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Mindset Awareness Training for Developmental and Nondevelopmental Education College Students

Eileen Marie Steffan
Walden University

Walden University

College of Education

This is to certify that the doctoral study by

Eileen M. Steffan

has been found to be complete and satisfactory in all respects,
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Review Committee
Dr. Vicki Underwood, Committee Chairperson, Education Faculty
Dr. Stephen Butler, Committee Member, Education Faculty
Dr. Andrea Wilson, University Reviewer, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

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Abstract

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MS, Robert Morris University, 2002

BS, Indiana University of Pennsylvania, 1981

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Recent research based on the Dweck's mindset theory has shown that persons with a growth mindset who believe traits such as intelligence are malleable may put forth more effort and have greater academic success than those with a fixed mindset. However, little research has been conducted on mindsets of college students, many of whom enter underprepared for the rigors of college-level work and are required to take developmental education courses as an intervention to reduce the inequalities of underprepared college students. A quasi experimental mixed design with ANOVA and *t* tests was used to examine how growth mindset awareness training affected mindsets of 739 developmental and nondevelopmental education students in their first term of enrollment at a career-focused 2-year college. The majority (79%) of participants' pretest mindset scores were toward the growth end of the fixed-growth continuum. There were no significant pretest differences between developmental and nondevelopmental education groups. Training was not differentially effective for the groups; mean mindset scores of both groups increased, moving toward a growth mindset. The overall mean posttest mindset score was significantly higher than pretest ($p < .001$), indicating that students' scores moved away from fixed and toward growth mindsets. Finding that the majority of students, both nondevelopmental and developmental, began college with a mostly growth mindset may indicate that these new college students already possessed the noncognitive skills needed to succeed and instead would benefit from assistance applying the skills. Positive social change may be achieved through a more proactive method of using mindset awareness training during new student orientation and later within programs to better engage all students in purposeful use of their mindsets to meet their academic and career goals.

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Dedication

This study is dedicated to my husband, Jim, who encouraged me to begin this journey, and has supported and motivated me every step of the way. His devotion has been the ever-present force that enabled me to finish this study. Having the love of my family has been a powerful lifeline during a challenging journey. I want to extend a special appreciation to our children, Kathleen, Vincent, and Heidi and their families, for believing in me and encouraging me along the way.

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Table of Contents

List of Tables

List of Figures

Section 1: The Problem

The Local Problem

Federal and state regulations have placed increased pressure on colleges and universities to be accountable for student outcomes, with departments of education and accrediting bodies using student retention and graduation rates to assess institutions (U.S. Department of Education, 2015a). The overall retention rate for 2-year, post-secondary institutions was reported as 62% in *The Condition of Education* 2018 (McFarland et al., 2018). Low retention ultimately results in low graduation rates, as evidenced by data from the National Center for Educational Statistics (NCES, 2018) indicating a decline in 2-year graduation rates of postsecondary institutions from 34% in 2008 to 32.6% in 2013.

A career-focused, proprietary college in the northeastern United States has experienced an increase in dropout rates for first-year students. According to the senior vice president of academic affairs (personal communication, April 18, 2016), dropout rates ranged between 24% and 28% over a 5-year period. Although this increase in dropout rates was small and the overall retention rate was still above the national average, the college took a proactive approach to addressing the increasing dropout rates in an effort to maintain the standards set by the college.

The open enrollment recruiting approach of the college enables underprepared students to enroll with the support of developmental education courses that provide basic foundation concepts as well as academic tools needed to successfully complete college-level courses. The college offers two levels of math developmental education courses and one in writing. Approximately 28% of incoming students enrolled in at least one

developmental education course during academic years 2015-2016 through 2018-2019 (learning and assessment coordinator, personal communication, August 24, 2018). Of particular concern during this same period was the consistent dropout rate of 50% or greater for developmental education students, nearly twice that of the general student population (learning and assessment coordinator, personal communication, August 24, 2018).

The college's strategic plan for 2014–2019 included an objective that specified developing programs and processes targeted toward retaining students and ensuring student success (vice president of strategic initiatives, personal communication, April 18, 2016). The college had previously implemented and was updating a student readiness course taken by all associate degree first-quarter students (senior vice president of academic affairs, personal communication, April 18, 2016). One factor that may affect a student's success is the student's mindset on intelligence, learning, and performance (Yeager et al., 2014). After reviewing Dweck's (2006, 2013) research and findings supporting mindset theory, in Fall 2014, the study site incorporated a growth mindset awareness training program into the student readiness course which will serve as the context for this study.

The mindset used by a student to approach learning and other motivational situations is determined by the student's belief that intelligence and abilities are fixed or malleable (Dweck, 2006, 2013). In Dweck's (2006, 2013) approach, mindset can be measured on a continuum ranging from a *fixed* mindset to a *growth* mindset. A person with a fixed mindset views intellect and abilities as unable to change, as opposed to a

person with a growth mindset who believes with effort one can grow and improve intellect and abilities (Dweck, 2006, 2013).

As part of the self-assessment process in the growth mindset awareness training program, an eight-item mindset assessment based on Dweck's theory (Dweck, 2013; Mindset Works, n.d.-b) was administered to the students as a pretest in Week 3 of the first quarter and as a posttest in Week 11, the last week of the quarter. This was used as a self-reflective instructional activity enabling the students to identify where they fell on the mindset continuum. The study site did not compare the students' mindset assessment results over time as a group nor by subgroups to identify if mindset was related to students' developmental education status.

The problem addressed by this research was the gap in practice created by the college not assessing the effectiveness of the intervention that was implemented. The focus of the current study was to determine how this program, referred to as growth mindset awareness training, may have affected the mindset of students who were either enrolled or not enrolled in developmental education classes at the college. In this study, I analyzed the students' pretest and posttest mindset data to determine if there were mindset differences based on students' developmental education status and if there were changes in students' mindsets after the growth mindset awareness training at this career focused, 2-year proprietary college.

Rationale

Colleges and universities across the nation are trying to increase students' successful outcomes (Field, 2014). The institutional strategies applied to improve

students' success often include interventions to change students' behaviors and improve their success strategies. Research has shown that noncognitive factors, such as mindset, are key to academic performance and degree completion in postsecondary education (Nagaoka et al., 2013) and may be just as important as cognitive factors, such as memory and reasoning, in predicting academic success (Nagaoka et al., 2013; Reid & Ferguson, 2014). In applications of Dweck's (2006) growth mindset model, students are encouraged to persist through challenging situations. Academic leaders focus on students' strength and capacity for success by implementing mindset interventions to support student success, particularly for developmental education students (Macias, 2013). The implementation of effective growth mindset training may alter students' perspectives of their abilities and motivate them to persist in their educational endeavors (Marshall, 2017).

The purpose of this study was to determine if there were pretraining mindset differences based on students' developmental education status and the nature of any changes in students' mindsets after the growth mindset awareness training. Specifically, I aimed to determine if there were differences in students' mindset scores based on developmental education status, if growth mindset awareness training resulted in changes in students' mindset scores, and whether students' mindset scores were differentially affected by growth mindset awareness training based on their developmental education status.

Definition of Terms

Cognitive skills: A student's content knowledge and academic skills as measured by standardized intelligence and achievement tests (West et al., 2016).

Mindset: Individuals' perceptions of their intelligence and abilities that shape how they approach learning (Dweck, 2006).

Mindset continuum: The range of beliefs between a fixed mindset and a growth mindset (Mindset Works, n.d.-a).

Noncognitive skills: Students' skills not measured by academic assessments, such as self-efficacy, mindset, and social awareness (West et al., 2016).

Significance of the Study

Research on growth mindset training and how it may influence students' mindsets toward their academic work was of particular interest to the study site. The college was focused on decreasing the rising cost of student attrition and improving academic performance. Annual tuition revenue for the study site decreased by $4 million from 2010 to 2012; the overall graduation rate was 56% (NCES, 2018). The original contribution that this study made to the college was to determine, first, if there were differences in developmental and nondevelopmental education students' mindset scores, and second, if the growth mindset awareness training resulted in changes in students' mindset scores. Finally, whether these students' mindset scores were differentially affected by the growth mindset awareness training was examined. Findings of the study may be used to modify how the growth mindset awareness training will be conducted and whether mindset awareness is included in other coursework, particularly developmental education courses.

The results of this study benefit the study site but also may apply to students and programs at other colleges and universities that are similar to the study site. Researching ways to assist students with unproductive mindsets to overcome underachievement and undermotivation should be an ongoing initiative for researchers and educators (Yeager & Dweck, 2012). This study may support the continuation of mindset training programs that may lead to positive social change at the study site through development of students' confidence and motivation to succeed.

Research Questions and Hypotheses

The following research questions were used to explore whether there is a difference in students' pretraining mindsets based on their developmental education status and how growth mindset awareness training influenced students' mindsets. A shift in mindset was determined by the comparison of mindset pretest and posttest scores.

RQ1: To what degree, if any, did pretraining mindset scores differ between students enrolled in developmental education and students who were not enrolled in developmental education?

$H_0$1: There was no significant difference in mean pretest mindset scores between students enrolled in developmental education and students who were not enrolled in developmental education.

H_a1: There was a significant difference in mean pretest mindset scores between students enrolled in developmental education and students who were not enrolled in developmental education.

RQ2: To what degree, if any, did participation in growth mindset awareness training affect students' mindset scores?

$H_0$2: There was no significant difference in mean mindset scores from pretest to posttest for students who received growth mindset awareness training.

H_a2: There was a significant difference in mean mindset scores from pretest to posttest for students who received growth mindset awareness training.

RQ3: To what degree, if any, did participation in growth mindset awareness training differentially affect mindset scores of students enrolled in developmental education and students who were not enrolled in developmental education?

$H_0$3: There was no significant difference in mean mindset score change from pretest to posttest for students enrolled in developmental education when compared to students who were not enrolled in developmental education.

H_a3: There was a significant difference in mean mindset score change from pretest to posttest for students enrolled in developmental education when compared to students who were not enrolled in developmental education.

Review of the Literature

In this study, I determined if there were pretraining mindset differences based on students' developmental education status and examined the effect that mindset awareness training had on students' mindsets. Library research was conducted using EBSCO Host, ERIC, Education Source, Academic Search Complete, PsycINFO, and Google Scholar academic databases to find peer-reviewed reference sources. The key search terms used to conduct this research were *growth mindset*, *fixed mindset*, *implicit theories of*

intelligence, college students, developmental, underprepared, underserved, and *academic inequality*. The reference sources used in this study examined the foundational mindset theories and present research findings from studies exploring mindset theory at various levels of education and with specific student groups such as developmental education students.

This literature review is an exploration of research concerning students' mindsets and developmental education status as potential factors that relate to a student's ability to succeed in attaining a college education. The concept of implicit theories of intelligence is defined and the evolution of the fixed and growth mindset concepts are explained. Research findings are presented to describe how a person's mindset relates to self-efficacy, intelligence beliefs, and performance in an academic environment. Furthermore, I explore how mindset intervention can influence a person to shift towards a growth mindset on the mindset continuum and I provide research findings that report students adopting a malleable approach to their abilities and intelligence resulting in improved academic performance. In addition, research findings of mindset interventions applied to students enrolled in developmental education courses are discussed.

Foundational Mindset Theories

Through years of research, Dweck and colleagues have developed the implicit theory of intelligence that serves as the framework for how people perceive their intelligence and skills. The implicit theory includes the *entity theory (fixed mindset),* an individual's belief that intelligence and personal attributes are fixed traits, and the *incremental theory (growth mindset),* an individual's belief that with effort, intelligence

and personal attributes can be developed and cultivated (Davis et al., 2011; Dweck, 2006, 2012).

Individuals' perceptions of the malleability of their intellectual abilities can be identified on a continuum between a fixed and growth mindset (Dinger & Dickhäuser, 2013; Lewis et al., 2020). A list of mindset characteristics is provided in Table 1. It is possible to increase intelligence and capacity to learn by adopting a growth mindset approach of taking risks and working through challenging situations (Dweck, 2014; Yeager & Dweck, 2012). Neurons in the brain grow new connections as a person struggles with challenging situations, making the person more equipped to overcome obstacles (Dweck, 2014).

Students who believe they can improve their skills and abilities apply a growth mindset approach to goal setting and learning strategies that results in attaining higher academic standards and being more resilient when experiencing challenging situations (Karlen et al., 2019; Yeager & Dweck, 2012). Evidence presented by Yeager et al. (2014) showed that students from different academic settings experienced improved learning outcomes after gaining an awareness of the growth mindset theory and adopting a growth mindset approach to learning.

Table 1

Mindset Characteristics

Fixed mindset	Growth mindset
Belief that your intelligence is unchangeable. This frame of mind leads to a desire to maintain a status such as "being smart." A person with a fixed mindset may: • Avoid risk of failure by not attempting challenging tasks • Allow problems to become roadblocks • View the need for effort as a flaw • Reject the use of constructive feedback for personal improvement • View others success in a competitive way and is demotivated by their success	Belief that your intelligence is malleable. This frame of mind leads to a desire for continued personal development. A person with a growth mindset may: • Approach challenges as an opportunity to learn • Work through alternative solutions to overcome obstacles • View effort as an important component to learning and improving skills • Apply constructive feedback to the learning process • Use others' success as motivational and becomes inspired to put forth more effort
As a result, individuals with a fixed mindset may not strive to achieve his/her full potential and may limit the scope of goals set for himself/herself.	As a result, individuals with a growth mindset will continue to strive to achieve high levels of learning and will set challenging goals for himself/herself.

Note: Adapted from: https://www.mindsetworks.com/Science/Impact

The fixed (entity) and growth (incremental) mindset concepts have been applied to intelligence beliefs, achievement motivation, and academic achievement (Davis et al., 2011; Dweck, 2006; Yeager et al., 2014). For example, Dinger and Dickhäuser (2013) conducted an experimental study in which 80 college students were randomly assigned to read an article that identified intelligence as either malleable or fixed. The participants then completed a questionnaire that they believed was data collection for an unrelated

honor student's thesis. In actuality, the questionnaire was used to measure the students' mindsets and achievement goals. The research findings indicated that growth mindset related to mastery goals but there was not a significant relationship with performance goals (Dinger & Dickhäuser, 2013). The researchers connected their findings with the mindset theory that individuals with a growth mindset view achievement in terms of learning opportunities, and a step towards the mastery of goals, whereas, those with a fixed mindset view achievement as an evaluation of status and represent the goal outcome (Dinger & Dickhäuser, 2013).

Mindset Research Applied to Education

The foundational research conducted as the basis for the construction of the mindset theories predominantly used primary and secondary education settings (Blackwell et al., 2007; Burnette et al., 2013; King et al., 2012; Yeager et al., 2014). More recently, mindset research has extended into the postsecondary setting as higher education institutions strive to identify cognitive and noncognitive factors and strategies that improve student outcomes (Duckworth & Yeager, 2015; Gray & Swinton, 2017; Sparkman et al., 2012).

Mindset and Academic Performance

Students' self-efficacy, defined as persons' beliefs in their ability to carry out a course of action, was found to be related to academic performance, an approach to adverse academic situations, and resilience in Cassidy's (2015) study of British psychology undergraduates. Students' self-efficacy is a component of their mindset toward their ability to learn new skills; a student's mindset creates the framework within

which learning is approached. Proving one's ability is the focus for a student with a fixed mindset, while the focus of a student with a growth mindset is to improve one's ability (Dweck et al., 2014). Before being applied to higher education, research on the relationship between mindset and academic performance was initiated with elementary students.

Elementary and Secondary Students' Mindsets

Schroder et al. (2017) used a neurocognitive approach in which they analyzed task-related electroencephalographic data of school-aged children to provide scientific evidence that corroborated findings from prior mindset research using self-report methods. They found that students with a growth mindset allocated more attention to learning from feedback about their errors, which subsequently resulted in higher posttest scores. In another study, elementary students' achievement scores on the Iowa Test of Basic Skills that was administered three times over a 2-year period were examined to determine if changes were related to the students' mindsets (McCutchen et al., 2016). Using normal curve equivalents to report scores, it was found that there was a general decline in academic performance over the 2-year period, but the decline was greater for students with a fixed mindset. Schmidt et al. (2017) used a growth mindset intervention integrated into 7th and 9th grade science classes to determine if mindset made a difference to the classroom experience. The results indicated that the mindset intervention influenced a continued interest in the class and continued focus on learning for the 9th graders but not for the 7th graders. Diseth et al. (2014) used a structural equation model to determine if students' self-efficacy, self-esteem, and mindset of intelligence positively or

negatively correlated with academic performance. The findings showed a positive correlation between academic performance and self-efficacy, self-esteem, and growth mindset, with self-efficacy being the stronger predictor of academic performance. King et al. (2012), conducting a study of high school students from four different schools to determine if there was a relationship between students' mindsets and their emotions linked to academic achievement, found that students who approached learning with a growth mindset had a greater sense of control over their academic performance, and were less likely to feel frustrated, anxious, and hopeless. Yeager et al. (2019) reported the findings of the National Study of Learning Mindsets which showed improved academic performance in secondary students who participated in a one-session online mindset intervention.

College Students' Mindsets

A student's mindset affects how that student reacts when faced with challenging situations and setbacks (Aditomo, 2015). Education systems contribute to low academic achievement by sending students fixed mindset messages that support the belief that some students are talented and intelligent while other students are not (Boaler, 2013; Masters, 2014). Komarraju and Nadler (2013) studied 407 college students to determine if students' self-efficacy, mindset, and use of resources related to academic achievement. Their findings indicated that students with strong self-efficacy tended to have a growth mindset and were more confident in their academic abilities, exhibiting a determination to persist with challenging course work and achieve higher grades.

Students with growth mindsets have better academic performance because they strive to improve their abilities (Aditomo, 2015). Individuals with a growth mindset have been found to be more focused on their study strategies (Burnette et al., 2013; Lewis et al., 2020; Sevincer et al., 2014), more concerned with learning and improving their skills (King et al., 2012), more adaptable by being able to make necessary adjustments in thinking and behavior, as well as being conscientious and academically motivated (Martin et al., 2013).

Mindset research findings have indicated that educators may influence students' perceptions of effort and their ability to achieve academic success (Wiersema et al., 2015). Other findings suggested that presenting mindset frameworks to students may influence students with a fixed mindset, who see themselves as the underdog due to their perceived inabilities, to realize that they can change their abilities and overcome academic challenges (Davis et al., 2011; Sriram, 2014). A growth mindset approach to education focuses on students' individual learning progress achieved by pursuing challenging learning experiences that stretch each student (Masters, 2014). Gray and Swinton (2017) researched the effect of the implementation of a policy designed to overcome college students' lack of preparedness and poor learning outcomes by placing emphasis on students' effort and rewarding this noncognitive skill in the assessment process. Their findings revealed that the policy benefitted students who were able to improve cognitive skills by strengthening their noncognitive skills but did not result in a significant improvement in dropout rates compared to the pre-policy rates (Gray & Swinton, 2017).

Students' mindsets relate to how performance situations are approached, according to Dweck (2006) who found a relationship between students' views of their intelligence and how they responded to academic challenges. In challenging academic situations, individuals with a growth mindset approach tended to cope better and remain optimistic while those with a fixed mindset approach tended to feel helpless and defeated (Davis et al., 2011). Students with a fixed mindset view of their intelligence are concerned with being perceived as unintelligent and are more likely to withdraw from school when faced with academic challenges rather than put forth effort to overcome the challenges (Yeager & Dweck, 2012). In contrast, Renaud-Dubé et al. (2015) found, in their study with Canadian high school students, a relationship between students' belief in the malleability of their intelligence and their school persistence intentions. Similarly, Sevincer et al. (2014) found that individuals with a growth mindset were found to be more apt to develop a plan, focused on the future to achieve their goals, and showed greater persistence. Researchers using a dual study structure with German college students and American internet users as participants found that individuals with a growth mindset focused on the future and attaining their goals while those with a fixed mindset were concerned with their present status (Sevincer et al., 2014).

Students with a growth mindset have been found to apply more effort to overcome setbacks and they perceived feedback as a tool to overcome academic challenges (Dweck, 2015; Paunesku et al., 2015; Schroder et al., 2017; Yeager & Dweck, 2012). Students with a fixed mindset may view the need to apply effort to overcome deficiencies negatively because it represents a lack of ability that they perceive as

unchangeable (Gal & Szamoskozi, 2016). Dweck stated the need for continued work on mindset interventions that promote mindset shifts for those vulnerable to underachievement. Encouraging students to consider multiple potential solutions while problem solving has been found to foster a growth mindset and helped students recognize the malleability of their learning (Reid & Ferguson, 2014). Tempelaar et al. (2015) suggested that students need to be aware of their mindset and their beliefs about how effort relates to learning in order to positively affect learning.

Contradictory Mindset Research Findings

Contrary to the findings of Gray and Swinton (2017), regarding effects of a policy to reward students' effort, Sriram's (2014) study conducted with first-year undergraduate students from a southwestern university found that mindset awareness training positively influenced students' effort in the form of improved study skills but did not result in significantly improved academic performance. Findings in Bahník and Vranka's (2017) study also contradicted the theory that growth mindset positively influenced academic achievement. Their study included over 5,000 students from the Czech Republic taking the general academic prerequisite (GAP) test for admission to college. Bahník and Vranka hypothesized that students with a growth mindset would use more of the preparation resources available for the standardized test and score better than students with a fixed mindset. Students were able to take the GAP six times with the best score used by colleges for admission. The researchers also believed that students with growth mindsets would take the GAP more frequently than students with fixed mindsets in an effort to improve their scores. However, the findings of this study did not show a

positive association between growth mindset and GAP scores and did not find that students with growth mindsets made more attempts on the GAP than those with fixed mindsets (Bahník & Vranka, 2017). Additionally, a study conducted at a Belgian University included over 1,500 minority and majority students was focused on determining whether a growth mindset could offset the negative effects associated with minority status (Corradi et al., 2019). The findings indicated that, on average, minority students had a higher growth mindset than majority students. The students' growth mindset did not positively affect academic outcomes, but did have a positive effect on the factors involved in adjusting to the academic environment (Corradi et al., 2019).

Mindset and Academic Inequality

The pressures of the competitive climate in higher education have resulted in colleges and universities becoming more focused on improving academic performance and graduation rates (U.S. Department of Education, 2015a). In support of increasing student success rates, the U.S. Department of Education (2015b) implemented a Skills for Success initiative, awarding nearly $2 million in the first year of a 3-year initiative to enhance students' learning mindsets and skills, and support the Mentoring Mindsets Initiative to provide evidence-based mindset awareness tools for mentors.

First-term students, such as first-generation students, students from low socioeconomic backgrounds, and minority students may be at an academic disadvantage because of their perceived lack of academic abilities (Broda et al., 2018; Corradi et al., 2019). Although using student support services such as library resources is a normal part of a college education for all students, college students who come to school academically

underprepared may need further assistance from a learning support program (Payne et al., 2017). Learning support programs may include tutoring, student success curriculum, and non-credit-bearing developmental courses to strengthen foundation skills and to empower students to succeed. Mindset interventions administered to a diverse population were found to improve the grade point average of underperforming students and increase the number of satisfactory grades attained in their core courses (Paunesku et al., 2015).

Payne et al. (2017), in their research aimed at improving developmental education programming for students, found that this diverse student population required deliberate interventions using multiple strategies to empower students to take charge of their educational experiences. Michigan State University implemented developmental interventions, including mindset interventions that were geared to increase incoming disadvantaged students' sense of belonging and academic success (Broda et al., 2018). The findings in the Broda et al. (2018) study indicated improved academic outcomes for disadvantaged students, but the disadvantaged groups did not improve equally. The Latino student group had more improved outcomes than the African American student group (Broda et al., 2018).

Developmental interventions supporting disadvantaged students cultivate perceptions of their capacity for academic success (Macias, 2013). Students are placed into developmental education courses to attain remedial support with foundation skills and to reinforce study skills (Martin et al., 2017). College admission processes include a placement assessment that determines students' need for developmental coursework (Martin et al., 2017).

Placement Assessments

College placement assessments, such as Accuplacer, serve as tools to guide students into appropriate courses. Accuplacer is a computer-adaptive placement assessment system used to evaluate students' reading, writing, and mathematics proficiency (College Board, n.d.). Accuplacer score ranges are used by the study site to identify proficiency levels that place students in developmental education math and English courses. These non-credit-bearing developmental courses are offered concurrently with the first-level credit-bearing math and English courses to provide reinforcement of foundational concepts and additional time on task and teacher-student interaction.

In this research, I studied students' enrollment or nonenrollment in developmental education to determine if there were differences in mindset scores between these two student groups and whether growth mindset awareness training differentially affected the mindsets of these two groups.

Mindset Assessment and Intervention

The mindset research of Dweck and colleagues has shown that people have the potential to change mindsets and improve their outlook, health, and academic achievement (Dweck, 2006, 2015; Limeri et al., 2020; O'Rourke et al., 2014; Yeager et al., 2014) and suggests that interventions targeting noncognitive factors related to academic achievement could alter academic outcomes (Dweck et al., 2014; Paunesku et al., 2015; Yeager et al., 2013).

Although interventions have been developed to teach individuals how to shift from a fixed mindset to a growth mindset (Dweck, 2006, 2015), Dweck has called for researchers to conduct small scale correlational and experimental studies that measure students' beliefs and observe their actions and outcomes, then use the findings to design more effective mindset interventions. Several studies conducted by Dweck and colleagues targeted growth mindset interventions for students transitioning to high school and college and found that the mindset intervention improved students' adjustment to school and academic performance, especially for those students who experienced social adversity and were categorized as underachievers (Dweck, 2015; Hacisalihoglu et al., 2020; Paunesku et al., 2015; Yeager et al., 2014).

Incorporating instructional methods into educational practices that reward risk, effort, and striving for improvement fosters a growth mindset and reinforces learning and perseverance (O'Rourke et al., 2014; Wiersema et al., 2015). Thus, learning is most likely to occur when students are encouraged to explore new areas and try challenging tasks (Masters, 2014). Training sessions geared toward informing faculty members and students of the growth mindset concepts have resulted in increased academic success and retention rates with students who are at risk for underachievement (Dweck, 2015; Yeager et al., 2014). These growth mindset interventions included awareness training along with teaching practices that rewarded effort and persistence (Dweck, 2015; O'Rourke et al., 2014). Barshay (2015) reiterated Dweck's caution to educators to avoid the growth mindset pitfalls of misapplying the mindset concepts by focusing mostly on effort and

instead encouraged educators to acknowledge processes and strategies, along with effort, that are tied to students' outcomes.

Noncognitive interventions, such as mindset intervention, influence students' self-efficacy and how they feel about school (Yeager et al., 2013). Interventions that have resulted in improved academic performance and retention include instruction on the growth mindset theory, suggest the application of various problem-solving strategies, and encourage taking on new challenges (Dweck, 2010; Lewis et al., 2020; Meierdirk, 2016; Yeager & Dweck, 2012). Students became more persistent in learning when their effort, strategies, and improvements were recognized as achievement (Dweck, 2010, 2014). Students with a growth mindset approached negative feedback as constructive, and used it for future improvement (Hu et al., 2016; Leith et al., 2014). Shifting students' mindsets to a growth approach increased the likelihood of students taking learning opportunities as they present themselves (Yeager et al., 2013).

Negative Mindset Intervention Findings

Contrary to the numerous research findings reporting positive relationships between a growth mindset and academic achievement, some researchers have claimed that there is a lack of substantiated evidence that mindset interventions actually make a difference in students' academic achievement (Macnamara, 2018; Sisk et al., 2018). Skeptics who question the value of mindset interventions challenge the importance of effect sizes reported for positive growth mindset findings (Sisk et al., 2018). Another criticism of growth mindset research is the lack of validation of students' shifts on the mindset continuum through a pretest and posttest research design (Macnamara, 2018).

In their meta-analysis, Sisk et al. (2018) analyzed 29 studies with 43 effect sizes and found that there was not a significant effect of mindset interventions on average high school and college students' academic performance. One study included in the meta-analysis exposed students in Grades 9 and 10 to stories of the struggles that famous scientists experienced in their scientific work to show the students that hard work influenced scientific achievement (Lin-Siegler et al., 2016). Lin-Siegler et al. (2016) found that students' science grades improved but did not demonstrate a significant shift in students' mindsets. However, it was reported in the meta-analysis that mindset interventions targeted towards specific at-risk populations more often have significant results and interventions combined with other educational and psychological interventions demonstrated more positive results and were more scalable (Yeager et al., 2016). It was also reported in the meta-analysis that mindset interventions were shown to have a significant relationship with the academic performance of economically disadvantaged and academically at-risk students.

In this study, I determined if students' mindsets differ depending on whether students are enrolled in developmental education; if growth mindset awareness training influenced a shift in first-term students' mindsets; and if the effect of the growth mindset awareness training differed based on students' developmental education status.

Implications

Academic leaders at the study site, similar to those at other 2-year colleges, were interested in adopting practices that will improve student outcomes. In this research, I investigated whether students enrolled or not enrolled in developmental education

differed on pretraining mindset, if incorporation of a growth mindset awareness intervention in the first-quarter student readiness course curriculum influenced students' mindsets, and whether the growth mindset awareness intervention affected the mindsets of these two student groups differently. The foundation of the study is the belief that growth mindset training would influence students to strive towards achieving academic success and this influence may be more prevalent with students in developmental education. The findings of this study support the foundational premise regarding the merits of mindset awareness training. A policy recommendation paper was used to present the recommended modifications of the training to the study site.

Summary

Researchers have shown that noncognitive factors are key components that contribute to students' abilities to achieve academic success. One of these noncognitive factors, students' mindsets towards their abilities and educational experiences, has been found to help or hinder their development of new skills (Gray & Swinton, 2017). Following these findings, Dweck's (2006) framework was used by the study site to develop mindset awareness training to assist students in developing a growth mindset, but the effectiveness of the training was never assessed. The goals of this study were to determine if there were differences in students' mindset scores based on developmental education status; if growth mindset awareness training resulted in changes in students' mindset scores; and whether students' mindset scores were differentially affected by growth mindset awareness training based on their developmental education status.

The following sections will describe the research design and methodology, analysis of the data, and interpretation of the findings. Conclusions will be drawn from the analysis and findings. A discussion will summarize the study as it relates to the mindset theory and current applications in higher education.

Section 2: The Methodology

Research Design and Approach

A quasi experimental mixed design with one between and one within factor was used to compare mean pretest mindset scores of developmental and nondevelopmental education students as well as examine changes in these students' mean mindset scores after growth mindset awareness training to determine if there were differential effects of the training. A quasi experimental design does not use randomly assigned groups (Creswell, 2012). The quasi experimental design was appropriate for this study because no random assignment to groups was possible. The data had already been collected from first-quarter students who were enrolled in a student readiness course at the study site; thus, the data were archival in nature. The archived data provided the student information needed for the study including developmental education status as well as pretest and posttest mindset assessment scores. The use of the archived data allowed for retrieval of anonymous data and eliminated the need for contact with the students during the research process.

Setting and Sample

The study was conducted at a 2-year, proprietary college in the northeastern United States. The single campus college offers 30 certificate and associate degree programs, providing career-focused education to approximately 2,000 students. All of the associate degree and the majority of the certificate programs required a student readiness/career success course to be taken in the first quarter. The curriculum of the student readiness/career success course was designed to acclimate new students to the

college, review study skills, and administer self-assessment inventories to assist students in gaining awareness of their personal learning preferences and perceptions.

The sample in this study included all 739 of the college's first-quarter students enrolled in the student readiness/career success course during Fall 2017 and Winter 2018. The census sample approach was chosen because the entire first-quarter student population was a manageable number, and the students were all part of the interest group (Creswell, 2012). A power analysis for this sample is discussed in the Data Analysis section.

Instrumentation and Mindset Intervention

Accuplacer Exams

During the new student orientation process, incoming students were administered the Accuplacer assessments, which are computer adaptive placement exams that measure students' skill levels in reading, English, and math on a scale ranging from 20 to 120 with a mean of 71 (College Board, n.d.). The study site used the Accuplacer scores to place students in appropriate college-level math and English course offerings. The Accuplacer scores were also used to place students into one of the two levels of math and one level of writing developmental education courses to prepare them for the college-level courses in their program (learning and assessment coordinator, personal communication, April 24, 2016).

Accuplacer has been used as a placement assessment tool in colleges for over 30 years (College Board, 2017). The Accuplacer test reliability is .89 for reading, .88 for sentence skills, and .90 for math (College Board, 2017). Multiple methods are used by the

College Board to assess the reliability and validity of the Accuplacer placement tests. The tests are reviewed by the College Board test developers and college faculty member experts for reliability and fairness, and the College Board psychometricians review the Accuplacer test score database for signs of reliability issues (College Board, 2017).

Mindset Assessment

As part of the normal instructional procedures, students in the student readiness/career success course were administered a paper and pencil version of the Mindset Assessment (Dweck, 2000, 2013; Mindset Works, n.d.-b) in Week 3 as a pretest to the mindset unit taught in the course. The mindset assessment was also administered to students as a posttest in Week 11 at the end of the first quarter, after they had received growth mindset awareness training. The mindset assessment required students to report their beliefs on the malleability of their intelligence and ability. This assessment included eight questions with odd numbered items being growth mindset questions and even numbered items being fixed mindset questions (Mindset Works, n.d.-b). Students responded to statements supporting a growth mindset belief that intelligence is malleable or a fixed mindset belief that intelligence cannot change using a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*) for growth mindset questions. Scoring was reversed for the fixed mindset questions. Responses were tallied to determine each individual's mindset score with a possible score ranging from 8 to 48 points. The mindset score represents a level of mindset on the mindset continuum. Scores of 8 to 16 points represent a "strong fixed mindset," scores of 41 to 48 points represent a "strong growth mindset," and mid-range scores represent a mixed mindset with stronger

beliefs on either the fixed or growth side of the scale (Mindset Works, n.d.-b). There are also some people whose scores fall in the middle range, from 25 to 32, that are uncertain of their beliefs regarding the malleability of their intelligence and abilities. A strong growth mindset indicates a belief that hard work, effort, and taking on challenging learning experiences enable a person to increase intelligence; a strong fixed mindset indicates a belief that a person is born with a certain degree of intelligence that cannot be altered (Mindset Works, n.d.-b).

The eight-question Mindset Assessment, an adaptation from Dweck's (2000, 2013) theories of intelligence scale, has been used by Dweck and colleagues in their research. In the study by Dweck et al. (1995), the mindset assessment statements had high internal reliability, ranging from .94 to .98, with test-retest reliability for a 2-week interval of .8. Blackwell et al. (2007) reported internal reliability of .78 and test-retest reliability for a 2-week period of .77.

Mindset Intervention

The mindset intervention included the facilitation of a mindset awareness lesson in Week 3 of the first-quarter student readiness course. The lesson, taught in one class period, provided students with content on mindset theories and opportunities to reflect on their approach to learning (director of the Center for Teaching and Learning, personal communication, April 18, 2018).

During the mindset awareness lesson, the instructor taught the students the mindset theories and presented Dweck's (2006) early findings from studies using school children. The lesson also included activities that facilitated the students' reflection on

their academic experiences and their mindset perceptions. Small group activities were also used to facilitate students' interpretation of their mindset pretest scores and how their score related to their approach to learning.

Data Collection and Analysis

Concurrent with approval of the Walden University Institutional Review Board (IRB), permission was obtained from the college to use archived student data. Thus, new data were not collected for this study; existing data were retrieved from college databases. The Center for Teaching and Learning maintained the archived pre and post training mindset scores and provided the data to the registrar, who maintains student records and demographic information, including the students' developmental education status to be included in the dataset. Before providing the data, the registrar created a spreadsheet with these data deidentified for first-quarter students enrolled in the student readiness course during the Fall 2017 and Winter 2018 quarters.

Statistical analysis of the archived quantitative data was conducted using SPSS Version 25 to address the following research questions and hypotheses:

RQ1: To what degree, if any, did pretraining mindset scores differ between students enrolled in developmental education and students who were not enrolled in developmental education?

$H_0$1: There was no significant difference in mean pretest mindset scores between students enrolled in developmental education and students who were not enrolled in developmental education.

H_a1: There was a significant difference in mean pretest mindset scores between students enrolled in developmental education and students who were not enrolled in developmental education.

RQ2: To what degree, if any, did participation in growth mindset awareness training affect students' mindset scores?

$H_0 2$: There was no significant difference in mean mindset change scores from pretest to posttest for students who received growth mindset awareness training.

$H_a 2$: There was a significant difference in mean mindset change scores from pretest to posttest for students who received growth mindset awareness training.

RQ3: To what degree, if any, did participation in growth mindset awareness training differentially affect mindset scores of students enrolled in developmental education and students who were not enrolled in developmental education?

$H_0 3$: There was no significant difference in mean mindset change scores from pretest to posttest for students enrolled in developmental education when compared to students who were not enrolled in developmental education.

$H_a 3$: There was a significant difference in mean mindset change scores from pretest to posttest for students enrolled in developmental education when compared to students who were not enrolled in developmental education.

Data Analysis

Scores on the mindset instrument are measured on a continuous interval-level scale and range from 8 to 48, with lower scores indicating a fixed mindset and higher scores reflecting a growth mindset. The developmental education status was assigned to

students enrolled in any one or more of the developmental courses. Developmental education status is a binary variable; students were either enrolled in developmental education courses or they were not. The data analysis originally proposed to address the research questions was a mixed analysis of variance (ANOVA; Laerd Statistics, n.d.) with one between factor (developmental education status) and one within factor (pretest and posttest mindset scores) to determine if there were significant differences between the developmental and nondevelopmental education students' mean pretest mindset scores (simple main effect of developmental education status), between the overall pretest and posttest mean mindset scores (main effect of test), and whether there was a significant interaction of test and developmental education status indicating differential effects of the intervention on the student groups. As will be discussed later in Section 2, the data analysis plan was modified due to not meeting the assumptions of the statistical test.

Power is the strength of a statistical test to reject a null hypothesis, given the sample size, significance criterion, and effect size (Cohen, 1992). A power analysis for the proposed mixed ANOVA computed with G*Power 3.1 (Faul et al., 2009) using a high-power level of .95, alpha of .05, and a relatively small effect size of .15, indicated that a total sample size of 436 was needed for the between groups comparison, which required the largest sample of the three comparisons to be conducted for the study. Although it was expected that there could be a small number of students for whom posttest scores would not be available, the sample size needed for sufficient power of the

statistical test was expected to be met based on the enrollment of 739 students in the course.

Assumptions for the Study

The mindset assessment gauges individuals' perceptions of the malleability of their abilities and intelligence and identifies the individuals' mindsets based on where the mindset assessment score falls on the mindset continuum (Dweck, 2013). The mindset assessment was administered using a self-report method in which students responded to the assessment statements based on their perceptions about their intelligence and abilities. It is assumed that the students completed the mindset assessment honestly and provided true information regarding their beliefs about intelligence and ability. Another assumption is that the archived student data were accurately entered and retrieved from the student records.

Limitations

A limitation of the study was that the self-report mindset assessment instrument may have resulted in overrated or underrated reports of students' beliefs. Inaccurate reporting can be a challenge when assessing noncognitive characteristics using self-report instruments (Duckworth & Yeager, 2015). The same mindset assessment was used for the pretest and posttest, which makes it possible for the students to realize which questions represent a growth or a fixed mindset. This may have influenced their responses, despite the tests being separated by 8 weeks. In addition, it is possible that the eight-item Mindset Assessment (Dweck, 2000, 2013) may not have provided the sensitivity needed to detect changes resulting from the brief growth mindset awareness training. Another limitation in

this study was that students were not asked to disclose if they had prior knowledge of the mindset theories or if they had taken a prior mindset assessment.

Scope and Delimitations

In this study, I examined archived student data to determine if there were mindset score differences for students based on developmental education status and mindset score changes after the growth mindset awareness training. A delimitation of this study was that the archived student data had been collected from students who were all from the same college and enrolled in the same quarters. Thus, the data may not have been representative of the larger population of students in general; however, the findings may be generalized to similar college students from similar institutions.

Protection of Participants' Rights

Approval was obtained from the Walden University IRB (04-10-19-0534209) before retrieving data. The study was designed to use deidentified archived data, which provided for the students' confidentially and eliminated the need for me, as an administrator at the college, to interact directly with the students or with collection of the data used in the analyses. Permission to access the archived data was obtained from the college and included in the Walden University IRB review process, but individual students' consent was not necessary due to the use of archived data (Creswell, 2012). The study site did not have a formal institutional research review process; I obtained written permission from the executive vice president to use the archived data. The archived data will be securely held on an external drive and stored in a locked safe throughout the research process and for 5 years following the publication of this study.

Data Analysis Results

Mindset and developmental education data were received from the study site and imported into SPSS Version 25. Data cleaning was conducted to ensure data accuracy.

Descriptive Statistics

The data for the sample of 739 students enrolled in the student readiness course included 724 pretest mindset scores with 15 missing and 438 posttest scores with 301 missing posttest scores. Possible explanations for the difference in the number of pretest and posttest mindset scores could be student dropouts from school before the posttest assessment, students not completing the posttest assignment, or faculty members not submitting the posttest scores. Confirmation with the study site indicated that these scores were not available, but the reason for the missing data was unknown. The descriptive statistics reported in Table 2 show that the range of both pretest and posttest scores was 8 to 48 and with mean scores of 37.95 for the pretest and 41.04 for the posttest. The high mean scores and negative skewness values indicate that there was a greater number of high scores than would be anticipated in a normal distribution.

Table 2

Pretest and Posttest Mindset Score Descriptive Statistics

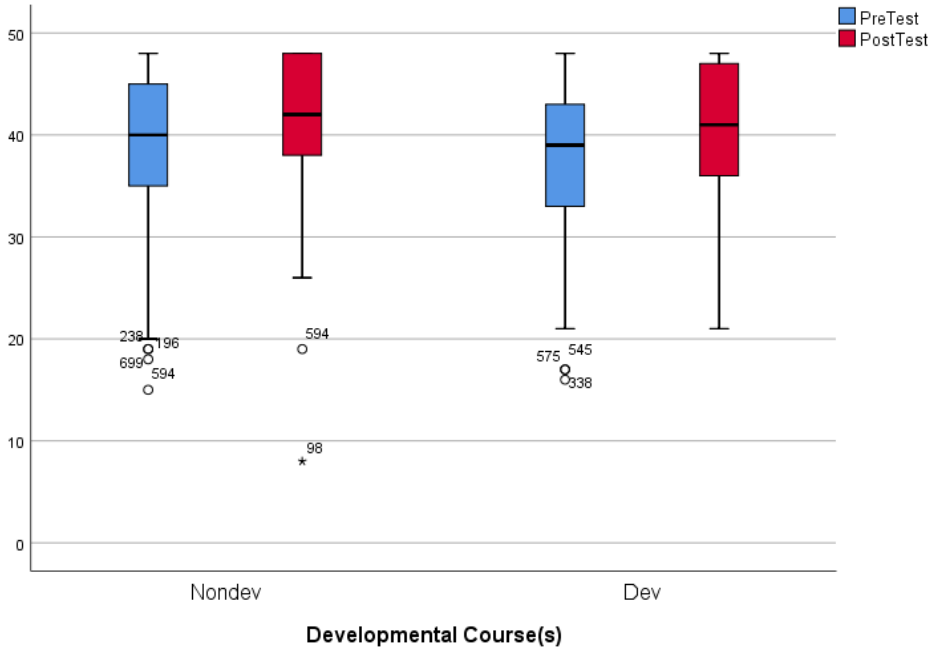
	Pretest	Posttest
N	724	438
Minimum	8	8
Maximum	48	48
Mean	37.95	41.04
Standard deviation	7.167	6.637
Skewness	-0.703	-0.933

Testing Assumptions of Statistical Tests

A mixed ANOVA (Laerd Statistics, n.d.) with one between factor (developmental education status) and one within factor (pretest and posttest mindset scores) was identified as the best statistical test to answer the three research questions. The mixed ANOVA enabled analysis of differences between the developmental education status categories and between the mindset pretest and posttest scores as well as determining if there was a significant interaction of these variables. Seven assumptions must be met in order to use the mixed ANOVA. The first three assumptions were met. These required a continuous dependent variable, one between subjects independent variable that is categorical with at least two categories, and one within subjects independent variable with at least two categories. However, the last four assumptions were not all met. These required no significant outliers, the dependent variable should be normally distributed, there should be homogeneity of variances, and there should be equality of covariate matrices. A descriptive analysis was conducted to test for outliers as shown in the boxplot in Figure 1. Eight outliers were detected that were more than 1.5 box lengths from the edge of the box in the boxplot and one outlier was detected that was more than 3 box-lengths from the edge of the boxplot. The dataset was checked and found to be error free. I decided to keep the outliers in the dataset because they represented actual student scores.

Figure 1

Boxplots Indicating Outliers in the Data



The distribution of the dependent variable to the independent variable groups violated the normality assumption as assessed by the Shapiro-Wilk test ($p < .001$). Although the assumption of homogeneity of variance was met as assessed by Levene's test, Box's test of equality of covariate matrices indicated that assumption was violated ($p < .001$). The assumption of equality of covariate matrices is critical to the interpretation of the interaction in the mixed ANOVA (Laerd Statistics, n.d.), which made it necessary to develop an alternative approach to answering the three research questions.

An option for the alternative approach was to apply a mathematical transformation to convert the data into a normal distribution. How the data are skewed would determine whether a square root, logarithmic, or inverse transformation should be

applied (Laerd Statistics, n.d.). The concern with using the mathematical data transformation approach was that the college leaders may perceive the modified data as not a true representation of their college students' data and might not find value in the findings or recommendations. Because of this concern, rather than transforming the data mathematically, a different approach to the data analysis was undertaken that required further dividing the original sample into subgroups.

A new nominal variable was created to divide the students entering the course into two groups, those with mostly fixed or mostly growth mindsets. The *mostly fixed* group included students with pretest mindset scores in the range of 0 through 32, and the *mostly growth* group included those with pretest mindset scores in the range of 33 through 48. The mindset group score ranges were based on the Mindset Works (n.d.-b) categorization. The mostly fixed group included the strong fixed, fixed with some growth, and unknown mindset categories. Categories included in the mostly growth group included the strong growth and growth with some fixed mindset.

The developmental education status variable was transformed to create a nominal variable where the *non-dev* category included students not required to take developmental courses and *dev* referred to students who were required to do so. The dev category was further divided into *dev-enrolled,* which included students who were already enrolled in developmental courses, and *dev-placed,* which included students placed into developmental courses but not yet enrolled. Although not included in the original design of the study, during data cleaning this latter group was found to include a substantial

number of students and was therefore included as a separate group in the study. Table 3 shows the sample breakdown for the mindset and developmental education categories.

Table 3

Sample Breakdown: Mindset and Developmental Education Status

		Pretest			Posttest		
	Classification	Original *N*	Modified *N*	Total	Original *N*	Modified *N*	Total
Mindset	Mostly fixed	155			83		
	Mostly growth	569			342		
				724			425
Developmental education status	Non-dev	508	508		287	287	
	Dev	216			138		
	Dev-enrolled		103			81	
	Dev-placed		113			57	
				724			425

The alternative method selected for answering the research questions used the original dataset without data removal or mathematical transformation. The decision to use the existing data was based on the accuracy of the representation of student mindset and developmental educational status. In this alternative approach, research questions were addressed using a separate statistical test to answer each question.

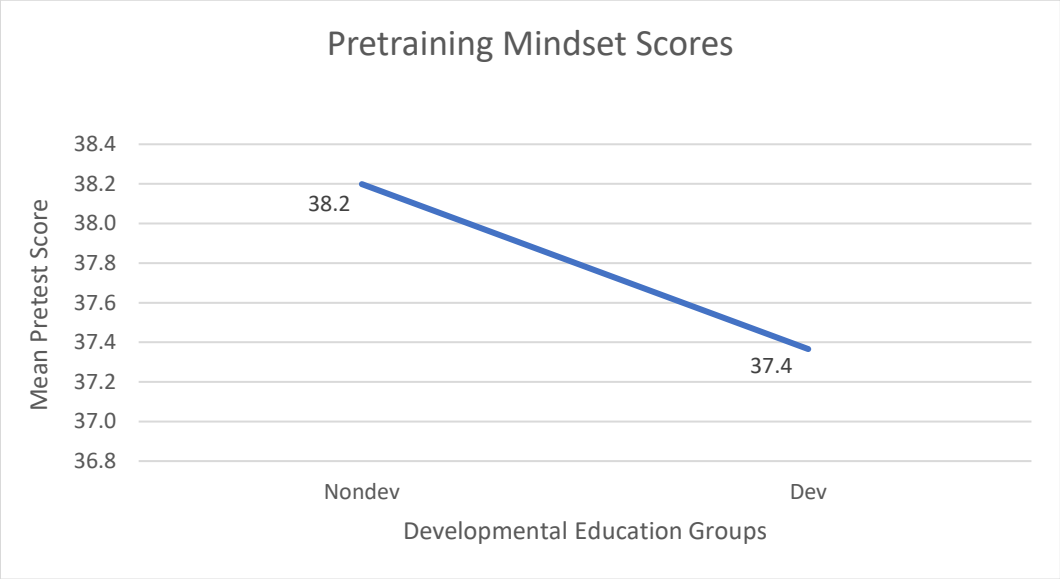
RQ1: To what degree, if any, did pretraining mindset scores differ between students enrolled in developmental education and students who were not enrolled in developmental education?

An independent samples *t* test was the alternative statistical test used to address RQ1, to determine if there was a significant difference in pretraining mindsets scores between students in developmental education and not in developmental education. The

assumptions of the independent samples *t* test were assessed; the mindset pretest scores and developmental education status met the requirements for dependent and independent variables, respectively. The assumption of independence of observations was also met because there are different students in the dev and nondev groups. There were 508 nondev and 216 dev student participants. The distributions of mindset pretest scores were negatively skewed, with more high scores toward the mostly growth mindset range for both nondev and dev students. Thus, mindset pretest scores were not normally distributed among the developmental education groups, as assessed by Shapiro-Wilk's test for nondev $W(508) = 0.95$, $p = .001$ and dev $W(216) = .096$, $p = .001$. There was homogeneity of variance for pretest scores for the nondev and dev students, as assessed by Levene's test for equality of variances ($p = .733$). Although the normality assumption was not met, the independent samples *t* test was used because the sample size was large enough that the normality violation was not problematic (Laerd Statistics, n.d.). Therefore, an independent samples *t* test was conducted to determine if there was a significant difference in pretraining mindset scores for dev and nondev students. As shown in Figure 2, although the nondev students scored higher ($M = 38.20$, $SD = 7.160$) than the dev students ($M = 37.37$, $SD = 7.166$) on the mindset pretest, this finding was not statistically significant, $t(722) = .432$, $p = .153$.

Figure 2

Mean Mindset Pretest Scores for Original Developmental Education Groups

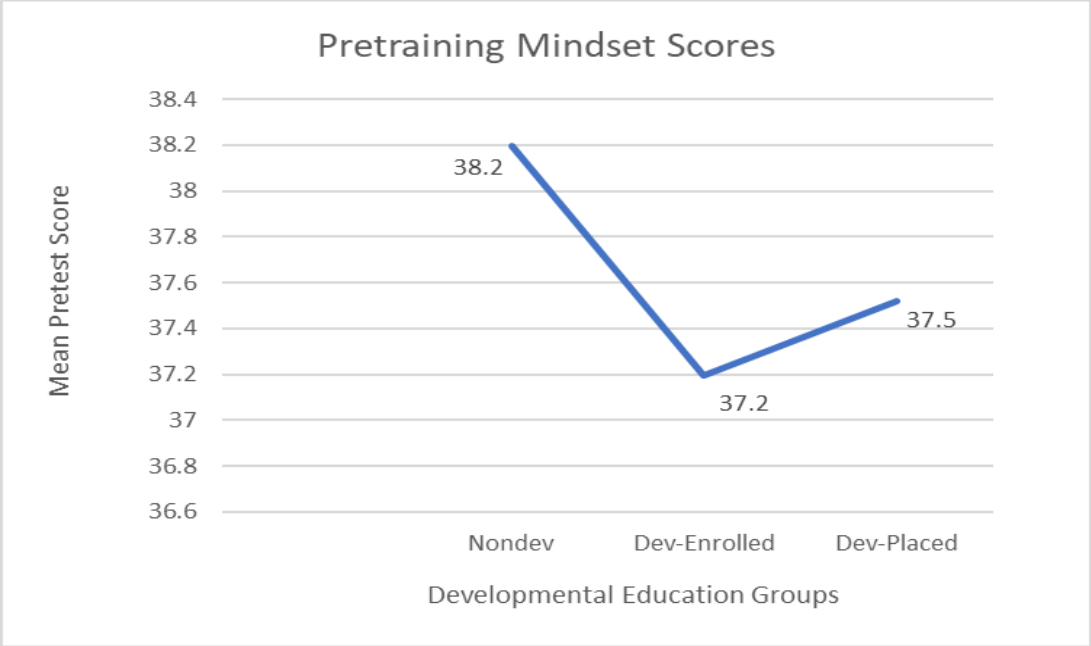


The lack of significant statistical findings on the independent samples *t* test prompted further exploration. The developmental education status data were further delineated into three groups based on information provided in the original dataset pertaining to whether developmental students were already enrolled in developmental courses (dev-enrolled) or placed in developmental courses but had not yet enrolled (dev-placed). The dataset included students classified as nondev (n = 508), dev-enrolled (n = 103), and dev-placed (n = 113). A one-way ANOVA was conducted using the three developmental groups to further explore RQ1. The first three assumptions for the one-way ANOVA relating to the study design were met because the dependent variable (mindset pretest score) was a continuous variable, the independent variable (developmental education status) had two or more categorical groups, and there were

different participants in each group. The boxplot showed a few outliers in the nondev and dev-placed groups. As was the case with the previous statistical test, it was determined that outliers would remain in the dataset without alteration because they represented actual student mindset data. The mindset pretest score was not normally distributed among the nondev, dev-enrolled, and dev-placed groups, as assessed by the Shapiro-Wilk's test with nondev W(508) = .95, p = .001, dev-enrolled W(103) = .96, p = .001, and dev-placed W(113) = .96, p = .002. Although the normality assumption was not met, the one-way ANOVA was conducted because the statistical test is considered robust with respect to normality issues (Laerd Statistics, n.d.). There was homogeneity of variance, as assessed by Levene's test for equality of variances (p = .908). Figure 3 shows the mean mindset pretest scores for the further delineated developmental education status groups, the nondev group (M = 38.2, SD = 7.2), the dev-enrolled group (M = 37.2, SD = 7.3), and the dev-placed group (M = 37.5, SD = 7.0), differences which were not statistically significant $F(2, 721) = 1.081$, p = .340.

Figure 3

Mean Mindset Pretest Scores for Modified Developmental Education Groups



RQ2: To what degree, if any, did participation in growth mindset awareness training affect students' mindset scores?

RQ2 was addressed using a paired-samples *t* test to determine whether there was a statistically significant difference between the mindset pretest and posttest scores. Outliers were identified in the boxplot, but it was established that the outliers represent student mindset data that are unusual but valid and were kept in the dataset. The assumption of normality was not met, as assessed by Shapiro-Wilk's test with W(425) = .86, p = .001. An option for addressing normality violations in the paired samples *t* test is to conduct the statistical test because it is robust to normality deviations (Wiedermann & von Eye, 2013). As previously noted, the data included a greater number of high mindset

scores than anticipated, creating the skewed distribution of scores. The mindset posttest scores were higher (M = 41.16, SD = 6.588) compared to the mindset pretest scores (M = 38.84, SD = 7.349), which was statistically significant, $t(424) = 7.284$, $p < .001$, $d = .35$. Although the mean difference was found to be statistically significant, the effect size of .35 indicates that the strength of the effect was small, consistent with the mean difference of just over two points (2.32).

RQ3: To what degree, if any, did participation in growth mindset awareness training differentially affect mindset scores of students enrolled in developmental education and students who were not enrolled in developmental education?

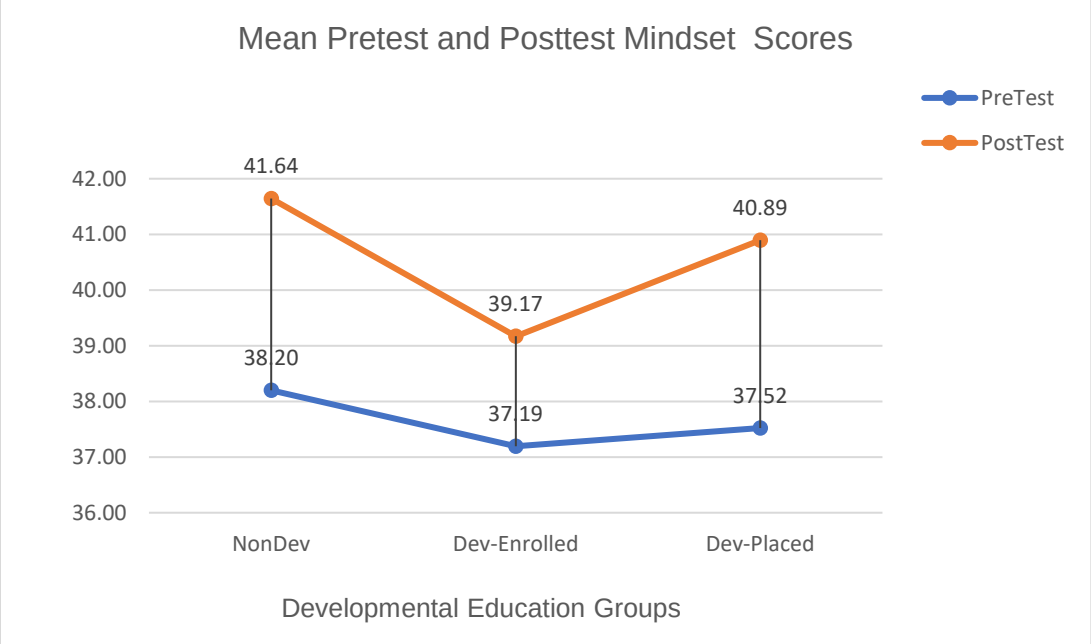
RQ3 was addressed using an independent samples *t* test with change scores to determine if the difference between mindset pretest and posttest scores was significantly different for the developmental and nondevelopmental students. The decision to use change scores was based on the violation of the equality of covariate matrices assumption for the mixed ANOVA. A mindset score change variable was created to indicate the difference in pretest and posttest mindset scores. As with the other statistical tests used with the previous research questions, outliers were detected, and it was determined that it was best to retain them. The normality assumption was not met, as assessed by Shapiro-Wilk's test with nondev W(287) = .87, p = .001 and dev W(138) = .87, p = .0001. The assumption of homogeneity of variance was not met, as assessed by Levene's test for equality of variances (p = .04). Therefore, a Welch *t*-test (Delacre et al., 2017; Shieh, 2018) was conducted to determine if there was a significant difference between the developmental education groups in the mindset change scores from pretest to posttest.

The mindset change score was higher in the nondev group (M = 2.35, SD = 7.06) than the dev group (M = 2.25, SD = 5.41), but this was not a statistically significant difference between the groups, $t(342.974) = .158$, $p = .874$.

As with RQ1, a one-way ANOVA was conducted to address RQ3 using the modified developmental education groups, nondev, dev-enrolled, and dev-placed. A one-way Welch ANOVA (Delacre et al., 2017; Shieh, 2018) was conducted to determine if mindset change scores from pretest to posttest were significantly different for the developmental education groups. Outliers were detected in each group, as assessed by the boxplot. The outliers were kept in the dataset because they represent valid mindset score data. The data were not normally distributed for each group, as assessed by the Shapiro-Wilk test with nondev $W(287) = .87$, $p = .001$, dev-enrolled $W(81) = .86$, $p = .001$, and dev-placed $W(57) = .90$, $p = .001$. The dev-placed group had the greatest change (M = 2.65, SD = 6.99) in mindset score as compared to the nondev group (M = 2.35, SD = 7.06) and the dev-enrolled group (M = 1.98, SD = 3.97), but the differences in change scores between the developmental education groups were not statistically significant, Welch's $F(2, 422) = .186$, $p = .830$. Figure 5 provides a visual depiction of the change between the mean pretest and posttest mindset scores.

Figure 4

Mean Pretest and Posttest Mindset Scores for Modified Developmental Education Groups



Discussion of Results

In this study, I sought to determine if there were significant differences in mindset scores between nondevelopmental and developmental students entering college (RQ1), whether mindset awareness training influenced a shift in mindset scores towards a growth mindset (RQ2), and if there were differences in the effect of mindset training on the nondevelopmental and developmental students (RQ3). The three research questions were addressed using an independent samples *t* test, paired sample *t* test, and a one-way ANOVA.

The basis of the study was Dweck's (2006, 2013) theory of intelligence and the belief that a student's intelligence is malleable. Thus, students with a growth mindset

would experience more academic success and influencing students to adopt a growth mindset would improve their academic success, particularly for developmental students (Mills & Mills, 2018). Spitzer and Aronson (2015) found that mindset interventions could change students' perceptions of learning and promote success. They concluded that these interventions could bring about subtle changes that may close the gap faced by developmental students.

There was an unanticipated large number of students, across all groups, who entered college with a high mindset score, indicating mostly growth mindsets. The descriptive statistics indicated a negative skew of pretest mindset scores that affected the normality of the data. A nonnormal distribution may have high scores piled to the right showing a negative skew or low scores piled to the left showing a positive skew (Creswell, 2012). The skewed, mostly growth mindset pretest scores created a ceiling effect where the mean scores were near the top of the mindset score range (Zedeck, 2014). The mindset assessment instrument, although used with college students elsewhere (McCabe et al., 2020), may have been too transparent for these students, making it easy to identify the growth mindset responses. The independent samples *t* test for RQ1, with a mean difference of less than one point (.83), resulted in the inability to show significant pretest mean differences between the developmental education groups.

The analysis for RQ2 showed a statistically significant increase in the mean score from pretest to posttest, indicating a shift in the students' mindsets toward the growth mindset end of the continuum. This shift of mindset scores aligns with Dweck's (2006, 2015) theory that mindsets can change, and mindset awareness training can influence

mindset changes. The majority of the pretest scores were on the mostly growth mindset area of the continuum due to the ceiling effect but the shift in mindset strengthened the growth mindset.

Although the RQ2 findings indicated a significant increase from pretest to posttest scores, the RQ3 statistical analysis showed no significant differences in mean change scores between dev and nondev students. Further analysis of the education status groups revealed that the dev-placed students had a higher mean increase in mindset scores than the dev-enrolled and the non-dev students, although this difference was not statistically significant. This finding was of particular interest in regard to the timing of enrollment in developmental education. Further investigation is required to fully understand the dynamics of the dev-placed higher mean mindset scores. It is possible that with application of a growth mindset approach to education and more confidence in their abilities, dev-placed students may negate their need for the developmental courses.

In recent years, researchers have examined the effectiveness of developmental courses offered to underprepared students entering college (Bailey & Jaggars, 2016; Center for Community College Student Engagement [CCCSE], 2016, 2019). Developmental courses are designed to bring students' academic acumen to a college-ready standard before students enter college-level courses. As stated by Bailey and Jaggars (2016), a flaw in the developmental course structure is the time added to developmental students' education, with developmental students often dropping out of school before they take all of the developmental courses. The reasons for dev-placed

students delaying their entry into developmental coursework are not explained by the data obtained in this study but may be the roots of a future study at the institution.

The findings of this study indicated that the mean pretraining mindset scores were not significantly different between the developmental education groups. It was discovered that most of these students entered college with growth mindset tendencies regardless of their developmental education status. Results of the study indicated that participation in the mindset awareness training had a significant effect on the students' mindset scores as shown by a significant overall increase in scores. This finding supports prior research findings that mindset interventions may increase growth mindset tendencies.

Further exploration was conducted on the effect participation in the mindset awareness training had on students' mindset scores based on their developmental education status. An analysis of the nondevelopmental and developmental education groups did not reveal any significant differences between the groups. Further delineation of the developmental groups showed a notably higher increase in post training mindset scores in the dev-placed group, but the difference was not statistically significant.

The findings of this study contribute to the body of research initiated by Dweck (2006, 2013) and continued by many researchers, showing that mindset awareness interventions can positively influence growth mindset tendencies. A relevant finding in this study was that the majority of students, both nondevelopmental and developmental, started college with a mostly growth mindset. This finding could mean that these first-

term students already possessed the noncognitive skills needed to succeed and needed help applying those skills to improve their academic outcomes.

The knowledge that the majority of students entered college with growth mindset tendencies influenced the approach used to develop the recommendations presented in the project. The focus of the project recommendations is to provide students with early knowledge of the mindset concepts and develop student self-awareness of how these concepts apply to their beliefs about their academic abilities. The intent is to alter the existing mindset training program to better prepare students for college before they start their classes.

Section 3: The Project

The results of this study presented a few findings that altered the original intent of the project. The pretest mindset scores indicated that most first-quarter students came to college with a mostly growth mindset. The predominant growth mindset was found for both the nondevelopmental and developmental students. Another finding of interest was that the mean mindset scores increased from pretest to posttest across all student groups, indicating changes toward growth mindsets.

Prior to conducting the study, I expected to find a more balanced array of students with mostly fixed mindsets and anticipated the mindset awareness training might shift at least some students' fixed mindsets to a mostly growth mindset. However, after reviewing the findings, I realized that an important component of the mindset awareness training was the self-assessment process and resultant increased student self-awareness. The recommendations in the original project concept were altered to include an increased self-awareness focus for the mindset awareness training. The recommendations in the project plan focus on enabling students to identify their mindsets and encouraging a purposeful use of a growth mindset to achieve their goals. These recommendations align with the qualities of a growth mindset, encouraging purposefulness, effort, and a plan of action. The policy recommendation paper presents the study site with an overview of the study, findings from the data analysis, and the recommendations.

Rationale

The policy recommendation paper, also known as a white paper, was chosen to provide the study site with research-based recommendations that can be used to

implement positive institutional change. A white paper informs the reader by providing knowledge and research to support a specific recommendation (Cullen, 2018). As suggested by Kezar (2011), higher education institutions should engage in professional dialogue to promote change. Obtaining support from the institution's leadership and other agencies, foundations, and organizations that support higher education institutions will enable change to expand beyond a single institution (Kezar, 2011).

As colleges focus on improving retention and graduation outcomes, interventions focus on academic and noncognitive factors (Buzzetto-Hollywood et al., 2019). Focusing on noncognitive factors, such as students' mindsets combined with academic and cognitive factors, may influence students to strive for success. The administrators at the study site recognized the potential influence of student mindset on student success and implemented mindset awareness training within the student readiness course. The training was designed to help first-quarter students shift their mindsets towards a growth mindset with the goal of students applying a growth mindset approach to their education.

The findings of this study indicated that the majority of students entered college with a mostly growth mindset. The negatively skewed student mindset distribution presented concerns with failure to meet the assumptions in the data analysis and resulted in reconsideration of the focus of the recommendations to be made to the research site. I had originally thought expanding the current mindset awareness training to influence a shift from mostly fixed to mostly growth mindsets would be most feasible. However, based on the findings of the study, especially that most students enter college with growth

mindsets, the policy paper recommendations focus on helping students gain an awareness of their mindset and adopting a growth mindset approach to setting and achieving goals.

Review of the Literature

The literature review in this section presents information on the genre used for the project, a policy recommendation paper. Various terms are used in reference to this genre, some of which are *white paper, policy paper, position paper, policy brief,* and *consensus statements* (Roukis, 2015). To gain further insight, I conducted a literature review on types of position papers, the purpose and structure of policy recommendation papers, guidelines for developing policy recommendations, policies and recommendations for new student college readiness practices, and college student mindset awareness intervention practices. Using Walden University's library, I searched multidisciplinary databases using the terms *policy analysis*, *policy implementation*, *policy recommendation paper, white paper, policy brief, guidelines for writing a white paper,* and *writing policy recommendations* to support my work on the policy recommendation paper. To provide contextual information, the search also included the following terms: *higher education, education policy, change models, mindset*, and *new student orientation*. The research on these topics will be included in the literature review.

Policy Recommendation Paper

A *policy recommendation paper* is a term used in reference to a type of white paper. A white paper is used by an individual or group to present factual information about a problem and the recommended solutions to a specific audience (Pershing, 2015; Purdue University, n.d.-b). Powell (2012) described the white paper as a document

written to strategically gain support for a proposed idea. The purpose of the white paper is to assist the audience in gaining an understanding of the situation and influence their acceptance of the recommendations. In many cases, the white paper must be written in language understandable by nonexperts because the target audience could be organization officials who are not experts in the field (National Education Policy Center, n.d.; Political Science Guide, n.d.).

The term *white paper* evolved from mid-20th century government policy papers (Malone & Wright, 2018). White papers served as policy recommendation papers prepared for government officials with decision-making authority (Doyle, 2013). More recently, white papers have been used in many sectors beyond government including business and marketing, healthcare, technology, and education (Campbell et al., 2020; Foleon, n.d.). The marketing industry is a prevalent user of white papers as an informative way to promote new products. White papers are used in marketing to describe new or improved features of a product or service and influence business decision makers (Malone & Wright, 2018; Mattern, 2020; Willerton, 2013). The white paper is also an effective way for businesses to introduce new technological products that are unknown to clients (Willerton, 2013). Technological advancements also made it more efficient and cost effective for businesses to create professional white papers, increasing the ability to quickly market new products (Willerton, 2013). Although marketing white paper concepts did not apply directly to my education project, some of the structure and target audience guidelines presented in the literature were transferable.

In policy situations, a white paper is used to guide policy decisions with expert advice, recommendations, and research support (Herman, 2013; University of North Carolina, n.d.). Policy papers are written to provide information on a certain topic and make recommendations to policy makers (DeMarco & Tufts, 2014). Policy recommendation papers are written succinctly, accurately, and with high readability to enable the reader to efficiently acquire the information needed for the decision-making process (Doyle, 2013). The policy paper is a call to action (Moore, 2013) that includes clear steps to achieve the desired outcome. Research findings are used to support the recommendations presented in the policy recommendation paper (Cullen, 2018; Doyle, 2013; McEneaney, 2018).

Policy recommendation papers are used in a variety of sectors in which the policy makers may represent constituents from a particular industry, organization, or community. The design of the paper and content are tailored to meet the needs of the target audience. For instance, Roukis (2015) explained that in a healthcare policy recommendation paper, the position on the issue and the recommendations are justified and strengthened with scientific evidence. The use of supporting research to present evidence-based recommendations is also applied in the education sector. Position justifications that are validated with research analysis may heighten the credibility of the position and recommendations (Hyatt, 2013). Byman and Kroenig (2016) suggested that education policy recommendation papers include actionable recommendations that correspond to clear implementation plans.

The approach to writing policy recommendation papers recommended by Byman and Kroenig (2016) that encourages the inclusion of strategic action plans was the framework used in the project. The format of the recommendation paper may vary but, in all cases, should serve as the framework for easy navigation of the document (Campbell & Naidoo, 2017). There are consistent components that should be a part of each paper. The recommendation paper should include specific information regarding the problem and suggested solutions, evidence that is supported with data, and thought-provoking narrative (Campbell et al., 2020; Doyle, 2013; Political Science Guide, n.d.). The design of a formal policy recommendation paper was described by Doyle (2013) as a direct structure where the content is organized with the most important information, the description of the issue and the recommendations, at the beginning and the supporting analysis information following. This structure allows the reader to get the needed decision-making information immediately and only read beyond if further knowledge of the considerations is desired. At times, a more academic design is used in a policy recommendation paper by applying an indirect structure that places the introduction of the issue and a discussion of the analysis and considerations before the presentation of the recommendations (Doyle, 2013). The indirect structure was applied to my project because the organization fit the approach to decision making most commonly used in education (Doyle, 2013).

The organization and language used in a paper are readability factors that should be considered in the development of a concise policy recommendation paper (Doyle, 2013). The recommended segments of the policy recommendation paper are an executive

summary, background information, position information with recommendations, and a reference list (DeMarco & Tufts, 2014). The format, wording, and tone may differ based on the group the paper is addressing (DeMarco & Tufts, 2014). In addition to the organization and succinct content, formatting strategies such as topic titles, bulleted lists, and bold, underlined, and italicized font treatments enhance the clarity of the document (DeMarco & Tufts, 2014; Hyde, n.d.; Swain & Swain, 2016). Graphics such as charts or graphs can be used to visually depict complex information (Hyde, n.d.). The paper content and enhancements should align to increase the ease in reading and comprehending the information.

The recommendations presented in a policy recommendation paper are considered by stakeholders as a solution to challenges faced by an organization. Research analysis validates the recommendations being considered by decision makers in determining whether to adopt the recommendations. The purpose of the policy recommendation paper is to influence positive change within the organization. Roukis (2015) showed that position papers, consensus statements, and clinical practice guidelines presented to the healthcare community to recommend changes in healthcare practices were highly valued. Similarly, Kon (2016) reported that professional organization policy statements have been used to recommend standards for clinical care and are used by clinicians for guidance. These examples of policy recommendations transitioning into applied practices in the healthcare industry can be replicated in the education sector.

The policy recommendation paper in the project presents recommendations pertaining to the reengineering of the college's current mindset awareness training and

new student orientation program. Mindset and new student orientation research analysis was used to validate the position presented in the project. My research provides new findings that can add to the body of research that is used to inform the college's decision makers.

Growth Mindset Applied to Education

The CCCSE (2019) defined *academic mindset* as students' perceptions and beliefs regarding learning and academic effort needed to achieve academic outcomes. Noncognitive traits of first-term students, such as academic mindsets, may shape their college experiences (Bowman et al., 2019; Caviglia-Harris & Maier, 2020). A student's academic mindset is comprised of motivation, self-perception, and community engagement (Han et al., 2017). Dweck (2016) noted that students with growth mindsets may have a false sense of strength, and they may not put in the hard work to cultivate their abilities. Mindset interventions administered to students early during key transitions, such as entering college, can change student perceptions about their academic abilities and influence the strategies used in their education approach (Bowman et al., 2019). In a study conducted by Limeri et al. (2020), it was reported that students' mindsets continue to shift over time and are influenced by past and current educational experiences. Talent is just one small piece of acquiring new skills; with a growth mindset approach, students can set their minds to learning a particular skill, and, with effort, achieve that goal. Students' mindsets are one noncognitive factor in predicting success in college (Han et al., 2017). Han et al. (2017) found that first-year college students' academic performance was influenced by their self-efficacy and belief in their academic ability. Students

possessing a growth mindset are more likely to put themselves in more challenging situations by taking more advanced courses and pursuing more challenging majors (Stroman, 2019). Colleges that provide opportunities for students to gain insight on their mindset may help them alter their perspectives on learning (CCCSE, 2019). A positive perception loop was identified by Limeri et al. (2020) where students' growth mindsets influenced their beliefs of their academic abilities, and their improved academic performance reinforced their growth mindsets.

Many students entering college are not prepared for the rigor of college coursework (Bailey & Jaggars, 2016). Low socioeconomic backgrounds and academic inequities relate to students entering college underprepared for the academic requirements and college environment (Bettinger et al., 2013; Claro et al., 2016). Developmental courses are used by colleges to increase students' academic preparedness to close the gap between students' academic readiness and the rigor of college courses to improve academic performance. Concerns for the effectiveness of using purely developmental courses as the solution for closing the gap have led to strategies using noncognitive interventions focused on learning and motivation (Bailey & Jaggars, 2016; Spitzer & Aronson, 2015). For example, noncognitive interventions described by Broda et al. (2018) as "light-touch" interventions were applied to first-year college students' curriculum to improve the educational experiences of disadvantaged students. Mindset knowledge can help students approach developmental coursework by seeing the relevance to achieving their goals and being more open to applying new learning strategies (CCCSE, 2019; Suh et al., 2019). Including mindset interventions with other

improvement strategies for underprepared students has led to more positive student attitudes toward school and students' beliefs that they can improve their academic performance with effort, persistence, and the application of new strategies (Spitzer & Aronson, 2015). In a study conducted by Suh et al. (2019), it was reported that developmental math students who participated in a growth mindset intervention had a higher rate of course completion than the other students who did not receive the intervention. The noncognitive interventions can create small changes to students' perceptions about their abilities and spark changes in their performance. Barclay et al. (2018) studied the differences between students who experienced academic success and those considered academically at-risk and found that scholarly, high achieving students had a greater growth mindset toward education than at-risk students. Their study indicated that noncognitive factors such as mindset are an important component of a student's approach to education.

Mindset Interventions

Many researchers have found that interventions focused on noncognitive factors such as mindset, self-efficacy, and goal setting may affect student success (Burgoyne et al., 2018; Buzzetto-Hollywood et al., 2019; DeBacker et al., 2018). Positive results were found in studies where interventions were administered to at-risk, underserved students, and students in developmental education to alter the students' beliefs in their academic abilities (Buzzetto-Hollywood et al., 2019; Hoyert et al., 2019; Sarrasin et al., 2018). In a study conducted by Paunesku (2013), students received recurring growth mindset messages through a course website that encouraged students to learn from their mistakes

and spend more time working on practice problems. Students' academic success following the intervention reinforced the belief that students' growth mindset affects performance, and that interventions administered over time in the appropriate setting can have positive results (Paunesku, 2013).

College administrators may combine mindset interventions with other strategies that address specific student contextual factors. In the study conducted by Corradi et al. (2019), it was reported that the effect of the growth mindset intervention was mitigated by the students' background experiences and other contextual factors. The researchers suggested taking the contextual factors into consideration during the development of the mindset intervention to optimize its effect.

New Student Orientation

New student orientations (NSOs) that occur before the start of the first academic term provide information, introduce new students to faculty members, staff members, and classmates, offer training, and create an opportunity for students to become acclimated to the college to help students avoid potential obstacles that may hinder their success (Chan, 2019; Hallett et al., 2020). The orientation program may include informational sessions as well as training sessions that introduce noncognitive concepts such as growth mindset. New student orientation programs can provide a means to strengthen students' sense of belonging and academic mindset through a combination of belonging interactions and mindset interventions (Han et al., 2017).

NSO programs are constructed to meet the needs of the institution, a specific student population, or focus. An NSO may be developed as a traditional in-person event

conducted in one day, a multi-day acclimation to campus, an academic readiness bridge program, an online program (Hibel, n.d.; Mitchell, 2014), or may be as extensive as a multi-week transitional bridge program that is part of the NSO and leads into a First Year Experience program (Hibel, n.d.).

Coleman-Tempel and Ecker-Lyster (2019) found that participation in a one-week on-campus, residential transition program that provided informational sessions and academic and social networking activities was effective in developing a connectedness in the students that helped them succeed. These types of transitional bridge programs are intended to increase academic preparedness and social integration (Grace-Odeleye & Santiago, 2019). Because NSO programs are recognized as important components to academic and social integration, student participation is highly encouraged. Online NSO programs have been developed to provide more flexible delivery options with the intent to increase participation (Colucci & Grebing, 2020). Colucci and Grebing (2020) reported that an online NSO program increased participation in a community college program and the students who participated in the program experienced greater academic success than the students who did not participate.

Higher education institutions recognize the transition to college as a component of student success and incorporate resources and programming to support the transition process (Sandoval-Lucero et al., 2017). These comprehensive transition programs set the academic expectations, introduce academic and personal support resources, and educate students on noncognitive factors that can affect student success (Sandoval-Lucero et al., 2017). Suh et al. (2019) noted that growth mindset interventions administered a few

weeks into the term may be too late because students may already be exhibiting poor practices such as not attending class. They recommended that growth mindset interventions be incorporated at the beginning of the students' educational cycle and continually reinforced. Incorporating growth mindset training early in the transitional period can influence students' approach to the challenges faced during this time (Korstange et al., 2020). This is the focus of the project recommendations described in the following section which are based on the premise that precollege mindset interventions can be used to set the foundation for student success.

Project Description

The policy recommendation paper to be presented to members of the senior leadership team at the research site includes an overview of my study and recommendations based on the findings. The college currently provides first-quarter students with training in noncognitive skills that include mindset awareness. The recommendations in the policy recommendation paper involve adjustments to the mindset awareness training currently offered to the new students. The main recommendation suggests incorporating the mindset training into the new student orientation program rather than in the first-quarter student readiness course. Emphasis will be on the benefits of precollege orientation programs that address student needs based on their life experiences to help them transition to college (Hallett et al., 2020).

Needed Resources and Existing Supports

Implementation of the proposed recommendations will require minimal additional resources and financial investment because it is a repurposing of a process already in

place. The shifting of the mindset awareness training from the existing first-quarter curriculum to the new student orientation program will need the buy-in of the academic, admissions, and student services teams. The primary resource needed will be time to coordinate the new student orientation mindset awareness program. Members of the admissions and academic teams may form a task force and be allotted dedicated time each week to plan and develop the new program. Additional resources may be needed throughout the students' education for the incorporation of the recommended follow-up activities. The expenses for these activities can be included in fiscal year operation budgets.

Proposal for Implementation

I will first initiate the buy-in and approval phase of the implementation plan. The first step of the plan is to present the policy recommendation paper to the academic leaders at the research site for their input and buy-in. With the academic leaders' approval, the policy recommendation paper will then be presented to the senior leadership team that includes the supervisors of the admissions and student services teams. Once the senior leadership team has approved the proposed recommendations, the new student orientation update phase of the implementation plan will begin. In this phase, the academic, admissions, and student services teams will work together to incorporate the existing mindset awareness training into the existing new student orientation program and determine the appropriate launch date. Table 4 outlines the proposed timeline of events that need to occur to implement the recommendations. The implementation launch date will align with the start of a new fiscal year. The potential launch date is July 2022.

Table 4

Implementation Timetable

Implementation task	Targeted implementation date
Academic leadership team approve recommendations	July – August 2021
Senior leadership approve recommendations	August – October 2021
Existing orientation program review	October 2021 – January 2022
Existing mindset awareness training revisions	January – April 2022
New student orientation mindset program pilot	April 2022
New student orientation mindset program launch	July 2022
Begin evaluation process	August 2022

Roles and Responsibilities

As an academic leader at the college that served as the research site, my role is to present the recommendations based on the findings of my doctoral study to the leadership teams at the college. It will be the college leaders' responsibility to review the recommendations and determine implementation feasibility. Once the recommendations have been approved for implementation, my role will be to coordinate the collaborative implementation plan with the academic, admissions, and student services teams. Members from each of these teams are also members of an orientation task force responsible for planning each orientation, assessing the program, and updating the program. The orientation task force will implement the recommended changes to the orientation program.

Project Evaluation Plan

The main goal of this project is to implement a policy and process change that will provide new students with mindset awareness training before starting college. This change is intended to provide students with knowledge of their mindsets so they can work to shift toward a mostly growth mindset or proactively use their growth mindsets to set and achieve goals.

The presentation of the policy recommendation paper and approval of the recommendations will be the first step of the evaluation process. The evaluation process will incorporate an evaluative thinking approach using continual questioning, reflection, and learning to identify improvements (Chianca et al., 2018). Presenting the recommendations to the study site's academic leadership and senior leadership teams provides the opportunity to answer questions and gain stakeholder input and buy-in for the implementation of the recommendations. The evaluation should be based on stakeholders' needs and priorities to ensure quality and relevance (Chianca & Ceccon, 2017). Once approval of the recommendations is received, the evaluation plan will be used to assess the implementation steps. Using an objective-based evaluation approach, the assessment of the implementation steps will be guided by the objectives set for each step (Lodico et al., 2010). Once the implementation plan has been executed, an outcomes-based evaluation plan will be used to assess the intended outcomes of the new student orientation mindset awareness training program.

Project Implications

The project includes recommendations for small changes that have the potential to greatly affect the stakeholders of the college. My study investigated nondevelopmental and developmental education students' mindsets, comparing their beginning college mindset scores as well as their mindset change scores after training. The findings indicated that most students entered college with a mostly growth mindset. Academic leaders at the research site will review this research to determine whether to adopt the recommendations to adjust the existing mindset awareness training process.

The recommended proactive approach to providing the mindset awareness information to students before entering college is designed to empower students to apply growth mindset strategies from the beginning of their college careers. The application of these strategies may empower students to strive for academic success.

Section 4: Reflections and Conclusions

In this section, I discuss my project's strengths and limitations in addressing the problem of students' successful transition to college and their preparedness for academic success. I describe alternative approaches that could be taken to solve the problem. This section will also include reflection on my personal, scholastic, and professional growth, as well as considerations for future research.

Project Strengths and Limitations

Because a majority of students came to college with a mostly growth mindset, my project is a recommendation to alter the existing mindset awareness training program so that it is administered prior to the students entering college. The proposed changes to the mindset training will create the foundation for a path toward student success. I decided that a recommendation paper was best way to communicate the proposed changes to the college.

A strength of the recommendation paper is that it is an efficient and concise method to communicate the study findings and recommendations to the college stakeholders. The recommendation paper includes the study findings with validation from supporting literature. This provides an effective way for the academic leaders to learn about the recommendations made to overcome the challenges experienced by students at the college.

Recommendations for Alternative Approaches

My recommendation to move the mindset awareness training to the new student orientation program that occurs before students enter college was based on the finding

that the majority of students had a growth mindset when they entered school. The recommendation focuses on helping students to recognize their mostly growth mindset and to use their mindset awareness to plan a growth mindset approach to their education. A different method of addressing ways to assist students in using their mindsets to affect student success could be the incorporation of a journal to document the incorporation of growth mindset strategies into the student's learning plan.

Other options for my study would have been to conduct a qualitative, longitudinal study that tracked student academic progress after the administration of periodic mindset interventions. A qualitative design could have added the students' perceptions of their mindset and its effect on their approach to education. My role as an academic leader at the study site prevented me from taking this more involved approach with my study.

Scholarship, Project Development, and Leadership and Change

Scholarship

Throughout my life, I have enjoyed learning and view every experience as a valuable learning opportunity. My approach to learning has always been practical and applied to specific situations. After earning my bachelor's degree, I waited to acquire my master's degree and pursue my doctorate until the degrees were a needed component in my career plan. Although my degrees were acquired in 20-year spans, I grew professionally between degrees through professional workshops, continuing education college courses, and education conferences. My education and credentials have served an important purpose in my career.

It is through my doctoral journey that I feel I have made strides as a scholar. A lack of confidence in writing and research was present from the beginning of my journey. Early on, I realized that, like many of my students, I possessed a fixed mindset for writing. Taking a writing workshop through Walden University helped me to apply a growth mindset approach to writing and work on improving in that area. It has been a long process, but through reading scholarly articles and receiving constructive feedback, I have improved in these areas.

Conducting research reinforced my knowledge in using the library and accessing articles from the various databases. The ability to use peer-reviewed articles to validate concepts presented in my work was an invaluable lesson. I have a greater appreciation for validating and building onto a body of work.

Following the structure of APA style prepared me to meet the requirements of my doctoral study and enhanced my professional writing and presentation skills. A strict discipline was required to apply the APA rules. Continual references to the APA Manual strengthened my understanding of APA style.

Project Development

My research skills were improved through the work on my doctoral project. During this process, I learned how to analyze my data using various statistical tests and effectively working with SPSS to conduct the tests. The most important lesson learned was that a project plan should not be developed based on assumed outcomes. On the contrary, the data inform the project plan. Initially, I did not realize that I had preconceived assumptions of what my data would show until I was faced with

unanticipated findings. I learned to step back and let the findings guide my project plan development.

Leadership and Change

Serving as an academic leader in higher education throughout my doctoral studies provided me the opportunity to apply the knowledge gained from the doctoral coursework and my study to my day-to-day professional life. My growth as a scholar, professional, and leader was great. Through this process, I have improved my own skills and inspired others to take similar steps in their career path. As a person who is 40 years into my career, I serve as a great example that you are never too old to learn and grow.

Reflection on Importance of the Work

As an employee of the study site for over 20 years, my dedication to the institution and the students guided my goal to conduct a study that would affect student learning and success. The doctoral study and project was an opportunity to critically analyze processes used by the study site, including where I had contributed to the original implementation. Conducting the research forced me to push aside any bias and assumptions I had about the students' mindsets and look objectively at the data. In doing this, I found the most important aspect of my work, which was to find ways to influence students to use their mindsets to proactively plan for and achieve their goals.

Implications, Applications, and Directions for Future Research

Findings of this study indicated that the majority of students at the study site came to college with a mostly growth mindset. Korstange et al. (2020) experienced similar findings in their study and acknowledged the limitations in helping students establish a

growth mindset. The recommendations of this study focused on helping students gain an awareness of their mindset and on influencing the purposeful application of growth mindset strategies. Providing the mindset awareness training before students enter college is an important step in a successful transition to college.

The recommendations in the project for this study also address the need for growth mindset reinforcement throughout the education cycle. Future research could explore the academic and social experiences in college that may alter the students' incoming mindsets. To continue my research at the study site, I may conduct a longitudinal case study using a set of incoming students that I could follow throughout their education and into their full-time career placement. Another approach for future research could be to explore the mindsets and teaching approaches of the faculty who teach incoming students during the transitional first year of college. The study could focus on determining how the faculty approaches affect the stability of the students' mindsets.

Conclusion

Applying mindset interventions as strategies to help students begin their college education with the framework for success is proving to be effective and scalable across the national higher education landscape (CCCSE, 2019). As mindset awareness training has evolved, it has been used to improve student success and decrease academic gaps.

A goal of this study was to identify the mindsets of incoming students and determine whether there were significant differences in mindsets between nondevelopmental and developmental education students. Another goal was to determine

if mindset awareness training could affect a shift towards a growth mindset. The findings of the study indicated little differences in incoming mindsets among students. Although pretest scores reflected students' mostly growth mindsets when entering college, the students could still strengthen their growth mindsets through mindset awareness training.

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Appendix A: The Project

Early Mindset Intervention

Sets the Foundation for Student Readiness

Eileen Steffan

Executive Summary

The higher education landscape has shown a trend of declining enrollment requiring colleges and universities to address competitive higher education environments with a heightened focus on student services to support the academic and social growth of diverse student populations. Support strategies at some colleges have included a noncognitive intervention, mindset awareness training, based on the mindset theory of Dweck that has shown persons with a growth mindset may apply more effort to learning experiences because they believe they can change traits such as their intelligence. Students who apply a growth mindset approach to education may pursue more challenging educational goals. Mindset awareness training, as an early intervention at the beginning of students' transition to college, can influence a growth mindset approach.

I studied the effect of mindset awareness training on students' mindset scores during their first-quarter on campus. Findings indicated that the vast majority of students entering the College had a mostly growth mindset at pretest, regardless of developmental education status. Post training mindset scores indicated increased growth mindsets.

These findings influenced the development of recommendations that focus on facilitating students' proactive application of a growth mindset to achieve education goals through a plan to re-engineer the College's current mindset awareness training program to increase its effectiveness. The goal of the recommendations is to adjust the structure of the mindset awareness training and incorporate follow-up mindset activities at various stages of the students' education cycle to influence a continued growth mindset approach to their education.

Introduction

This policy recommendation addresses how mindset awareness training can be proactively used to prepare students at the College, influence their approach to learning, and improve student success. The College conducted mindset awareness training for first-quarter students that provided students with information on the mindset theory followed by a mindset self-assessment and interpretation of results, with the intent that students would be motivated to adopt growth mindset success strategies. In my study, I explored the current noncognitive mindset awareness training to determine whether it influenced the students' mindsets. The recommendations included in this paper are based on the study findings involving this College and supported by a review of literature on noncognitive interventions, developmental education, growth mindset, and new student orientation.

Foundation of Student Success

Higher education institutions strive to increase student success. Increased student access to college provides students with educational opportunities as well as challenges. Students are entering college with varying levels of academic proficiency, educational backgrounds, and personal experiences. Many students enter college unprepared for the academic rigor and learning strategies needed to succeed (Bailey & Jaggars, 2016; Hoyert et al., 2019). To address this lack of preparation, colleges are implementing strategies that provide academic and personal support to first-year students to increase student success (Wright et al., 2017), including placing 67% of college students in

developmental education courses (Center for Community College Student Engagement [CCCSE], 2016).

Colleges and universities implement developmental education courses to close the gap of student academic underpreparedness. Bailey and Jaggars (2016) reported that over half of the students who enter community colleges are identified as underprepared for the academic rigor in college courses, yet these authors found that developmental courses applied as a single intervention did not have a long-term effect on student success. Many colleges are exploring the range of factors that influence student readiness and including these factors in the strategies developed to support students.

Colleges facilitate specialized programs to support students' transition to college and set the foundation for student success. Colleges have experimented with adding noncognitive interventions such as mindset training along with cognitive developmental interventions (Bailey & Jaggars, 2016). Students' mindsets represent their beliefs about their intelligence and ability to learn (Dweck, 2015). The administration of mindset interventions may prompt students to create an education plan with clear goals. Dweck (2016) suggested that educators should provide growth mindset knowledge to students as well as techniques to clearly calculate what it takes to achieve their goals.

Many colleges have incorporated strategies to influence a shift towards a growth mindset to improve student success (CCCSE, 2019). Colleges have combined developmental education interventions and mindset interventions to address cognitive and noncognitive factors that may impact student success (Mills & Mills, 2018).

Purpose of the Study

The College provides mindset awareness training to first-quarter students as a component of the student readiness course. The mindset awareness training provides students with information on growth and fixed mindsets; students also take a mindset assessment to gain insight into their mindset. To determine the influence mindset training had on the first-quarter students, a quasi experimental mixed research study was conducted using archived data from 739 first-quarter students enrolled in the student readiness course. Missing scores left the dataset with 724 pretest and 438 posttest mindset scores. To enable more delineated analysis, the student data were categorized by nondevelopmental (non-dev) and developmental course status. The developmental education students were further delineated by those students were actually enrolled (dev-enrolled) in developmental courses and those who were placed (dev-placed) but not yet enrolled.

Quantitative Analysis and Findings

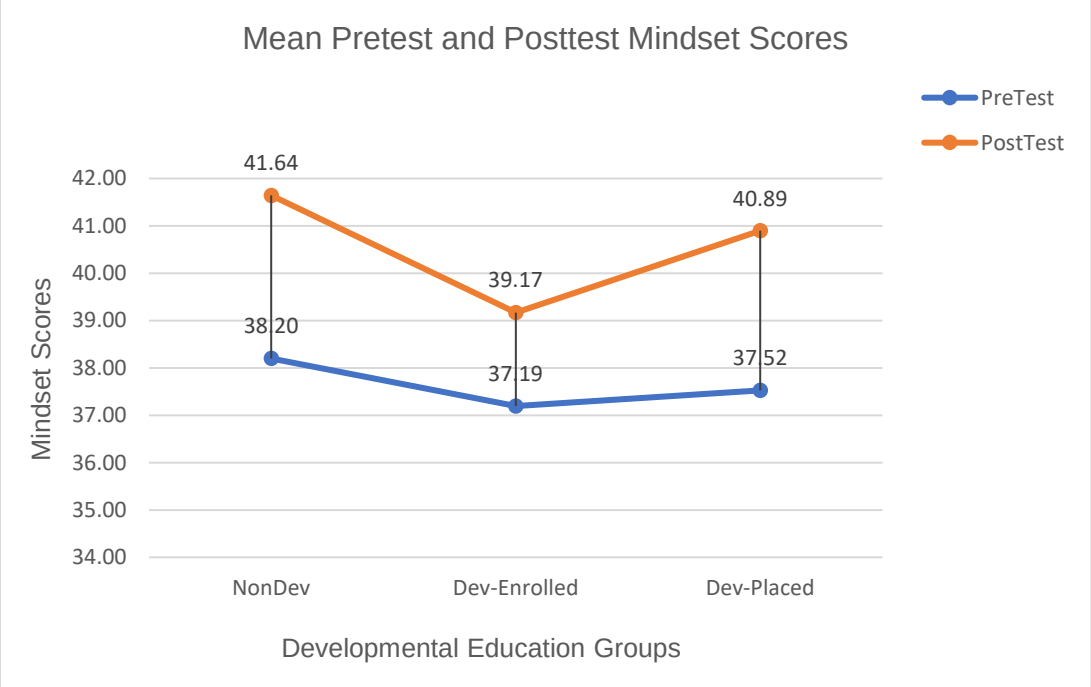
High mindset pretest scores and the large number of missing posttest scores created data imbalances that hindered the ability to meet the assumptions of several advanced statistical tests. The possible mindset scores ranged from 0 to 48; students with a mostly growth mindset had scores between 33 and 48. Of the pretest mindset scores, 79% were in the mostly growth mindset range.

There were no significant differences in the pretest mindset scores across the developmental education categories, nor were there significant differences between the mindset change scores across the developmental education categories. However, there

was an overall significant increase in mindset scores from pretest to posttest ($p < .001$). Figure 1 shows the increase from pretest to posttest for all developmental education categories.

Figure 1

Mean Pretest and Posttest Mindset Scores for Developmental Education Groups



Challenges of Transitioning College Students

Students' transition to college is a period of adjustment and preparation. During this transitional period, students become acclimated to the college, gain an understanding of the academic expectations, and become connected to the college community (National Orientation Directors Association, 2014; Venezia & Jaeger, 2013). However, this exciting new phase in a student's life may be an anxious time if the student is not

equipped to navigate the college environment. Students' lack of college readiness may stem from academic deficiencies including the personal frame of mind to succeed (Venezia & Jaeger, 2013). Academic preparedness sets the foundation for students to meet the academic rigor of college courses, but it takes more than cognitive skills to adjust to college and experience student success. Non-cognitive factors such as student self-efficacy, sense of belonging, and student mindset contribute to the student's acclimation to the new college environment (Chan, 2017; Venezia & Jaeger, 2013).

New Student Orientation Programming

New student orientation (NSO) programs that normally occur prior to students' first term are often used to acclimate students to the college resources and processes, as well as provide an opportunity for students to meet key people from the college (Chan, 2019). The NSO structure provides a venue for higher education institutions to provide college readiness interventions to incoming students (Han et al., 2017). The purpose of the NSO is to provide resources and training ahead of the start of the students' education to reduce obstacles that could prevent student success (Hallett et al., 2020). The NSO program may include training in noncognitive skills that will help students connect with the campus community and strengthen self-efficacy (Han et al., 2017). Hughes and Smail (2015) suggested that colleges and universities should implement new student transition strategies that promote positive thinking and behaviors.

Benefits of Mindset Awareness Training

Colleges and universities are implementing first-year student experience programs designed to acclimate students to the college environment and academic expectations

(Jaijairam, 2016). Many colleges are including noncognitive interventions in the first-year college experience programs (CCCSE, 2019). Examples of first-year experience program components include study skills, financial literacy, belonging activities, and mindset interventions. The intent in addressing noncognitive skills is to help students reframe their perspective and approach to achieving education and career goals (CCCSE, 2019). Noncognitive interventions such as mindset awareness training have been found to have a positive influence on students' approach to education and have resulted in increased student success, especially with underrepresented racial/ethnic students (Broda et al., 2018; McCabe et al., 2020). McCabe et al. (2020) noted that introduction to the mindset concepts does not create academic change immediately; rather, it takes student buy-in and application of the growth mindset strategies to achieve improved outcomes. A study was conducted at Michigan State University in which incoming students from underserved ethnic minority populations attended a 2-day summer orientation program where students participated in a mindset group that introduced the growth mindset concepts or a comparison group that reflected on stories of the basic adjustments students must make when starting college such as learning how to get around campus. The college tracked the students over the first two semesters, recording their grade point averages, number of credits taken, and courses taken. The findings of the study indicated a significant increase in the first semester grade point average of Latino students who participated in the mindset group versus the comparison group. These findings supported the idea that it is possible to influence academic success with growth mindset interventions for underserved students (Broda et al., 2018).

Another example of the benefits of early mindset intervention is the Productive Persistence methods developed at Seattle Central College that address noncognitive aspects of learning including students' learning beliefs, their perception of the subject matter, and their sense of belonging. The college initiated the Productive Persistence activities in precollege math courses in 2013, and over the years incorporated them into many academic programs as well as the new student orientation program (CCCSE, 2019). Based on the success of the Productive Persistence in the precollege math courses, Seattle Central College included in its 2015–2020 Educational Master Plan an expansion of the program to all classes (Seattle Central College, 2020). I reflected on the findings of the Michigan study, the Productive Persistence activities of Seattle Central College, and the findings in my study, particularly the comparatively large shift in mindset with the dev-placed group who had not yet started their developmental coursework. A precollege introduction to the growth mindset concepts could set a foundation for success and affect the education trajectory of all students, and particularly the developmental education students, at our College.

Recommendations

Acclimating students to college, setting academic expectations, and equipping students with the tools needed to be more self-directed at pursuing and achieving their goals are important components of a college's student success strategies. The College currently offers student readiness courses and resources that acclimate new students to the College, assess their academic preparedness, provide study skills strategies, explore goal setting, and introduce mindset concepts, as well as assessing the students' mindsets.

In the recommendations listed below, I propose a more proactive method of using the mindset awareness training and self-assessment information to better engage students in purposeful use of their mindsets to achieve academic and career goals.

Recommendation 1: New Student Orientation (NSO) – Mindset Awareness Program

The mindset awareness training should be moved from its current location in the student readiness first-quarter course and added as a session in the NSO program. A review of the current mindset awareness training should be conducted by members of the admissions and education team, and recommendations for revision should be made to align with the NSO objectives.

Recommendation 2: On-Campus and Online Mindset Orientation Programs

The mindset awareness training should be developed to accommodate both on-campus and online modalities. Delivering the orientation mindset program across both modalities will provide needed flexibility in reaching all incoming students. The online mindset program should be developed using the learning management system and digital resources used in the students' academic courses to reinforce consistency of resources and processes.

Recommendation 3: Mindset Interpretation

The NSO mindset program should include the student mindset self-assessment and interpretation of the scores. An important component of the mindset awareness training is helping the students understand their mindsets and how it can help or hinder them from achieving their goals. This training component will be the basis of a

discussion on clearly understanding what it takes to accomplish their academic, personal, and career goals.

Recommendation 4: Mindset Reinforcement

The research has shown that one mindset training session may not be enough to bring about mindset change that will affect student success (McCabe et al., 2020). Mindset reinforcement should be incorporated into the students' education cycle. Reinforcement activities including reading updated mindset information and discussions can be built into the existing student readiness and professional development courses in the curriculum. During the annual curriculum review, academic teams should indicate appropriate areas of the curriculum where mindset reinforcement activities can be incorporated. The reinforcement activities may be developed to include online resources that can easily be incorporated into existing curriculum.

Conclusion

Many students, and especially high-risk students with academic deficiencies, socioeconomic challenges, and lack of belief in their abilities, enter college unprepared to succeed. Preparing students to address the demands of college helps the individual student, the college, and society.

Colleges that implement strategies to address academic and noncognitive skill deficiencies are investing in student success. Interventions such as mindset awareness training are developed and implemented to help students realize their full potential. Unfortunately, one single strategy will not remove the student inequities and enable all

students to be prepared for success. Rather, it takes a blend of cognitive and noncognitive strategies implemented and reinforced over time to affect student success.

The review and adjustment of strategies already implemented at the College provides the opportunity to make great strides in improving student outcomes. The revamping of the mindset awareness training can be the first of several student success strategies reengineered to meet the current needs of the students and College.

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