

The Impact of Non-Cognitive Skills on Literacy Measures

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Abstract

The purpose of this study was to determine the potential relationship between non-cognitive (“soft”) skill development and cognitive (“hard”) skill development through a semi-quasi experiment that tested the impact of a specific intervention on a small sampling size of sixth-grade students. The study hypothesized that there would be no significant statistical impact on the experimental group when comparing posttest results on the i-Ready Reading Diagnostic Assessment. The study employed the use of a targeted, non-cognitive skill intervention on a sample size of 20 students. The null hypothesis was confirmed, and the results of this study determined that there was, in fact, no statistically significant impact when comparing the experimental and control group. The results of this study help to support the need for more research regarding which specific interventions are successful when attempting to increase non-cognitive skill development as well as which accurate tools could be employed when measuring such interventions.

CHAPTER I

INTRODUCTION

Overview

In this study, the potential relationship between non-cognitive (“soft”) skill development and cognitive (“hard”) skill development is explored through a semi-quasi experiment that tests the impact of a specific intervention on a small sample of sixth-grade students. Historically referred in educational research and practice as “hard skills,” cognitive skills are defined as the necessary brain skills or higher order thinking skills individuals needs to process problem solving strategies, the acquisition of new learning, reading, mathematical computation, and higher-order functioning associated with learning. This learning is measured in a variety of ways within a school, for example through formative and summative assessments, psychological tests, performance tasks, and most notably state and national tests linked to overarching standards. Within the context of this study, the cognitive skill of reading was assessed and analyzed through a computerized assessment called i-Ready.

In comparison, non-cognitive skills, which have become increasingly popular among educators and researchers over the past two decades, is a catchall term for the traits, skills, and processes individuals are capable of learning and performing not captured by traditional cognitive ability and knowledge assessments (West et al., 2016). Unlike the traditional understanding of “soft skills,” the Education Endowment Foundation refers to non-cognitive skills as a “set of attitudes, behaviors, and strategies that are though to underpin success in school and at work, such as motivation, perseverance, and self-control” (Gutman & Schoon, 2013, Executive summary para. 1). Likewise, there is an increasing amount of research that highlights the positive impact of non-cognitive skill development on overall student achievement,

specifically the increased proficiency of cognitive skills such as reading, writing, and math. In a report published by the Centre for the Economics of Education (as cited in Carneiro, Crawford, & Goodman, 2007), the findings highlighted the strong, positive correlation between combined interventions of non-cognitive skill instruction, cognitive skill instruction, and an overall increase in student achievement measures. Lastly, Gutman and Schoon (2013), in concurrence with the findings of the Centre for the Economics of Education (as cited in Carneiro et al., 2007), determined that specific, targeted interventions can greatly benefit non-cognitive skill development. Specifically, they argued that through developing the capacity of a student's ability to self reflect within the context of self-assessment, non-cognitive skills can be positively impacted

Within the context of this study, non-cognitive skills were measured using a school created resource, the Character Report Card¹, and consequently the qualitative data gathered from it was used as an initial area of focus for the intervention. The report card was designed as a self-assessment tool in cooperation with the general educators (as guides) as a means to assess certain non-cognitive skills within each student, which include skills such as "grit," "optimism," "self-control," and "curiosity." For the purposes of the study, only 20 sixth-grade students were selected; consequently, the Character Report Card was completed for each student by each of the general educators (science, social studies, math, language arts, and fine arts). The data gathered from the Character Report Card was then used by the Dean of Students as criteria for conducting the intervention.

The intervention involved the use of data gathered from the Character Report Card as the criteria to isolate three of the lowest scored non-cognitive skills. Then a goal setting document²

¹ See Appendix A for an example of the Character Report Card

² See Appendix A for an example of the Goal Setting document

was used to target these three skills and begin a discourse with the 20 identified students on which specific skills they needed to improve, how they could potentially impact their learning, and their desired growth goal on the i-Ready diagnostic for reading (using the data gathered from Window 2, administered in December). Lastly, one biweekly conference, lasting approximately 20 minutes, was utilized with each of the 20 selected students within the experimental group to focus on specific interventions and self-reflection strategies associated with the three non-cognitive skills identified. The purpose of this intervention was to provide an additional support, specifically one that targets the development of non-cognitive skills, in addition to the cognitive skill instruction administered within each of the general education settings.

Statement of the Problem

The purpose of this study was to determine whether the implementation of explicit “non-cognitive” skill instruction impacts student achievement, specifically impacted literacy proficiency as measured by a standardized, electronic assessment.

Hypothesis

There will be no statistically significant increase in literacy measures for those students receiving the intervention (experimental group) in comparison to those who do not (control group).

Operational Definition

The independent variable of this study is the non-cognitive skill intervention, specifically the use of the non-cognitive skill assessment, the Character Report Card, the Goal Setting document, and the biweekly, 20-minute student conferences centered on specific non-cognitive skills linked to the assessment. The intervention lasted a total of eight weeks. The dependent

variables for this study are the literacy measures, specifically a comparison of Window 2 assessment to Window 3 assessment for each student, as measured by i-Ready.

CHAPTER II:

A REVIEW OF THE LITERATURE

This literature review seeks to examine the impact of non-cognitive skill development on overall student achievement, specifically increasing literacy rates among adolescent learners. Likewise, this review seeks to understand the relationship between “non-cognitive” skill development and “cognitive” skill development and its overall impact on positive student outcomes, both in the short and long term.

Section one provides an explanation and outline of “cognitive” skills and their impact on student achievement. Section two provides an explanation of “non-cognitive” skills as well as a basic understanding as to what they are and how they are measured. Further, it explains the impact of “non-cognitive” skill instruction on specific student outcomes, such as acquiring content knowledge and a child’s ability to read. Lastly, section three outlines how researchers and educational experts assess “non-cognitive” skills within students and what specific interventions, curriculum, and instruction may improve “non-cognitive” skill proficiency in students.

What are Cognitive Skills?

Historically referred in educational research and practice as “hard skills,” cognitive skills are defined as the necessary brain skills or higher order thinking skills individuals need to process problem solving strategies and the acquisition of new learning, reading, mathematical computation, content knowledge application, and other higher-order functioning associated with learning or applying what has been learned. In short, cognitive skills are the “technical competencies and domain knowledge” individuals possess that allow them to access both the professional and academic world (Rao, 2010, p. 3). Cognitive skills are typically measured by IQ

tests, standardized assessments, reading comprehension (which includes fluency, vocabulary, and decoding), and mathematical/arithmetic tests (Carneiro et al., 2007). These assessments are used to gauge a student's understanding of what has been taught and, consequently, if employed correctly, are then utilized to determine which instructional practices, aligned to these specific cognitive skills, should be adjusted or modified. Measuring cognitive skills has only grown in popularity with the rise of data-driven instruction and the employment of formative assessments, aligned to specific standards and learning objectives, to drive learning in academic institutions beginning as early as Kindergarten (reinforced through federal initiatives such as No Child Left Behind and ESSA). Likewise, curriculum experts, educational researchers, and academic institutions as a whole have focused primarily on their development. This can be noted not only in what is taught within primary and secondary schools, but with the pedagogy that is employed as well. Post-secondary institutions and teacher preparatory colleges have historically focused on developing the capacity of educators at the primary and secondary level to deliver high-quality instruction that focuses explicitly on cognitive skill development.

The outcomes measured through assessments that target cognitive skills have explicitly and historically been used to gauge future academic success across all age bands as well as socio-economic status. This is noted in a number of recent studies, specifically results published recently by Hanushek and Woessmann (2008), which state that cognitive skills have powerful effects on individual earnings, on distribution of income, and on economic growth. Likewise, they argued in their findings that a direct comparison between the level of skill attainment and the amount of income annually earned by individuals can be drawn from those employed in both developed and developing countries (where previous studies focused primarily on school attainment and not explicit skill proficiency) (Hanushek & Woessmann, 2008). However, there is

substantial and mounting evidence that argues that non-cognitive skills (discussed below) are actually better and more important determinants of school and labor outcomes (Carneiro et al., 2007).

Non-Cognitive Skills and Their Impact on Learning

Although there is little debate about the positive impact of explicit instructional practices focused on developing cognitive skills within young learners, there is a growing volume of discourse among educational researchers on the impact of non-cognitive skill instruction on overall student achievement as well as life outcomes. West et al. (2016) explain that non-cognitive is a “catchall term for traits or skills not captured by assessments of cognitive ability and knowledge” (West et al., 2016, p. 149). In his most recent work, How Children Succeed, author and education advocate Paul Tough (2012) outlines the growing concern among educators on the need to focus explicitly on developing our students’ proficiency with a number of non-cognitive skills. Citing Duckworth and Quinn’s (2009) seminal work on “self-discipline” (which built upon 1991 research conducted by Seligman and Peterson on “character”), Tough explains that there is mounting evidence supporting the argument that explicit instruction focused on non-cognitive skill development has a greater impact on overall student outcomes than a mere focus on cognitive/content instruction (Tough, 2012). Likewise, Tough, citing evidence outlined by Duckworth and Quinn, argues that non-cognitive measures and proficiency are in actuality a more reliable measure of student achievement potential in comparison to traditional scholastic measures, such as IQ scores. However, what is meant by “non-cognitive” skills and how they differ from traditional educational terminology, such as “soft skills” and “character traits”, is a continued topic of conversation among educational and psychological researchers.

The Education Endowment Foundation (as cited in Gutman & Schoon, 2013) refers to non-cognitive skills as a “set of attitudes, behaviors, and strategies that are thought to underpin success in school and at work, such as motivation, perseverance, and self-control” (Executive summary para. 1). Unlike traditional labels, such as “character traits” and “soft skills”, non-cognitive skills include overarching, complex concepts and skill sets, including, but not limited to, “motivation” (both intrinsic and extrinsic), “perseverance” (which encompasses two sub-skills – “grit” and “engagement”), and “self-control” (resisting short-term impulses). These non-cognitive skill sets are the underpinning competencies within individuals, as argued by a growing amount of research, that work in tandem with cognitive skill sets to correlate to either positive or negative student learning outcomes.

In a report conducted and published by Carneiro et al. (2007), the findings outlined by the research highlight the importance of both cognitive and non-cognitive skill instruction. When both are targeted explicitly, there is a positive correlation to student learning outcomes. The report argued that “social skills” may be more “malleable” than cognitive skills (Carneiro et al., 2007). This means that through specific, targeted interventions (discussed below), such as mentoring, service learning, and outdoor adventure, that focus primarily on non-cognitive skill development, there can be a substantial positive increase in student outcomes that measure these complex skill sets. Looking specifically at the malleability of intrinsic and extrinsic motivation, Gutman and Schoon (2013) explain that there are a number of findings associated with meta-analytic studies that suggest intrinsic motivation can be influenced in an experimental setting.

For their part, Deci, Koestner, and Ryan (1999) found that external, tangible rewards actually negatively impacted the development of intrinsic motivation within children, whereas verbal rewards displayed a positive gain. In addition, the presence of choice within a

participant's selection of the external reward had a positive increase in skill development. Lastly, another study cited that intrinsic motivation can be positively impacted through individual goal setting (Gutman & Schoon, 2013).

Since these skill sets are regarded as “malleable”, researchers have argued that through specific, targeted interventions individuals can increase proficiency associated with these specific non-cognitive skills. Kautz, Heckman, Diris, Weel, and Borghans (2014) state within their executive summary that the general basis for these proficiencies associated with non-cognitive skills are influenced by environments, which include family setting, schools, and peers. Within their study, they argue explicitly that these non-cognitive skill measures are as, if not more, important than cognitive skills or IQ in explaining academic and employment outcomes. The authors cite in their key findings that a large body of research supports the argument that non-cognitive skills, such as self-control, are correlated with academic outcomes and that these non-cognitive skills are inter-connected and need to be developed in concurrence with one another in order to sustain meaningful growth (Gutman & Schoon, 2013).

Likewise, in a study conducted by Jurkowski and Hanze (2015), the German researchers found that there was a direct correlation between the non-cognitive skill of assertion and oral proficiency, particularly verbally participating in class. Similarly, the researchers found that students with highly proficient skills associated with positive peer relations performed stronger on in-class assessments (Jurkowski & Hanze, 2015). Therefore, through the focus, fostering, and measuring of non-cognitive skill development, researchers argue that this may in fact have a greater impact on overall academic success as well as assessments that target cognitive skills.

However, it is important to note that despite research suggesting non-cognitive skills are important when attempting to increase life or academic outcomes, there are considerable

difficulties when attempting to accurately measure these skills (Davidson, 2014). Davidson (2014) argues that there must be reliable and valid instruments of measure when it comes to measuring proficiency with non-cognitive skill attainment. The concept of non-cognitive skills, such as grit and perseverance, are relatively new terms that have not been clearly defined by academic research and discourse. This can become problematic when examining the measurable impact of specific interventions and supports that target the skills outlined above. Lastly, although Davidson does conclude that there is a positive correlation between non-cognitive skill proficiency and professional outcomes, Davidson argues that the use of self-assessments (which are typically employed to measure non-cognitive skills) can be challenging when applied across different institutions.

Interventions and Non-Cognitive Skill Development

Although there is conclusive evidence to support the explicit focus of non-cognitive skill development and an increase in short and long-term student outcomes, many of the findings presented suggest a broad array of conclusions when examining which specific interventions to employ and when. West et al. (2016) conclude in their study that although schools can have a positive impact on academic outcomes when non-cognitive skill sets are explicitly targeted, specifically through an examination of self-reports, there are complications when considering the evidence of reference bias. This can be a remarkably challenging limitation because the researchers argue that in the “rush to embrace non-cognitive skills” (West et al., 2016, p. 167) within American schools, the reliance on self-reports from students and families could lead to false conclusions if the assessments used are biased by “distinct frames of reference” (West et al., 2016, p. 167). Therefore, researchers argue that better measures that are unbiased in nature should be employed across multiple school districts in order to accurately measure student

growth regarding non-cognitive skills. This is important to note because although there is a direct correlation between the focus of non-cognitive skill development and student outcomes, the accuracy of this data when examining specific, individual non-cognitive skill sets may be misleading. This, in turn, may impact the authenticity or effectiveness of interventions employed.

However, when examining research that focuses explicitly on the impact of early childhood interventions on positively impacting the development of non-cognitive skills, there is a number of studies that highlight how malleable these skill sets truly are. Kautz et al. (2014) state that there is “substantial evidence” that high quality early childhood programs have “lasting and beneficial effects” (p. 65) on non-cognitive skills. They argue that, in adolescent studies, explicit focus on non-cognitive skill development was more beneficial to overall student achievement as opposed to programs that solely focused on cognition skill sets and academic learning. Lastly, their report found that remediation programs for adolescent learners had minimal impact on overall learning outcomes when compared to early childhood and elementary programs that incorporated non-cognitive skill elements.

The summary report conducted by Carneiro et al. (2007) argues that there are specific non-cognitive skills that were coded as more “malleable” than others and consequently that some interventions are more effective than others. Of the interventions examined, mentoring, service learning, outdoor adventure, and SEL, the researchers concluded that service learning and outdoor adventure had the most significant impact on increasing non-cognitive skill development. However, researchers also conceded that intervention strategy should reflect the needs of the school and the community in which it serves (Gutman & Schoon, 2013). The non-cognitive skills of “self-efficacy” (under the umbrella of self-perceptions) and “resilience and coping” scored “high” on their malleability rating. Therefore, it could be argued that despite the

difficulty in measuring non-cognitive skill proficiency across communities and institutions, within singular groups through self-assessment and targeted interventions the capacity of children regarding non-cognitive skill development can be positively impacted.

Summary

The development of an individual's cognitive skill sets has been the primary focus of educational research and, consequently, educational institutions for decades; however, a growing body of study and research has shown that explicit teaching as well as targeted interventions that focus on the development of non-cognitive skills can have an even greater impact on student outcomes. This is noted in a number of social, economic, and psychological studies that highlight the understanding that non-cognitive skills are "malleable" and can be positively manipulated through research-based interventions and practices. This focus on non-cognitive skill development taught in tandem with cognitive skill curriculums can have a positive impact on both short and long-term measures. These short-term measures include traditional cognitive skill assessments, such as comprehension and arithmetic tests, as well as non-cognitive measures, such as intrinsic motivation and self-control. Therefore, through an explicit understanding of non-cognitive skill development as well as targeted interventions and assessments that measure their results, educators are effectively able to increase the capacity of young learners and their overall success in school.

CHAPTER III

METHODS

The goal of this research was to determine the impact of non-cognitive skill instruction on increasing literacy rates as measured by a specific reading assessment.

Design

This study used a quasi-experimental design with convenient sampling. The independent variable was the student's daily literacy instruction while the dependent variable was the use of goal setting (linked to Character Report Card³ and i-Ready Diagnostic Assessment), daily conduct sheets, and bi-weekly check-in meetings (non-cognitive skill reinforcement) conducted by the Dean of Students (Curriculum Associates, 2018).

Participants

The research was conducted at a Baltimore City public school in West Baltimore, which is a public charter school in its eighth year which serves students in Grades 6 – 12. Although a “choice school”, the majority of students come from the surrounding neighborhoods in West Baltimore and, consequently, the average sixth and ninth grader, the school's two points of entry for incoming students, are reading at least two to three grade levels behind. The school has an overall enrollment of 793 students; specifically the middle grades encompass a total of 380 sixth-through eighth-grade students, and the high school encompasses a total of 413 students in ninth through twelfth grade. For the purposes of this research, the sixth grade was the targeted population of focus and consequently this specific grade level encompasses 122 students (approximately 31 students per home). The diversity of the school is limited, with 98.5% of the student body identifying as African American. Within the sixth grade, 55% (67 students) of the student body identifies as female, 45% (55 students) as male, and 97.5% identify as African

³ See Appendix A for an example of a Character Report Card

American (119 students). Lastly, within the middle school there was a 91.2% attendance rate in 2017 and 89.5% of middle school students qualified for FARMS.

The students in this sample were a convenient sample from four different sixth-grade homerooms. The homerooms within the sixth grade for the study school are grouped by “ability level” (using i-Ready reading scores from the diagnostic assessment given in September) and placed into four distinct homerooms, which follow as a unit for the entire day. This homeroom spends approximately 60 minutes each day with the science, mathematics, social studies, fine arts (vocal music), and language arts teacher. There are approximately 31 students overall in each homeroom, and for the study, five students from each homeroom were selected at random, therefore comprising a total of 20 students. All the students selected are African American, and three of the students have an Individualized Education Plan (IEP) and consequently receive special education services (all three of these students are in the same homeroom⁴). Within the selected population, 100% are African American, 55% are female (11 students), 45% are male (9), and all students qualified for FARMS. Lastly, all of the students selected were reading an average of one or more years behind grade level as measured by the i-Ready Reading Diagnostic assessment administered in September.

Instrument

The instrument used in data collection was i-Ready, which is an “adaptive” diagnostic assessment that covers main Common Core domains, such as phonics, phonological awareness, high-frequency words, vocabulary, comprehension of literature, and comprehension of informational text. The diagnostic assessment includes multimedia paired passages in which students are asked to synthesize ideas from multiple sources. Likewise, the assessment covers

⁴ It is important to note that the students with IEPs are in a co-taught homeroom, which has a fulltime special educator assigned to the homeroom in science, mathematics, and language arts.

both informational and literary texts, and the multimedia activities require students to draw evidence from within the text provided. The assessment is linked to the Common Core Standards, and the adaptive diagnostic is capable of providing students with easier or harder questions depending on student answers to the previous questions. At its completion, the assessment is capable of providing teachers and students with valid and reliable measures of performance across the key domains in reading. In addition, this diagnostic provides both teachers and students with a measure of how the tested student compares to grade-level peers both inside the school and nationally. Therefore, the finalized report provides a detailed description of which areas of strengths and weaknesses the student possesses in all of the domains listed above as well as where the student scores in comparison to his or her peers both locally and nationally.

During this study, the i-Ready diagnostic was given as a preliminary diagnostic assessment in September (third week of September). This provided a baseline data summary for the entire school, specifically all incoming sixth-grade students who had just begun their middle school tenure at the study school. A second iteration of the assessment was given at the end of December. This version of the assessment and scores obtained from them were used as the baseline for the study of concern. All sixth-grade students were given the i-Ready reading diagnostic assessment and had a total of two days (two language arts instructional class periods) to complete the test. A third and final iteration of the diagnostic was given during the second week of March, and the data obtained from these assessments were used to examine the success of the intervention utilized between January and March.

Procedures

The purpose of the study was to study the impact of specific, targeted non-cognitive skill interventions on the overall performance levels of students on the i-Ready diagnostic assessment as compared to peers who do not receive the intervention. The intervention was conducted on a random sampling of five students from each of the four homerooms within the sixth grade. The four homerooms within the sixth grade are organized by reading level as indicated by the i-Ready diagnostic assessment given during the third week of September. For the purposes of this study and to ensure a variety of participants were selected across multiple reading levels, the students selected were chosen at random from each of the four homerooms. The assessment data utilized as a baseline figure were taken from the i-Ready reading assessment given in December, and the intervention implemented occurred during the course of eight weeks. The intervention concluded one week prior to the most recent iteration of the i-Ready reading diagnostic, which was administered during the third week of March.

The intervention performed on the 20 selected students, five from each homeroom, involved the use of a “goal setting” form and one biweekly conversation with the Dean of Students centered on specific non-cognitive behaviors linked to student success. These behaviors were identified by the grade-level teachers through a tool created by the Dean of Students. The tool, the Character Report Card, had a list of specific non-cognitive behaviors linked to the school’s core values. Teachers were asked to rate each of the 20 students on the list of behaviors identified within the non-cognitive report card, which included a series of skills identified by the Dean of Students as areas of focus. The skills identified on the report card include “zest”, “self-control-schoolwork”, “curiosity”, “gratitude”, “honesty”, “grit”, “optimism”, self-control-interposal” and “social intelligence” with a series of sub-skills linked to each umbrella standard.

These conversations lasted approximately 20 minutes and were facilitated by the Dean of Students on the data gathered from the report cards.

The goal setting form, completed at the initial conference, outlined three “non-cognitive” skills of focus as well as the specific sub-skills that comprised the overall standard. During the conference, the Dean of Students and the students identified for the study discussed the diagnostic reading scores gathered from the December assessment as well as corresponding areas of strength and growth linked to the domains discussed above. During the biweekly conversations, the Dean of Students, in cooperation with the students, discussed specific behaviors and strategies that the students could improve to assist with increasing their proficiency on the three cognitive skills identified as areas of concern. Therefore, the purpose of the intervention, the combination of the “goal setting form,” three areas of growth associated with the character report card, and structured biweekly conversations with each of the 20 students, was to increase the proficiency of non-cognitive skills and consequently improve the overall reading levels of the students as measured by i-Ready.

CHAPTER IV

RESULTS

In this study, the potential relationship between non-cognitive (“soft”) skill development and cognitive (“hard”) skill development was explored through a semi-quasi experiment that tested the impact of a specific intervention on a small sampling size of sixth-grade students. Over the course of the eight-week experiment, 20 sixth-grade students, selected at random (five from each of the four homerooms), received targeted interventions centered on non-cognitive skill instruction. The specific intervention involved the use of a non-cognitive diagnostic assessment (the Character Report Card), a goal setting and reflection form (Goal Setting Document), and a biweekly, 20-minute conference with the Dean of Students centered on specific tasks, data, and sub-goals to further develop three specific non-cognitive targeted by the non-cognitive diagnostic.

Both groups (experimental and control) then participated in a post literacy assessment (i-Ready Diagnostic Skill Assessment) to determine the impact, if any, of the non-cognitive skill intervention on literacy scores. The results were recorded, specifically by comparing all sixth-grade students who completed the literacy diagnostic during Window 2 (end of December) and Window 3 (end of March). The hypothesis, which stated that there will be no statistically significant increase in literacy measures for those students receiving the intervention (experimental group) in comparison to those who do not (control group), was retained.

Data on the following variables were gathered. In terms of reading comprehension, scale scores on the i-Ready assessment were gathered pre- and posttest and then statistically examined by the independent t test. Table 1 displays the Measures of Central Tendency, and Table 2 displays the Independent t Test results. The data displayed highlights that there was not a

statistically significant impact on the post literacy diagnostic results when comparing the experimental to the control group. Therefore, the null hypothesis must be retained because the intervention performed did not significantly increase literacy scores.

Table 1

Measures of Central Tendency

	Group	N	Mean	Std. Deviation	Std. Error Mean
Gain Score	1.0	20	10.25	30.589	6.840
	2.0	17	20.59	27.309	6.623

Table 2

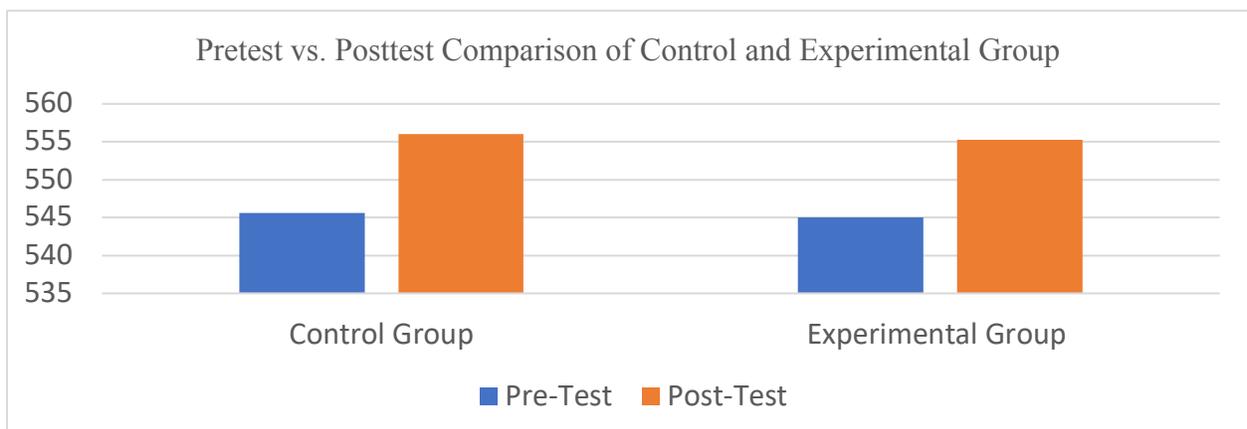
Independent t test Results

		Levene's Test for Equality of Variances		t	df	Sig. (2-tailed)	Mean Difference
		F	Sig.				
Gain Score	Equal variances assumed	.254	.617	-1.076	35	.289*	-10.338

*p>.05 thus, not statistically significant

Table 3

Pretest and Posttest Results



CHAPTER V

DISCUSSION

The purpose of this study was to determine whether a specific, targeted non-cognitive skill intervention would have a statistically significant impact on a literacy diagnostic skill measure. This study used a quasi-experimental design with convenient sampling. The independent variable was the use of goal setting (linked to the school's Character Report Card and i-Ready Diagnostic Assessment), daily conduct sheets, and biweekly check-in meetings (non-cognitive skill reinforcement) conducted by the Dean of Students. The dependent variable was the resulting scores on the i-Ready Reading Diagnostic Assessment.

The null hypothesis, which stated that there will be no statistical significant increase in literacy measures for those students receiving the intervention (experimental group) in comparison to those who do not (control group), was retained. Therefore, what resulted from the study was an understanding that the targeted intervention did not display statistically significant results when comparing the literacy scores from the experimental group to the control group.

Threats to Validity

Like any research study, there were both internal and external threats to validity based on a number of factors. When examining the internal threats to the study, it is important to note two major threats, (1) history and (2) the order of effects. There were a series of events that occurred for a number of the participants over the course of the study. For example, several of the students selected were absent, a few were suspended, and many were receiving additional support from related service providers, such as the social worker and school psychologist. These experiences over the course of the history of the experiment impacted the validity of the study, specifically the consistency of the intervention, because if students were not present at school, they were

unable to receive the non-cognitive skill intervention. Similarly, if they were pulled for behavioral concerns, the conversation conducted by the Dean of Students shifted to one of consequences and restorative practices and not the targeted, non-cognitive skill intervention.

In addition, the students selected for the intervention had a varying degree of investment throughout the eight-week trial. Since the 20 students were selected at random, the intervention had varying degrees of success during the eight-week study because many of the students lacked interest, did not engage, or struggled to grasp the purpose of the intervention and how it may impact their learning. Therefore, as the eight-week trial progressed, a number of students began to openly disengage from the conversations as well as the intervention itself. This order of effects may have had a significant impact on the overall internal validity of the intervention itself.

The predominant external effect that may have impacted the validity of the test was the conduct of the students while participating in the intervention compared to when not. This means that the students selected, due potentially to their age and the nature of the setting (the Dean of Students' office), may have changed their behavior to comply with the intervention during the moment, but this alteration might not have translated into lasting results when applied to the classroom setting, specifically the i-Ready Diagnostic Reading Assessment. Therefore, what may have occurred with many of the participants is the fact that they "understood" the skills being developed within the office setting but struggled to apply these skills with true meaning within (a) a new setting (the classroom) and (b) a new format (instead of activities with the Dean of Students they would be applying skills to the i-Ready Assessment).

Lastly, another threat to the external validity of the test involved situational factors. For example, the eight-week intervention was occurring between the second window and third window of the i-Ready Assessment. Therefore, the Character Report Card and goal setting

document were applied within the overall context of the time between the two testing windows. This may have threatened the overall external validity of the test because the intervention was purposefully conducted with the intent of increasing proficiency with three specific non-cognitive skills and then applying this growth to the last administration of i-Ready. This limits the ability of the test to generalize across other settings because the study was time sensitive and designed to occur within the time between the second and third window of i-Ready examination.

With regard to evidence of generalization, it is important to consider within the context of the study the sampling model and the proximal similarity model. The sampling model is important because the sample size selected was small (20 students), was only drawn from the sixth grade, and was drawn at random only from one specific school. This meant that the students selected were not entirely representative of middle school body as a whole. Therefore, the study cannot be generalized outside of the context of the sixth grade from that specific school.

Additionally, when considering the proximal similarity model, especially within the context of the two testing windows, it is important to note that time has an important impact on generalizations that can be made to other situations. Due to the nature of the time period, which occurred during the eight-week break between the second testing window and third testing window for i-Ready, the students were participating in a specific, targeted intervention that focused on increasing non-cognitive skill proficiency within the context of literacy and diagnostic assessment. At the same time, the overall sixth-grade school instructional climate was focused on increasing i-Ready reading scores because of Student Learning Outcomes (SLOs), which are determined by comparing the third administration of the assessment to the first. Therefore, the result obtained from this study should not be generalized beyond a time period in

which i-Ready diagnostic assessments are given, especially when considering Student Learning Outcomes and their overall importance within the school community in connection with i-Ready scores.

Connections to Existing Literature

When examining the current study in the context of the previous literature, there are many similarities that be drawn. Within the literature, the Education Endowment Foundation (as cited in Gutman & Schoon, 2013) refers to non-cognitive skills as a “set of attitudes, behaviors, and strategies that are thought to underpin success in school and at work, such as motivation, perseverance, and self-control” (Executive summary para. 1). Similarly, with the current study, the Character Report Card, completed by each of the general educators for the students selected, identified the strengths and weaknesses of each participant regarding a series of non-cognitive skills.

These skills included, but were not limited to “perseverance,” “grit,” “self-control,” and “motivation.” The intervention designed by the Dean of Students targeted these skills in an attempt to increase their proficiency and consequently translate into literacy growth on a designed reading assessment, i-Ready. This directly corresponds to research conducted and published by the Centre for the Economics of Education (as cited in Carneiro et al., 2007), which found that “social skills” may be “malleable” and therefore through specific, targeted interventions, such as mentoring and service learning, growth could occur.

However, after the eight-week study, the null hypothesis was retained, and there was no statically significant growth on the reading diagnostic when comparing the experimental group to the control group. Although disappointing, measuring non-cognitive skill growth is extremely difficult. It is important to note that, despite research suggesting non-cognitive skills are

important when attempting to increase life or academic outcomes, there are considerable difficulties when attempting to accurately measure these skills (Davidson, 2014). Davidson (2014) argues that there must be reliable and valid instruments of measure when it comes to measuring proficiency with non-cognitive skill attainment.

The concept of non-cognitive skills, such as grit and perseverance, are relatively new terms that have not been clearly defined by academic research and discourse. This can be problematic when examining the measurable impact of specific interventions and supports that target the skills outlined in Chapter II of this study. Therefore, within the context of this study and the literature referenced, it is important to note that, despite the intervention and its potential success with increasing proficiency with non-cognitive skills, the reading diagnostic may not have accurately measured this growth.

Recommendations for Future Research & Study

A review of the current study could result in the conclusion that more research should be conducted on (a) how to properly and effectively measure the growth and proficiency for non-cognitive skills and (b) which targeted interventions display the most consistent positive results on specific non-cognitive skills. As the research highlights, it is difficult to accurately measure the extent of success for specific non-cognitive interventions and similarly the degree to which they are “malleable.” In the context of this study, using overall reading diagnostic levels may not have been the most accurate measure of success in determining whether the interventions were successful in raising literacy measures. Therefore, the study should be redesigned using further research to construct an experiment that (a) selects a tool that accurately measures non-cognitive skills and (b) utilizes an intervention that is linked to prior research.

However, within the context of this study and the use of the i-Ready Assessment, the tool could still be utilized but the examined measures changed. For example, i-Ready is able to display the amount of “time on task” a participant utilizes during the i-Ready Diagnostic. Therefore, a specific, targeted intervention could be designed and employed that focuses solely on developing the capacity of a student to self assess and reflect on the non-cognitive skill of “motivation.” Potentially, this could be measured through i-Ready, but not by utilizing the overall reading level diagnosis. Instead, a more specific measure, “time on task,” could be examined to determine whether the intervention employed increased or decreased the amount of time (“motivation” to complete the task) a student dedicated to the diagnostic assessment.

Conclusion

The purpose of this study was to determine the measurable impact of a specific, targeted non-cognitive skill intervention on a student’s overall reading level as measured by i-Ready. The concept of the study was derived from literature that stated non-cognitive skills are “malleable,” important to the development of a student’s academic and life success, and through specific interventions can improve over time. However, within the context of the eight-week study, the intervention proved to have no statistically significant improvement on i-Ready scores. Therefore, it is important to note that additional research must be examined to determine (a) meaningful non-cognitive skill interventions and (b) accurate tools to measure growth for specific non-cognitive skills.

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Appendix A:

Scale of 0-5 (5 being highest level of proficiency)						
OVERALL SCORE			Science	Lang. Arts	Math	Social Studies
PERSEVERANCE		2.19				
Grit	Finishes whatever he/she begins	2	3	2	1	2
	Tries very hard even after experiencing failure	1.75	2	1	2	2
	Works independently with focus	2.5	2	2	3	3
Optimism	Gets over frustrations and setbacks quickly	2.5	3	2	2	3
SUSTAINABILITY		3.25				
	Treats environment with respect and care	3.25	4	3	4	2
	Treats materials with care and minimizes waste	3.25	4	2	3	4
SCHOLARSHIP		2.39				
Zest	Shows enthusiasm	2.5	2	2	3	3
	Actively participates	2.75	3	2	3	3
Self Control	Comes to class prepared	1.5	1	1	2	2
	Pays attention and resists distractions	2.5	3	3	2	2
	Remembers and follows directions	2.25	3	1	2	3
	Gets to work right away rather than procrastinating	2	2	1	2	3
Curiosity	Is eager to explore new things	2.25	3	2	2	2
	Asks and answers questions to deepen understanding	2.75	2	4	3	2
	Actively listens to others	3	4	3	2	3
CITIZENSHIP		2.42				
Self Control	Remains calm even when criticized or otherwise provoked	2.5	3	2	3	2
	Is polite to adults and peers	2.25	2	3	2	2
Social Skills	Demonstrates respect for feelings of others	2.5	3	3	2	2
INTEGRITY		1.88				
Gratitude	Recognizes and shows appreciation for others	2	2	3	2	1
	Tells the truth and does what is right	2	1	3	2	1

Appendix B:

i-Ready Goal-Setting

Name: _____ Date: _____

My mid-year i-Ready Scores was:

Grade Level: _____ Score: _____

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**READING GOAL:**

Points: \_\_\_\_\_ Grade Level: \_\_\_\_\_

My GROWTH GOAL IS: \_\_\_\_\_ points

In order to accomplish this goal I will.....

**Character Report Card:**

My strongest skill was: \_\_\_\_\_

My weakest skill was: \_\_\_\_\_

The three skills that we will work on are:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_