, the College Board's Personal Qualities Project examined 30 preadmissions variables (e.g., athletic achievement, creative talent, personal statement quality, high school rank, and SAT score) and their prospective associations with success in college. One quality, follow-through, defined as "purposeful, continuous commitment to certain types of activities versus sporadic efforts in diverse areas," captured the essence of grit (p. 213). Willingham (1985) quantified follow-through on a 5-point scale based on evidence of participation and accomplishment in extracurricular activities (e.g., 5 points were assigned for evidence of at least two instances of multiple-year involvement in an activity, with noteworthy advancement and achievement in

both; 1 point was assigned when there was no evidence of multiple-year involvement in any activity). Among more than 3,500 participants, follow-through in high school was a better predictor than all other measured variables, including SAT scores and high school rank, of leadership and accomplishment in college.

We built upon this follow-through measure to develop a 7-point scale (0 to 6) for assessing teachers' grit. We first piloted several different rubrics for coding grit, including the original College Board 5-point scale. During this pilot phase, we discovered that a 7-point rubric captured more systematic variation in performance than did the original 5-point College Board rubric. Applying this 7-point rubric to two, three, and all extracurricular activities for each participant, we determined that there was no marginal benefit to scoring more than two activities.

Coders used the following procedure to determine a final score on the 7 point scale: First, they assigned one point for college activities or work experience in which participation lasted for a total of at least two years. They assigned activities in which a moderate level of achievement had been attained an additional point, and activities in which a high level of achievement had been attained two additional points. Moderate achievements were defined as a leadership position or award within an activity, though not the highest form of either (e.g., secretary of an organization or assistant manager of a restaurant). High achievements were reserved for those individuals running organizations or reaching the highest honor within an activity or work experience (e.g., president, captain or the MVP of a team, employee of the year). Thus, for any given activity, participants could receive from 0 points (i.e., involvement less than two years) to 3 points (i.e., multi-year involvement with high achievement). To calculate a final grit score, points for the two highest scoring activities were summed, making each teacher eligible to receive a score between 0 and 6. See Table 1 for sample profiles.

After coding all résumés, the first author coded any résumés that had been assigned disparate scores by the two coders, and each discrepant case was coded to consensus (i.e., résumés were discussed until the first author and the two coders reached a consensual score). Prior to consensus coding, inter-rater agreement for the two coders was $r = .82$, $p < .001$.

Ratings of leadership experience from interviews. The teacher training organization assessed leadership experience by asking applicants questions during an in-person interview. Questions included how they approached their responsibilities, how they worked with others, and what they accomplished. Interviewers used responses to assign each applicant a score using a 5-point scale, where higher scores indicated more previous leadership experience. Since this is an internal measure used by the teacher training organization, there are no published norms or psychometric properties available for the metric.

Academic credentials. The teacher training organization provided college GPA for all applicants and SAT scores for 81% of participants. Teachers for whom SAT scores were not available did not differ from the rest of the sample in performance or any other measured characteristic.

Teacher performance. In this study, there were two key performance outcomes of interest: teacher retention (through the year) and teacher effectiveness. Teachers were considered *retained* if they continued in their positions to the end of the school year and *resigned* if they did not.

For teachers who were retained, regional supervisors responsible for overseeing the professional development of teachers in their geographic district rated the effectiveness of their teachers. The teacher training organization trained supervisors to use a rubric for effectiveness ratings based on objective evidence of student progress. Supervisors used national or state

standardized achievement test scores when available, rating teachers *effective* if, on average, their students made a year's worth of progress according to published norms and *less effective* if student progress fell short of that target. Alternatively, if growth scores were not available, supervisors rated teachers as *effective* if their students mastered at least 70% of content on the standardized achievement test and *less effective* if student progress fell short of that target. When national or state standardized achievement test scores were not available, supervisors used an alternative assessment (e.g., district-created or department benchmark exam) given at the beginning and end of the year. Such alternative assessments had to meet several criteria, including rigor and alignment with state standards. Supervisors then used the same rule (i.e., a year's worth of progress or at least 70% content mastery) to assign teacher effectiveness ratings on these assessments. The teacher training organization did not include the résumés of teachers for whom inadequate information was available to judge their effectiveness.

Results and Discussion

Grit ratings based on biographical data in applicant résumés ranged from 0 to 6, the full range possible given our coding scheme, $M = 3.72$, $SD = 1.55$. Like all other continuous variables in this sample, grit ratings were normally distributed. As shown in Table 2, there was a strong association between SAT score and college GPA, $r = .40$, $p < .001$, but neither was related to grit, ps $> .05$. Similarly, grit ratings did not correlate with demographics or school assignment. Interview ratings of leadership, in contrast, were moderately correlated with grit, $r = .36$, $p < .001$.

As shown in Table 3, teachers who were retained for the school year had higher grit ratings ($M = 3.98$, $SD = 1.45$) than teachers who resigned in the middle of the school year ($M = 2.79$, $SD = 1.58$), $t(152) = 4.09$, $p < .001$, $d = .79$. In contrast, there were no significant

differences between retained and resigned teachers on any other measure, including demographic characteristics, school assignment, SAT score, college GPA, or leadership ratings.

Given the covariance of grit and leadership ratings, we assessed the incremental predictive validity of grit for retention by fitting a binary logistic regression model. We first standardized both predictor variables for a more intuitive interpretation of odds ratios. When controlling for leadership, teachers who were one standard deviation higher in grit were more than twice as likely to be retained over the course of the year than their less gritty peers, OR = 2.34, $p < .001$. Leadership ratings in this model were not predictive of retention, OR = 0.89, p = .59.

Analyses for teacher effectiveness revealed similar results. As demonstrated in Table 4, effective teachers had higher grit scores (M = 4.16, SD = 1.43) than less effective teachers, (M = 3.54, SD = 1.50), $t(119) = 2.24$, $p < .05$, d = .42. There were no significant differences between effective and less effective teachers on any other measure. To assess the incremental predictive validity of grit above leadership, we again fit a binary logistic regression model predicting teacher effectiveness. When controlling for leadership, teachers who were one standard deviation higher in grit were 60% more likely to outperform their less gritty peers, B = .47, OR = 1.60, p <.05. Leadership ratings in this model were not predictive of effectiveness, OR = 0.96, p = .85.

Study 2

In Study 1, novice teachers in their first and second year in the classroom who had demonstrated higher levels of grit in their pursuits prior to entering teaching are more likely to remain in the classroom for the school year and, among those who stayed, to make academic gains with their students. While interview ratings of leadership were moderately associated with résumé ratings of grit, only grit was prognostic of teacher effectiveness and retention. More

traditionally measured teacher characteristics, including the academic credentials of SAT scores and college GPA, failed to predict either retention or effectiveness. Because Study 1 used a stratified sample of teachers, underperforming teachers were overrepresented. In Study 2, we replicated the same study design using a new (i.e., non-overlapping) sample of teachers that were randomly selected by the same national teacher training organization.

Participants

As in Study 1, a national teacher training organization provided de-identified résumés for 423 first-year and second-year teachers assigned to six low-income rural and urban school districts during the 2008-2009 school year. These teachers also participated in summer training and were enrolled in an alternative certification program during the year. One hundred and sixteen of the original 423 résumés were discarded for incomplete information (e.g., no dates of participation for particular activities). There were no significant differences in terms of demographic variables or teaching assignment between participants in the final sample and those who were excluded from analyses because of missing data.

In the final sample of $N = 307$ teachers, 75% were White, 72% were female, 50% were in their second year (as opposed to first year) in the classroom, and 94% applied directly out of college. Teachers were evenly distributed in terms of the grade levels they taught: 32% were assigned to elementary schools, 31% to middle schools, and 37% to high schools.

Procedures and Measures

As in Study 1, teacher résumés were coded for evidence of grit without knowledge of teacher performance or any other information about teachers. After résumés were coded, the teacher training organization provided all other data used in this study, including SAT score,

college GPA, leadership ratings based on in-person interviews, and teacher effectiveness and retention data.

Ratings of grit from résumés. Using the same procedures in Study 1, two trained research assistants blind to outcomes coded all résumés on a 7-point scale for evidence of grit in college extracurricular activities. Prior to consensus coding with the first author, the inter-rater agreement for the two coders was $r = .85$, $p < .001$.

Ratings of leadership experience from interviews. As in Study 1, the teacher training organization provided 5-point ratings of applicants' leadership experience based on an in-person interview about how they had in the past worked towards ambitious goals.

Academic credentials. The teacher training organization provided college GPA for all applicants. As a result of changes in the application requirements for the teacher training organization, only 41% of participants ($n = 181$) reported SAT scores during the application process. However, teachers for whom SAT scores were not available did not differ from the rest of the sample in performance or any other measured characteristic.

Teacher performance. As in Study 1, performance data included measures of both teacher retention and teacher effectiveness.

Results and Discussion

Consistent with Study 1, grit ratings based on biographical data in applicant résumés were normally distributed and covered the full range of possible scores. Comparing the samples in Study 1 and Study 2, there were no significant differences in grit, SAT score, college GPA, ethnicity, gender, or year teaching, ps > .05. Since a stratified sample based on performance was used in Study 1, and since the teacher training organization was during the time of this investigation engaged in continual structural improvements with the intended effect of improving

both retention and effectiveness, we were not surprised that the teachers randomly sampled for Study 2 were as a group much more successful. Specifically, 79% of teachers completed the school year in Study 1, compared with 99% in Study 2, χ^2 (1) = 41.16, p < 001. Likewise, 66% of teachers were effective in Study 1, compared with 82% in Study 2, χ^2 (1) = 12.47, p < 001.

Given insufficient variance in teacher retention in Study 2, the only performance outcome of interest was teacher effectiveness. As shown in Table 5, there was a strong association between SAT score and college GPA, r = .40, p < .001. Consistent with Study 1, grit was associated with neither of these predictors but was moderately associated with interview ratings of leadership potential, r = .35, p < .001. As shown in Table 6, effective teachers had higher grit scores (M = 3.88, SD = 1.56) than less effective teachers, (M = 3.20, SD = 1.48), t(303) = 2.96, p < .01, d = .45. Conversely, no other predictor distinguished between effective and less effective teachers.

Given the covariance of grit with leadership ratings and assignment to a middle school (r = .14, p < .05), we assessed the incremental predictive validity of grit for effectiveness by fitting a binary logistic regression model. Controlling for leadership and assignment to a middle school, teachers who were one standard deviation higher in grit were 64% more likely to outperform their less gritty peers, OR = 1.64, p <.01. Neither leadership nor assignment to a middle school predicted teacher effectiveness in this model.

In sum, consistent with Study 1, applicants in Study 2 whose résumés revealed evidence of passion and perseverance for long-term goals became novice teachers whose students made more academic progress under their guidance.

General Discussion

In this investigation, we reported on two prospective, longitudinal studies of novice teachers assigned to elementary, middle, and high schools in low-income districts. In Study 1, in a stratified random sample of 154 teachers, evidence of sustained passion and perseverance in activities prior to entering teaching were more likely to be retained through the school year (d = .79) and to improve their students' academic performance (d = .42). Study 2 corroborated the results for effectiveness (d = .45) with a random sample of 307 teachers. In contrast, academic credentials (i.e., SAT score and college GPA), interview ratings of leadership potential, and demographics failed to predict retention or effectiveness outcomes in either study.

In the past decade, federal policy has been focused on ensuring that all teachers are "highly qualified," as indicated by certification and subject-matter competency (U.S. Department of Education, 2004). However, recent research suggests that these more traditional measures of teacher quality predict only modest variation in student outcomes (Kane, Rockoff, & Staiger, 2006; Rivkin et al., 2005). In response, Rockoff et al. (2008) have suggested recruiting teachers with certain adaptive personality traits to improve the effectiveness of the teaching force. Our investigation supports this recommendation by demonstrating the predictive validity of one very specific trait, grit.

Our findings corroborate vivid anecdotal evidence that the challenges associated with teaching can be incredibly discouraging (Johnson & Birkeland, 2003; Labaree, 2000). Among the most disheartening aspects of the work is teachers' inability to observe their impact on students: "a carpenter at the end of the day can actually see what he has built, a doctor can observe a patient responding to treatment, but a teacher oftentimes has to go along for months with relatively few noticeable results" (Thompson, 1991, p.104). In low-income districts, the multiplicity of factors often outside a teacher's control (e.g., parental support, available

resources, poor working conditions) further obscures the link between hard work and positive student outcomes (Lortie, 1975). Despite the "endemic uncertainties" associated with teaching practice, society continues to place incredibly high expectations on teachers. Moreover, beginning teachers are often asked to take on more difficult assignments (e.g., larger classes, more challenging students) than their experienced counterparts (Lortie, 1975). Given the challenges associated with teaching, particularly in the first few years of the profession, it seems logical that grit would positively impact teacher performance and persistence.

Limitations

Several limitations of the current investigation are worth noting. First, given the non-experimental nature of our study design, third-variable confounds pose a potential threat to the internal validity of our conclusions. The available data made it possible to measure and control for academic credentials (operationalized as teachers' SAT scores and college GPA) and ratings of leadership potential collected by the teacher training organization during the interview process. Thus, we feel that the most obvious third-variable confounds were accounted for and ruled out in the present investigation. Still, it is possible that an alternate measure of leadership or some other *unmeasured* third-variable confounds were responsible for higher grit scores and superior teaching performance It is important, therefore, that future research continue to assess teachers on multiple measures (e.g., leadership skills, emotional intelligence) at the time of hire to investigate their relationship with grit and measures of teacher effectiveness and retention.

Second, although teacher effectiveness was measured in the currency that we believe matters most (student learning), by necessity, teachers from diverse school districts were assessed using diverse sources of student performance (e.g., different standardized tests). Further, teacher effectiveness ratings were not adjusted for student or school characteristics,

extraneous factors known to influence student academic gains. Despite these limitations, the outcome measure revealed important information about how much students learned in various teachers' classrooms and demonstrated teachers' ability to meet the teacher training organization's metrics of effective performance. We would expect that improving the reliability and validity of our outcome measure would, by reducing error, in fact strengthen the observed relationship between grit and teacher effectiveness. Nonetheless, future research should test the hypothesized associations between grit and teacher effectiveness with more rigorous value-added measures.

Finally, we note that the external validity of our findings is limited by the nature of our sample. Since we studied novice teachers in their first and second year of the profession who were certified through alternative routes, our findings may not generalize to veteran teachers or those entering the profession through traditional pathways. Rates of teacher turnover are much higher among novice teachers (Ingersoll, 2001) and further, those who remain in the profession improve in effectiveness in their first few years (Hanushek 2005; Henry, Bastian, & Fortner, 2011), suggesting that the experience of novice teachers may differ in important ways from those of their experienced counterparts. Second, teachers in this investigation were assigned to schools in low-income communities, where grit may be more relevant to retention and effectiveness than in higher-income areas. Our sample of teachers also had superior academic credentials than many new entrants into teaching. While the observed standard deviation in SAT scores (*SD* = 143 in Study 1 and *SD* = 124 in Study 2) exceeded national averages (i.e., 100), suggesting that restriction on range in the present study did not reduce the predictive validity of SAT scores, future research is needed to test whether grit predicts teaching performance among less academically accomplished teachers.

Implications and Conclusion

The current investigation makes a significant contribution toward understanding the characteristics that distinguish effective teachers and influence teacher retention. Although the importance of teachers' personality traits has historically been recognized, there has been limited progress linking effectiveness and retention with objectively measurable traits at the time of hire. Our analysis begins to fill that void, demonstrating that grit, defined as passion and perseverance for long-term goals, predicts both teacher retention and effectiveness. Though "soft" personal attributes may "matter the most," to teacher performance, they have historically been the "hardest to measure" (Walsh & Tracy, 2004, p. 10). Our investigation shows that in lieu of easily faked self-report questionnaires, grit can be objectively quantified from biographical data available to administrators at the time of hire. Further, it demonstrates that this information need not be directly related to teaching specific behaviors, but instead can be collected from evidence of sustained engagement and advancement in prior activities and work experience.

We suggest that school administrators consider grit as one factor – among many – in identifying promising new teachers. While no single factor in isolation should determine a hiring decision, the method for quantifying grit from biographical data developed for this investigation represents a practical tool for predicting success in the first few years in the teaching. Despite its predictive validity, policymakers should proceed cautiously when using this measure of grit during the screening process and continue to consider a wide range of variables, not just those that are easy to measure, when making hiring decisions. In addition, before using these measures for high stakes purposes, districts should conduct their own internal validation studies to ensure grit is predictive of valued teaching outcomes in their sample of teachers.

Our experience suggests that résumés are unfortunately often idiosyncratic (e.g., dates of participation are not always reported) and time-consuming to code (i.e., requiring two independent coders and a third coder to resolve discrepant ratings). As an alternative to résumé coding, the same information could potentially be gathered more efficiently through a structured form, on which prospective candidates list college activities and work experience, dates of involvement, and associated achievement and leadership roles. Further research is of course needed to confirm the predictive validity of more structured approaches to gathering biodata on grit.

Future research should explore the specific mechanisms linking grit to superior teaching performance. Given evidence that teachers who maintain high levels of self-efficacy and commitment perform better than those whose motivation is diminished (Ashton & Webb, 1986; Gu & Day, 2007; Ebmeier, 2003; Goddard et al., 2004), one possibility is that gritty teachers are better able to maintain confidence in their abilities and a sense of purpose, perhaps through support seeking or other adaptive coping skills. Likewise, since prior research suggests that gritty individuals gravitate to learning experiences that are especially challenging and effortful (Author, 2010), a future study could quantify the extent to which teachers proactively seek out feedback and professional development opportunities. Finally, since grittier teachers tend to be more optimistic (Author, 2009b), an intervention study might examine the effects of professional development workshops in which teachers learn to identify specific, changeable causes (rather than global, permanent causes) for setbacks and adversity.

Given the urgency of closing the achievement gap between low-income and high-income children in the United States (Paige & Witty, 2010; Rothstein, 2004) and the significant number of novice teachers in low-income schools (Clotfelter, Ladd, & Vigdor, 2005; Rubenstein,

Schwartz, Stiefel, & Bel Hadj Amor, 2007), it is essential to improve our understanding of teacher characteristics that predict their subsequent performance. Further, as alternative certification programs continue to recruit candidates with characteristics similar to those in our sample, it becomes increasingly important that we understand what leads some novice teachers to outperform others and remain committed to teaching. This study contributes to these efforts by demonstrating that grit is a robust and sizeable predictor of effectiveness and retention among novice teachers.

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Table 1

Summary of rubric for rating grit from biographical data in applicant résumés

Grit Rating	Sample Profile	Explanation of rating
0	No multi-year involvement in any college activities	
1	Member of the swim team for three years but did not advance or win an award; no other multi-year activities	1 pt for multi-year activity; No other multi-year activities
2	Member of the mock trial team for two years and won the most improved award; no other multi-year activities	1 pt for multi-year activity +1 pt for moderate achievement in that activity; No other multi-year activities
3	Member of a fraternity for three years but no leadership roles; Assistant manager at the local movie theatre for three years	1 pt for multi-year activity; 1 pt for multi-year activity + 1 pt for moderate achievement in that activity
4	Camp counselor at local summer camp for three years; Player on the volleyball team for three years and captain in her senior year	1 pt for multi-year activity; 1 pt for multi-year activity + 2 pts for high achievement in that activity
5	President of the student body for three years; treasurer for the Kite and Key Club for two years	1 pt for multi-year activity + 2 pts for high achievement in that activity; 1 pt for multi-year activity + 1 pt for moderate achievement in that activity
6	Member of the cross-country team for four years and voted MVP in senior year; Founder and President for two years of the University's Habitat for Humanity chapter	1 pt for multi-year + 2 pts for high achievement in that activity; 1 pt for multi-year and 2 pts for high achievement in that activity

Table 2

Descriptive Statistics and Bivariate Correlations for Study 1

Teacher Characteristics	1	2	3	4	5	6	7	8	9
1. Grit Rating	-	0.36***	0.02	0.16	0.08	0.03	-0.09	-0.04	0.08
2. Leadership Rating		-	0.03	0.03	0.12	-0.17*	0.07	-0.09	-0.14
3. College GPA			-	0.40***	0.04	0.07	0.11	0.43***	0.00
4. SAT score				-	0.05	0.20*	-0.01	0.32**	-0.02
School assignment[a]									
5. Middle school					-	-0.37***	-0.02	0.06	0.04
6. High school						-	-0.19	0.04	-0.02
7. Second-year (vs. first-year)							-	-0.08	-0.02
8. White								-	-0.05
9. Female									-
Range	0 – 6	1 – 5	2.6 – 4.0	950 – 1600					
Mean	3.72	3.62	3.56	1344.58	42%	16%	51%	61%	77%
Standard Deviation	1.55	0.97	0.26	142.54					

Note. $N = 154$, except for White, where $N = 137$ and SAT score where $N = 125$. *p < .05. ** p < .01. *** p< .001.

[a]Reference group is elementary school.

Table 3

Comparison of Retained and Resigned Teachers for Study 1

	Teachers retained for the year (*N* = 121)		Teachers resigning mid-year (*N* = 33)		
Variable	*M*	*SD*	*M*	*SD*	*Cohen's d*
Grit Rating	3.98	1.45	2.79	1.58	0.79***
Leadership Rating	3.64	0.97	3.54	0.97	0.10
College GPA	3.55	0.27	3.55	0.25	<0.001
SAT score	1356.29	138.36	1303.57	151.69	0.36
School assignment[a]					
Middle school	41%		46%		-0.07
High school	19%		3%		0.36*
Second year	49%		58%		-0.14
White	60%		66%		-0.10
Female	74%		85%		-0.20

Note. $N = 154$, except for White, where $N = 137$ and SAT score where $N = 125$. *Cohen's d* was calculated for categorical predictors from the *phi coefficient* using method discussed in Rosenthal and DiMatteo (2001).

*$p < .05$. **$p < .01$. ***$p < .001$.

[a]Reference group is elementary school.

Table 4

Comparison of Effective and Less Effective Teachers for Study 1

	Effective Teachers (*N* =80)		Less Effective Teachers (*N* = 41)		
Variable	*M*	*SD*	*M*	*SD*	*Cohen's d*
Grit Rating	4.16	1.43	3.54	1.50	0.42*
Leadership Rating	3.68	0.95	3.53	1.00	0.15
College GPA	3.57	0.27	3.53	0.26	0.15
SAT score	1344.84	131.04	1365.88	166.01	-0.14
School assignment[a]					
Middle school	38%		46%		-0.17
High school	20%		17%		0.07
Second year	46%		51%		-0.10
White	59%		62%		-0.04
Female	78%		70%		0.14

Note. N = 154, except for White, where N = 137 and SAT score where N = 125. *Cohen's d* was calculated for categorical predictors from the *phi coefficient* using method discussed in Rosenthal and DiMatteo (2001).

*p < .05. **p < .01. ***p < .001. [a]Reference group is elementary school.

Table 5

Descriptive Statistics and Bivariate Correlations for Study 2

Teacher Characteristics	1	2	3	4	5	6	7	8	9
1. Grit Rating	-	0.35***	-0.09	0.06	0.14*	-0.04	-0.01	-0.06	-0.10
2. Leadership Rating		-	-0.12*	0.04	0.10	-0.07	-0.08	-0.05	-0.05
3. College GPA			-	0.40***	-0.15	0.07	-0.09	0.25***	0.11*
4. SAT score				-	-0.17	0.15	0.08	-0.03	0.01
School assignment[a]									
5. Middle school					-	-0.51***	0.02	0.02	0.03
6. High school						-	0.01	-0.07	-0.27
7. Second year							-	0.02	-0.03
8. White								-	0.04
9. Female									-
Range	0 – 6	1 – 5	2.6 – 4.0	1030 – 1600					
Mean	3.75	3.20	3.59	1332.09	31%	37%	50%	76%	72%
Standard Deviation	1.56	0.86	0.29	124.43					

Note. N = 307 except for White where N = 252 and SAT score where N = 127. * $p < .05$. ** $p < .01$. *** $p < .001$.
[a]Reference group is elementary school.

Table 6

Comparison of Effective and Less Effective Teachers for Study 2

	Effective Teachers (*N*=250)		Less Effective Teachers (*N*=55)		
Variable	*M*	*SD*	*M*	*SD*	*Cohen's d*
Grit Rating	3.88	1.56	3.20	1.48	0.45***
Leadership Rating	3.20	0.88	3.21	0.76	-0.01
College GPA	3.59	0.30	3.60	0.23	-0.04
SAT score	1332.78	120.52	1327.65	151.51	0.04
School assignment[a]					
Middle school	30%		27%		0.06
High school	37%		40%		-0.05
Second year	51%		40%		0.17
White	74%		80%		-0.11
Female	72%		73%		-0.01

Note. N = 305 except for White where N = 252 and SAT score where N = 127. *Cohen's d* was calculated for categorical predictors from the *phi coefficient* using method discussed in Rosenthal and DiMatteo (2001).

*$p < .05$. **$p < .01$. ***$p < .001$

[a]Reference group is elementary school.