ABSTRACT

GOT GRIT? AN ANALYSIS OF STUDENT GRIT ON RESPONSE TO INTERVENTION

by Evan Robert Geist

How does a student’s grit, or motivation in the face of adversity, affect their responsiveness to the intervention supports provided in an Response to Intervention (RTI) system? This study collected the grit scores of students at the third and fourth grade level and compared those scores to their placement in the school wide system of RTI. With this knowledge, practitioners can better understand a potential predictive factor for intervention effectiveness.
GOT GRIT? AN ANALYSIS OF STUDENT GRIT ON RESPONSE TO INTERVENTION

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Dedication

To my beloved wife, Megan, who has always supported me in everything I do.
Introduction

“Three percent of peer-reviewed psychology articles in the past years were referenced by the key word “self-control” or closely related terms” (Duckworth, 2011). This is a clear indication of the relevance of self-control in today’s world. Self-control or self-regulation is defined as the voluntary control of attention, emotion, and behavior impulses in the service of personally valued goals and standards (Carlson & Duckworth, 2013). Essentially, this is a person’s ability to make their own decisions in order to help reach his or her goals. Motivation is also a similar factor for achievement and it is believed by some that those students who are motivated and resilient are those who believe their abilities can be developed through their effort and learning (Dweck, 2007).

When motivation and self-control are looked at together, it is easier to understand the concept of grit. Grit is defined as “perseverance and passion for long term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007). Grit is not only an individual’s desire and motivation to accomplish something, but their perseverance to do so in the face of adversity. This may seem like a difficult concept to quantify in a person, but Angela Duckworth, from the University of Pennsylvania, actually created a scale and survey for measuring both children and adult grit levels for educational research (Duckworth, 2009).

There are many possibilities for educational research surrounding the concept of grit. Some students face adversity, which might make it more difficult for them to be academically successful. Those academic needs can be addressed in a Multi-tiered System of Support (MTSS). One form of MTSS is known as Response to Intervention (RTI), which is a tiered system, used as a preventative model for assisting students with their academic and behavioral needs. In a typical RTI system there are three tiers and the tier a student is placed in depends on their level of needed assistance. Tier one is classified as a general education tier for students who are making grade-appropriate progress, tier two is for students needing small group intervention and extra assistance, and tier three is for students who require more intensive intervention. The ultimate goal of this system is to help students early on before their academic and behavioral problems become a larger issue. Students in the different tiers face many challenges and there are multiple tools available for these students to be successful.

Grit has the potential to be one of the tools available to students in the various tiers of RTI and their subsequent movement between the tiers. Because tier placement is indicative of the level to which a student is struggling in the general education setting it would also suggest that students would face varying levels of adversity between the tiers and would need the qualities of grit to help them achieve their goals and move through the different levels of RTI (Urso, 2013). Other factors may give insight into student success with the RTI model but grit is important because it deals more closely with the idea of perseverance despite challenges. The challenges a student in tier two faces are much different from those of the general population in tier one and so they would need a higher level of grit to succeed compared to their peers. The purpose of this research is to determine whether or not there is such a correlation between grit level and tier placement. In doing so, the hope is that insight into the importance of grit will allow a
better understanding of student needs during the RTI process. With this knowledge, future interventions and assistance can be developed to help students reach their goals.

**Literature Review**

**Self-Control As A Predictive Factor**

In terms of education, student academic and behavioral goals are numerous and can play a role in predicting factors such as income, savings, and financial security. Studies have shown that proper classroom behavior, such as following classroom rules and completing homework assignments on time, can help to yield long-term rewards (Duckworth, Quinn, & Tsukayama, 2012). Examples of those long-term goals include report card grades as well as standardized test achievement. Those same studies have shown that although cognitive ability can help to predict standardized achievement, self-control is a better predictor of report card grades (Duckworth et al., 2012).

Self-control can also be seen as a better indicator of academic performance in general. Highly disciplined students with strong self-control were shown to perform better than their more impulsive peers on multiple academic performance areas including report card grades, achievement tests, and others (Duckworth & Seligman, 2005). According to the research of Duckworth and Seligman, the more important academic area to consider is grade point average since this type of score assesses student ability over an extended period as opposed to standardized tests which only sample a student’s knowledge and skills over the course of a few hours (Duckworth & Seligman, 2005). By this argument, intelligence quotient (IQ) may be a good indicator of standardized achievement, but it is not necessarily the best for overall academic ability.

IQ also has a connection to the ideas of self-control and motivation. Assessment of intelligence can be completed in a variety of ways, but each test has its own validity, which indicates the accuracy of a result. A 2011 study sought to examine whether motivation is less than maximal on intelligence tests administered in low-stakes research. The results of this study found that incentives significantly increased IQ scores by an average of .64 SD (Duckworth, Quinn, Lynam, Loeber, & Stouthamer-Loeber, 2011). This shows that motivation does in fact impact the predictive validity of intelligence, and that test motivation diminished the predictive validity of IQ tests greatly.

Another predictive factor could be the perception of willpower and how it relates to self-regulation and grades. One study sought to answer the question on whether or not there are worse outcomes in everyday life when demands on self-regulation are high (Job, Walton, Bernecker, & Dweck). This study showed that a nonlimited theory predicted better self- for students who faced high self-regulatory demands. It also showed that among students taking a heavy course load, those with a nonlimited theory of willpower ended up earning higher grades with less procrastination.
Motivation In Motion

When narrowing the scope of motivation, it can also be seen to have a strong impact on the field of special education or at-risk student populations. Students involved in interventions face many challenges, which can require repetition in order to achieve mastery. At-risk students tend to lack the resources of their peers and need extra assistance to achieve such levels of mastery. This means that both of these groups of students will need to change their outlook on long-term goals and be able to remain positive. Studies suggest that such an outlook can be changed with positive results (Dweck, 2008) and through the implementation of a growth mindset workshop; teachers began to see their students become more engaged learners.

Another such study sought to examine the difference between positive thought and Mental Contrasting with Implementation Intentions (MCII), which is a metacognitive strategy for converting positive thoughts and images about a desired future into self-regulated behavior change. This study looked at the question of whether or not goal pursuit helped those students who were economically disadvantaged change their thoughts about the future and put them into action. Results showed that students taught MCII earned higher third quarter GPAs than children taught positive thinking (Duckworth, Kirby, Gollwitzer, & Oettingen, 2013). They also came to school more regularly and had better overall conduct. The final discussion for this study showed that it is in fact more important to contrast positive thoughts about a desired future with obstacles standing in the way (Duckworth et al., 2013).

Students in special education are also in danger of obstacles to their future desires. A combined motivational intervention was administered to eighty second grade through fifth grade students. The results of this intervention were that comprehension was improved for the reading disability groups with and without ADHD (Zentall & Lee, 2012). Implementing an intervention that focused on motivation was able to improve overall reading ability for students within this target demographic.

There are even more questions that motivation research seeks to answer. Another study analyzed whether or not a child’s motivation shifts along different contexts and topics (Pinxten, Marsh, De Fraine, Van Den Noortgate, & Van Damme, 2014). This study focused on examining the different areas in the subject of science that motivation might affect. While it did give some answers, there are many questions that still exist as a result of this study. Less is known about how concrete experiences relate to a child’s motivation such as science experiences and their relation to motivation in science (Pinxten et al., 2014). Similarly, another study by Grund and Fries sought to measure what students were working on versus the motivation they had to complete that task. This study by Grund and Fries attempted to link motivational characteristics of two conflicting activities such as preparation for an exam and meeting friends (Grund & Fries, 2014).

Another area of concern in terms of motivation is to see the negative consequences of a lack of motivation. By comparing motivation levels and belief in success in school versus high school dropout rates the study conducted by Fan and
Wolters sought to explain why students might be dropping out. Results showed that a student who has higher educational expectations were less likely to have negative opinions of their ability in Math and English and be less like to drop out. The results also showed that student intrinsic value in Math and English had a large impact with student behavior of leaving school (Fan & Wolters, 2014). The conclusion to be drawn from this study is that there is still plenty of research left in the area of motivation to truly understand how students might be able to succeed. It is important, based off of this study, to know that there are other reasons for student dropout status aside from student’s social background and school behaviors (Fan & Wolters, 2014).

**The Grit Factor**

When combining the previously mentioned areas of both self-control and motivation, an overarching term of grit can be used. Grit is defined as “perseverance and passion for long term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007). In other words, grit is an inherent trait within a person that allows them to overcome adversity and obstacles and continue to achieve. A survey to assess grit was developed by Angela Duckworth and colleagues. She sought to answer the question why do some individuals accomplish more than others of equal intelligence? Initial studies with grit showed that more educated adults were higher in grit than less educated adults of equal age (Duckworth et al., 2007). Grit seems to be an indication for the intellectual edge one person might have over another.

Studies on grit have shown that individuals motivated to seek happiness through immediate pleasure would be less inclined to maintain interest overtime. In contrast, those with high grit were more intrinsically motivated and their motivation continued for longer (Von Cullin, Tsukayama, & Duckworth 2014). Research also shows that inherent talent isn’t an automatic guarantee of grit (Duckworth & Eskreis-Winkler, 2013). In fact, grit seems to be a trait, which exists in spite of talent or lack thereof. Grit has also been shown to increase with age indicating that it is a sign of maturity that is developed within a person (Duckworth & Eskreis-Winkler, 2013). Grit was able to predict the completion of a rigorous summer training program better than any other predictor (Duckworth et al., 2007).

**Multi-Tiered System of Support: An Introduction to RTI**

Many districts are beginning to adopt another form of rigorous program implemented within schools. This program is known as a multi-tiered system of support (MTSS) which seeks to use evidence-based interventions to increase instructional time and improve educational outcomes (Utley & Obiakor, 2015). MTSS is also intended to use ongoing measurement, monitoring, and evaluation of standards to drive data-based decision making (Hayes & Lillenstein, 2015).

Studies have been done to evaluate the importance of MTSS framework within schools (Dulaney, Hallam, & Wall, 2013) with results that suggest that it is important to develop a common language and framework and work collaboratively as a school. When implemented effectively, research has shown that such a framework help to close the achievement gap experienced by students (Benner, Kutash, Nelson, & Fisher, 2013).
RTI: Response To Intervention

Another way to understand the MTSS framework in schools is through response to intervention (RTI). RTI is defined as “a tiered process of instruction and increasingly supportive intervention services with a deliberate progress monitoring component” (Urso, 2013). This tiered program focuses on prevention and progress monitoring in order to help students before they need to be placed in special education services.

RTI models most often include universal screening of all enrolled students to identify appropriate candidates for more intensive or differentiated intervention (i.e., Tier 2 or 3 services), and progress monitoring of these individuals’ achievement as tiered intervention is provided (McConnell, Wackerle-Hollman, Roloff, & Rodriguez, 2014). This progress monitoring is done in order to discern General Outcome Measures (GOMS). GOMs are brief, easy-to-collect, and psychometrically rigorous indices of academic or related achievement that describe both current levels of performance and rates of progress over time (McConnell et al., 2014). In the first stage of progress monitoring, also known as universal screening, a brief assessment for all students is conducted at the beginning of the school year. Placement within the different tiers of RTI is determined by whether or not a student scores below a cut point on the universal screening. According to the National Center on Response to Intervention, a cut point is a score on the scale of a screening tool or a progress-monitoring tool. For universal screeners, educators use the cut point to determine whether to provide additional intervention (2010).

Those interventions can change in intensiveness as well as the amount of time needed depending on the tier of RTI. Tier one is also known as general education and about eighty percent of the student body can be found at this tier. Services include universal screening to assess students who might be in need of extra help. Tier 2 is for those students who have been determined to need extra help. Interventions in this tier include small group work and this is typically ten to fifteen percent of the student population. The final tier of RTI, tier three, is intended for students who need even greater assistance academically. These students require intensive interventions and range from five to ten percent of the student population (Saddler & Asaro-Saddler, 2013). The purpose of RTI is to identify students who are struggling with skill acquisition and to intervene early (Saddler & Asaro-Saddler, 2013).

Response to Intervention programs implemented in schools have been reported by some to result in progress for students and decreased numbers of required special education evaluations a school must conduct. One area of study that RTI shows great benefit is with the areas of reading and writing. This can be a significant area to improve because it has been reported that approximately 42% of K-12 students are struggling with literacy in some form (Urso, 2013). According to the National Center on Response to Intervention, the goals of RTI are to integrate all the resources, to minimize risk for the long-term negative consequences associated with poor learning or behavioral outcomes, and strengthen the process of appropriate disability identification (2010). However, it is important to note that the National Center on Response to Intervention does not consider RTI to be “synonymous with special education.” Instead, RTI is a general education initiative and operates separately but in conjunction with special education as a means by
which to get students help before special education services or testing would ever be required.

While there is consistent need for schools to implement an RTI model, there is not always consistency in how it is implemented. Depending on the school, assessment can occur frequently or less so. One school might choose to progress monitor and assess students on a quarterly basis and determine if each student needs to be moved up a tier for more interventions, or down a tier for less intensive services. While parts of RTI can vary, the essential components are: Multi stage universal screening, progress monitoring, and data based decision-making (Kuo, 2014).

The Right Fit For Grit
Grit has seen significant attention in today’s media. Angela Duckworth has presented on the topic for a TED Talk and the concept has been studied in comparison to everything from National Spelling Bees to NFL Quarterback success. However, there is no known research on the effect grit might have in a school that uses an RTI model. Previous research has been conducted to compare motivation and the RTI model (Timpone, 2012), but this research was done before grit became a more prominent area of research. Other studies have looked at the specific interventions that motivate classroom learning (Lin-Siegler, Dweck, Cohen, 2016), which suggests there is a desire to learn more of the impact of motivation in an educational setting. Given grit’s previously established predictive qualities, as well as correlations between grit and academic performance, it is logical to perform exploratory research to determine a possible relationship between grit and RTI. The discovery of a potential relationship could be the groundwork to future interventions that help foster grit and assist school administrators in determining educational placement for students.

The purpose of this study is to answer two questions. The first question is whether or not there is a change in the average grit level of students in the three tiers of RTI over time. The second question will be whether or not there is a change in a student’s placement in the tiers or RTI, either moving up a tier or down one, based off of their assessed grit levels. It is hypothesized that the answer to the first question will show that the students in the lower tiers of RTI have higher grit and that grit levels will increase over time. It is hypothesized that in the second question, students with higher grit levels will be able to persevere and move down to a lower level of the RTI model.

Methodology

Subjects
Subjects for this research were acquired from an elementary school in Indiana. Because Response to Intervention programs are considered school-wide, the participants were taken from the entire school population. Participants were enrolled in the third and fourth grade, both male and female. The only identifying information associated with each student was the tier of the RTI program in which he or she was currently enrolled and their pre and post grit scores.
Materials

The main material used to collect data is the Short Grit Scale developed by Angela Duckworth (Duckworth, 2009). This survey involves eight questions in which students will self-report about their own qualities and abilities. This is done with a five point Likert scale for each question (from five meaning like me to one meaning not like me at all). After this, the raw score is added together and then divided by eight to achieve a total grit score. A student with a score of five has very high grit and a student with a score of one has much lower grit. A confirmatory factor analysis supported the two-factor model of grit and it was shown to more correlate with the Big Five Inventory (a five factor personality test) of Conscientiousness than with Neuroticism.(Duckworth & Quinn, 2009) The internal reliability of the grit scale survey has been reported as $\alpha= .82$. (Von Cullin et al., 2014)

Procedures

At the beginning of the academic school year, school data records were examined to determine every student’s current placement in the different tiers of RTI. The school district process for RTI consisted of student identification, implementation of research-based practices in a small group setting, and monitoring of student progress. Screening tools were administered three times each year to identify student qualification for the intervention process. Once RTI tiers was determined, students were administered the Short Grit Scale to determine their initial grit scores. Grit scores were placed into different envelopes marked with three different colored stickers to relate to the different tiers of RTI in which students were placed. Normal school records were kept approximately every eight weeks as progress monitoring continued and determinations were made as to whether or not to move students within the various tiers of intervention. At the end of the third academic quarter, grit scores were once again assessed and data was collected from school records to determine if students had moved up or down through the different tiers of RTI.

Data Analysis

Initially, data was going to be analyzed inferentially, however there were limitations with the data that made this impractical. The sample size for this research was small enough that inferential analysis may have resulted in the incorrect rejection of a true null hypothesis by finding significance where it hadn’t actually occurred. As a result, the data for this research was analyzed descriptively instead. This descriptive analysis summarized the results of the research in order to determine where patterns might occur within the sample population.

Results

The results of this analysis came from data obtained from thirty-one students in two third grade classrooms and two fourth grade classrooms. Of the total thirty-one students, sixteen students had grit levels which decreased, twelve students had grit levels which increased, and three students had grit levels that stayed the same.

When looking at initial tier placement for students, those who were initially placed in Tier 3 had higher grit scores during the pre test but lower scores during the post test. As seen in Table 1, the pre test mean grit score for students receiving Tier 3 services
was 3.76. Posttest data showed that those students receiving Tier 3 services had a mean grit score of 3.08. Although students initially receiving more intensive services had higher grit at first, they had lower grit scores at the end of testing.

There was also a pattern for the rate at which grit changed based on initial tier placement. As seen in Table 1, the average grit level change for students who started in tier 1 was -0.33, the average grit level changes for students who started in tier 2 was -0.16, and the average grit level change for students who started in tier 3 was -0.29. Students initially placed in tier 1 had a larger drop in grit level overall compared to students in tier 2 and tier 3.

Table 1  
*Mean Grit of Initial Tier Placement*

<table>
<thead>
<tr>
<th>Tier</th>
<th>n</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Mean Grit Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>16</td>
<td>3.69 (sd=.66)</td>
<td>3.30 (sd=1.10)</td>
<td>-0.33 (sd=1.08)</td>
</tr>
<tr>
<td>Tier 2</td>
<td>12</td>
<td>3.62 (sd=.51)</td>
<td>3.32 (sd=.60)</td>
<td>-0.16 (sd=.97)</td>
</tr>
<tr>
<td>Tier 3</td>
<td>3</td>
<td>3.7 (sd=.57)</td>
<td>3.08 (sd=.38)</td>
<td>-0.29 (sd=.51)</td>
</tr>
</tbody>
</table>

In comparison to pre test tier level, posttest tier levels were different in terms of grit change. As seen in Table 2, those students who received tier 1 services at the end of testing had an average grit level change of -0.20. The average grit level of students who ended in tier 2 services was -0.43, and the average grit level of students who ended in tier 3 services was -0.29. Average grit level change was at a smaller rate for students whose post service tier was tier 1 (= -0.20) compared to students whose pre service tier was tier 1 (= -0.33). Those students who remained in tier 1 or moved down a tier in service remained more consistent in their grit level.

Table 2  
*Mean Grit of Final Tier Placement*

<table>
<thead>
<tr>
<th>Tier</th>
<th>n</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Mean Grit Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>21</td>
<td>3.70 (sd=.58)</td>
<td>3.48 (sd=.93)</td>
<td>-0.20 (sd=.93)</td>
</tr>
<tr>
<td>Tier 2</td>
<td>7</td>
<td>3.53 (sd=.66)</td>
<td>3.13 (sd=.85)</td>
<td>-0.43 (sd=1.32)</td>
</tr>
<tr>
<td>Tier 3</td>
<td>3</td>
<td>3.76 (sd=.57)</td>
<td>3.08 (sd=.38)</td>
<td>-0.29 (sd=.51)</td>
</tr>
</tbody>
</table>

Of the total thirty-one students, six students went down a tier in their level of intervention support needed. One student’s tier level increased, and the rest remained the same. As seen in Table 3, the average pre grit score for students who went down a tier was 3.69, the mean pre grit score for students who went up a tier was 3.63, and the mean pre grit score for students whose tier did not change was 3.59. Those students whose tier level decreased had a higher mean grit score compared to those students whose tier of intervention support did not change or became more intensive.
Table 3
*Mean Grit of Change in Tier Placement*

<table>
<thead>
<tr>
<th>Tier</th>
<th>n</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Mean Grit Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down A Tier</td>
<td>6</td>
<td>3.69 (sd=.22)</td>
<td>3.58 (sd=.50)</td>
<td>-0.10 (sd=.60)</td>
</tr>
<tr>
<td>Up A Tier</td>
<td>1</td>
<td>3.56 ( )</td>
<td>3.23 ( )</td>
<td>-0.24 ( )</td>
</tr>
<tr>
<td>Same Tier</td>
<td>24</td>
<td>3.63 (sd=.66)</td>
<td>1.88 (sd=.91)</td>
<td>-1.75 (sd=1.03)</td>
</tr>
</tbody>
</table>

Of those students who did go down a tier level, all students were placed in tier 2 services. There were twelve total students and six students had post test services at tier 1. As shown in Table 4, the mean grit change for those students whose tier did go down was -.01 and the mean grit change for those students whose tier did not change was -.21. Those students who did experience a change in their level of support needed had a grit level which went down at a smaller rate compared to those students whose tier level did not change.

Table 4
*Mean Grit of Initial Tier 2 Placement*

<table>
<thead>
<tr>
<th>Tier</th>
<th>n</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Mean Grit Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 2 to Tier 1</td>
<td>6</td>
<td>3.69 (sd=.22)</td>
<td>3.58 (sd=.50)</td>
<td>-0.10 (sd=.60)</td>
</tr>
<tr>
<td>Tier 2 to Tier 2</td>
<td>6</td>
<td>3.52 (sd=.72)</td>
<td>3.31 (sd=.71)</td>
<td>-0.21 (sd=1.30)</td>
</tr>
</tbody>
</table>

In order to compare student grit levels more in-depth, scores were divided into further categories of low (six students), medium (sixteen students), and high grit (nine students). Students with low grit had scores between 1 and 3, Students with medium grit had scores between 3 and 4, and students with high grit had scores between 4 and 5. As seen in Table 5, the average change in grit for students who started with low grit was an increase of .38. Students with medium grit experienced a grit change of -.34. Students with high grit experienced a grit change of -.60. Students with initially high grit experienced a decrease in grit over time while those with initial low grit experienced an increase.

Table 5
*Mean Grit Change By Grit Category*

<table>
<thead>
<tr>
<th>Grit Score</th>
<th>n</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Mean Grit Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Grit</td>
<td>6</td>
<td>2.75 (sd=.09)</td>
<td>3.13 (sd=.49)</td>
<td>0.38 (sd=.50)</td>
</tr>
<tr>
<td>Medium Grit</td>
<td>16</td>
<td>3.55 (sd=.24)</td>
<td>3.20 (sd=1.09)</td>
<td>-0.34 (sd=1.15)</td>
</tr>
<tr>
<td>High Grit</td>
<td>9</td>
<td>4.32 (sd=.25)</td>
<td>3.72 (sd=.50)</td>
<td>-0.60 (sd=.63)</td>
</tr>
</tbody>
</table>
Percentages for subjects within each tier were also calculated. As shown in Table 6, there were a higher percentage of students with medium grit that began with tier 2 services (29%). According to posttest results, a larger percentage of students receiving post tier 1 services had medium (29%) or high (26%) grit levels. Across all three tiers, student percentages in low grit areas did not change. The percentage of students receiving post tier 1 services did change over time and this change was greatest with students who had initial scores for Medium Grit.

<table>
<thead>
<tr>
<th>Grit Score</th>
<th>Tier 1 Pre (n)</th>
<th>Tier 1 Post (n)</th>
<th>Tier 2 Pre (n)</th>
<th>Tier 2 Post (n)</th>
<th>Tier 3 Pre (n)</th>
<th>Tier 3 Post (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Grit</td>
<td>13 (n=4)</td>
<td>13 (n=4)</td>
<td>3 (n=1)</td>
<td>3 (n=1)</td>
<td>3 (n=1)</td>
<td>3 (n=1)</td>
</tr>
<tr>
<td>Medium Grit</td>
<td>16 (n=5)</td>
<td>29 (n=9)</td>
<td>29 (n=9)</td>
<td>16 (n=5)</td>
<td>6 (n=2)</td>
<td>6 (n=2)</td>
</tr>
<tr>
<td>High Grit</td>
<td>23 (n=7)</td>
<td>26 (n=8)</td>
<td>6 (n=2)</td>
<td>3 (n=1)</td>
<td>0 (n=0)</td>
<td>0 (n=0)</td>
</tr>
</tbody>
</table>

Discussion

Change In Grit Level

The first question for this hypothesis was to determine whether or not there is a change in the average grit level of students in the three tiers of RTI over time. It was hypothesized that students with higher grit levels would be placed in lower tiers of intervention service and that grit levels would increase over time. According to Table 6, out of the thirty-one students sampled, thirty nine percent of students with medium to high grit were receiving tier one services. Thirty five percent of students with medium to high grit levels were placed within tier two services and six percent of students with medium to high grit were receiving tier three services. This information would suggest that more students with medium to high grit were receiving tier one services and would agree with the hypothesis that students with higher grit levels are placed within lower tiers of service. Additionally, those students who experienced a change in their level of support were found to be placed in tier 2 services. Those students receiving tier 2 services have both general education instruction as well as more individualized experiences, which may have resulted in their self-report of higher grit.

Results of pre and post test grit assessment also indicate that grit scores do change over time however, those results differ from the hypothesis that grit would increase over time because the average grit score decreased over time as seen in Tables 1 and 2. This potential loss of grit overtime may change the way schools want to approach setting goals for students as the school year progresses.

Change In Placement In Tiers of RTI By Grit Score

The second question for this study was to determine whether a student’s grit level could be used as a predictive factor to determine if a student would need less intensive services for intervention over time. It was hypothesized that students with higher grit would need less intensive services and would move down a tier level. According to Table
4, there were six total students who experienced a change in their tier placement from pre testing to post testing. All six of those students had been placed in tier two services initially and moved down to tier one services through the course of the school year. The average grit change over time for these students was at the smallest rate compared to all other categories at -.10. Those students who required less intensive intervention services remained consistent in their overall grit rating.

Of those six students who did experience a change in level of intervention services, one student had a pre grit score within the high grit range while the other five were within the medium grit range. Each of those students initially received tier 2 intervention services and were able to make adequate progress and move down to tier 1 placement. Based on these results, a pattern was found that suggests those students with higher grit scores were better able to achieve their long-term goals and make the necessary academic progress to be considered at grade level. Those students also experienced a lower rate of grit change over time and were more consistent in their self-report of overall grit. No students rated as having a low grit score experienced any change in intervention services.

Summary and Interpretations
Grit scores did change over time for all but three students. Though the exact cause for diminishing grit scores is difficult to discern, it is important for schools to be aware of this potential change. It may be beneficial to consider factors such as stress and deleterious effects on academic performance, which may show a rise in decreasing, grit scores.

In terms of any change in percentage experienced by the sample in this study, it was determined that students with medium to high grit scores were also more likely to receive less intensive intervention and be at lower tiers of the RTI model. Overall, this data is consistent with the hypothesis made for this study. The second question for the hypothesis is more difficult to answer due to the limited sample size for this study. Data did agree with the hypothesis that students with higher grit scores would require less intensive intervention over time. All students who experienced a change in their level of intervention service had medium to high, but there were only six students who did experience that change out of the total thirty-one students.

Limitations
Limitations of this research include the relatively small sample size that was used. It is more difficult to make broad generalizations since this research only looks at one school. The age ranges of the participants were selected because of the availability for data collection, but it would have been beneficial to look at grit in comparison to a larger age range. Another issue is the fact that this research deals with a self-reported measure. Because the information presented in the survey is a more idealized representation, there might be potential for a halo effect in which students rate themselves as having higher grit than they actually have. Finally, the sample sizes from the three tiers of RTI will be markedly different which may affect the assumptions of this data. It might be beneficial
in the future to combine this kind of research with a classroom observation in which observers determine if grit level self-reports match up with actual behaviors.

**Implications**

The data from this seminal and novel study indicate and suggest that grit may be beneficial in a Response to Intervention (RTI) model or one involving a Multi-Tiered System of Support (MTSS). Six total students did experience a change in the level of intervention services that they received and those students consistently scored within the medium to high range for grit levels. Those students who had “perseverance and passion for long term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007) were more likely to be receptive to supports put in place to help them achieve those goals in the classroom.

The fact that this research showed that grit scores are more likely to decrease as the year goes on could also be helpful information for schools in terms of how to view student confidence and motivation. When implementing interventions for students, a component for instilling confidence may be beneficial, as students who do not have higher grit scores may need more chances for success to sustain and increase their confidence and effort. Supports might also need to be more intensive as the school year progresses due to a potential decrease in grit. This may also suggest the benefit of assessing grit levels multiple times a year and determining norms for different times throughout the school year (Fall, Winter, and Spring).

**Future Research**

The Response to Intervention model is meant to be proactive in terms of support rather than reactive. As a result, the focus is intended to bring support to students in the classroom before they would require specialized instruction through special education services. The scope of this study did not include students receiving special education services but given the long-term goals that are established for students with Individualized Education Programs, it may be beneficial to assess grit level for those students and compare their progress report data to see if grit could be used as a predictive factor for those students. Standardized norms may be an important future aspect of how schools measure grit. These norms could be broken down further for students within special education programs as well as by gender and time of year (Fall, Winter, and Spring).

This study also looked at Response to Intervention from a school wide perspective and did not take into account the type of intervention being used. There is a wide variety of intervention used within schools including both areas of academic support and behavioral support. Future research may take this into account and look at grit compared to different types of interventions. Most interventions already have a form of progress monitoring built in so the data collected from those interventions can be compared to grit score for a more specific area of need. By conducting research for specific interventions, a connection may be found with which intervention services foster grit and motivation naturally versus which interventions may need to give students more motivational support.
Conclusion

According to research defining the concept of Response to Intervention, intervention services are implemented for students when they present with a behavioral or academic need. Those needs can be measured through long term goals that they must strive to achieve in order to be successful in the classroom. It is not always an easy achievement for students to work towards their educational goals, and they may face adversity along the way. As seen in previous research, student’s face adversity through a lack of resources, potential for dropping out, and different diagnosis for disability, all of which have been shown to impact motivation. Just as previous research has shown that self-control and motivation can impact IQ and school grades, a student’s grit can show how much internal motivation and perseverance they will display as they work towards long-term intervention goals.

This research has shown that student’s with higher grit are more likely to require less intensive interventions but that grit scores are more likely to decrease over time. Schools must be aware of this in order to continue to motivate students and ensure that intervention continues to be effective. This research has also shown that students with higher grit levels are more likely to be receptive to intervention supports. It will be beneficial for schools to be aware so they can better predict which students will need more intensive support over time.

Grit is not the definitive measure for predicting higher scores and cannot guarantee student success and achievement. However, grit does provide an extra piece of the puzzle for student growth. It can be extremely helpful to provide more targeted and individualized support for each student so that every student can be successful in reaching their long-term goals despite adversities they may face.
References


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