

ACHIEVEMENT GOALS AND ENGAGEMENT OUTCOMES
IN THE SECOND SEMESTER OF FOURTH-YEAR
HIGH SCHOOL MATHEMATICS COURSES

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ABSTRACT

The second semester of the high school senior year has been associated with a lack of motivation among students and increased frustrations among parents and teachers. This qualitative study examines the achievement goals and engagement outcomes of second semester high school seniors in their mathematics classes. Data were collected from eight high school seniors, three of their parents, and two teachers enrolled at an all male college preparatory school in Pennsylvania. In-depth interviews were used to gather participants' definitions of success prior to their senior year and during the second semester of their senior year. Student participants' behavioral, emotional and cognitive engagements were assessed through directed interview questions and observations. Data were analyzed using a three goal framework of task-involvement, ego-involvement, and work-avoidance (Nicholls, Patashnick, & Nolen, 1985). The participants' definitions of success suggested four themes. First, student participants defined success in mathematics consistently as they recalled their four years of high school and transition into the second semester of their senior year. Second, the phenomenon of senioritis was found to be more perceived than real for most of the participants. The work-avoidant participants described feeling the effects of senioritis for most of the second semester whereas the task-involved and ego-involved students reported brief effects before regaining focus. Third, students' achievement goals in mathematics were found to be more closely aligned to their parents' goals and less aligned to their teachers' goals. Lastly, students described different achievement goals from one class to another during the same semester, at times even within the same discipline. Implications for practice and suggestions for future research were also discussed.

This dissertation is dedicated to
Elizabeth, Sofia, Amelia and Caralina.

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CHAPTER 1

INTRODUCTION

Who would be considered more stubborn: high school seniors who have decided that the second semester is no longer important, or the teacher of those seniors, who is attempting to convince them otherwise? Over eleven years of teaching mathematics, I observed a phenomenon in my students: despite my efforts to keep them on track, there were second-semester seniors who were resigned to coast through to graduation. I witnessed students of all abilities turn off an academic switch as if all of the pressures that had built up over the previous eleven-and-a-half years had vanished. I believed the phenomenon was a mindset, and it was my goal to change that mindset, to change the culture of what the students called “senioritis.”

Senioritis, according to *Merriam-Webster* dictionary, refers to “an ebbing of motivation and effort by school seniors as evidenced by tardiness, absences, and lower grades” (senioritis, 2013). The ebbing of motivation of once-diligent students has frustrated many of my colleagues over the years. Some of my colleagues attempted to fight back with harder projects, harsher grading, and more homework. After-school detentions were given to students who failed to submit homework assignments. Other teachers attempted to use very easy assignments, lenient due dates, multiple-resubmission allowances, and no-out-of-the-classroom-assignments policies as a means of motivating students. It was hoped that the feeling of success produced by such approaches would spark student interest, and, therefore, students would be more motivated. However, none of these approaches reflected an attempt to understand the students’ perspective. For

example, are they satisfied with their behaviors? Would barely passing, but passing, be considered successful for some students?

I began my research by focusing solely on students who exhibit “senioritis” in their mathematics course and found this path only offered a partial answer. There were also students whose motivation did not decrease. These students remained motivated in their study of mathematics; some students even increased in their motivation while classmates slacked off and teachers attempted to keep the semester from unraveling. By understanding the motivated students’ definitions of success in mathematics, I hoped to see a broader picture of this phenomenon. Is there something about the motivated students’ personal goals in mathematics class that helps them avoid senioritis? A fuller understanding of the experiences of students with varying definitions of success would then provide insight for educators of high school seniors and, in turn, help to inform policy. This policy would then help parents and teachers stave off senioritis in future senior classes.

This research study used qualitative methods to understand, describe, and interpret the phenomenon of senioritis as understood by high school seniors, their parents, and their teachers during the second semester of fourth-year math courses. The introductory chapter of this dissertation will be organized with the following sections: (a) overview of the problem, (b) theoretical framework, (c) statement of the problem, (d) purpose of the study, (e) research questions, (f) significance of the study, and (g) conclusion.

Overview of the Problem

To gain an understanding of the decrease in motivation toward academics as secondary school draws to an end at the research site, a more global view is necessary to provide perspective and add context. This phenomenon may be universal; however, the term *senioritis* is uniquely American (Kirst, 2000). Aware of the phenomenon, the United States Department of Education created the National Commission on the High School Senior Year (NCHSSY) in June of 2000 (Conley, 2001; NCHSSY, 2001a). The commission was convened with the goal of evaluating the high school senior year and making recommendations toward increasing productivity during the senior year. These recommendations included establishing a K–16 system of education, developing more rigorous alternatives to the traditional senior year, and raising educational achievements and aspirations for all students, not just those on a college trajectory (NCHSSY, 2001a). These recommendations have been echoed in the literature regarding senioritis, which have been predominantly prescriptive, focusing on preparation for postsecondary life by making the twelfth grade more pertinent to the student’s future goals.

The NCHSSY (2001a) reported that nearly all Americans will require at least two years of training or education after completing high school. This includes those students attending college and those who require postsecondary education in a particular trade. According to Conley (2001), the “fundamental problem of senior year” (p. 26) is the linkage between high schools and postsecondary institutions. Presumably, the purpose of high school is to prepare students for the world after high school; however, studies have found that the standards for course work are different between what students are taught in high school and what is expected of them in their postsecondary institutions (Kirst &

Venezia, 2004). The deficiency in the utility of the senior year, Kirst (2000) argues, “reflects the deep disjuncture between post-secondary and K–12 education” (p.1). The consequence of this disjuncture is that there are no incentives and no motivation for students to work diligently in school, especially in their senior year.

In a contribution to a college search website, high school senior Alison Graham (2013) details four stages of senioritis: excitement, complacency, detestation, and nostalgic reflection. Seniors are excited about the end of high school and the anticipation of moving on to college. Complacency sets in when students don’t want to fail, but also don’t want to do anything about it. They then begin to detest having to attend classes and follow rules. And finally, during the last few weeks, seniors get nostalgic and reflect on their high school experiences. No matter what the stage, if you ask any senior, he will tell you, “There is no cure for senioritis.”

My colleagues have often discussed what possibly causes the seniors to slack-off in the second semester. Basically, they think the students are lazy, and, since they have reached their goal of getting into college, the seniors feel as if they have nothing more to prove. Popular and academic literature provides many theories regarding the causes of senioritis, some not dissimilar to those of my colleagues. For example, a sense of entitlement (Dreis & Rehage, 2008), or a perceived reward for attending school for twelve years (Conley, 2001), has been identified as causes. After attending school for eleven years, students believe their hard work has been recognized by college admissions offices and that these offices put little or no emphasis on the final semester of high school. Even high-performing students speak of the second semester of senior year as a time of well-earned relaxation and fun (Kirst, 2000). Perhaps it may even be the

monotony of going through the same school-day routine for twelve years, leading students to become bored (Dreis & Rehage, 2008).

In his school newspaper, high school senior Ryan Thomas (2015, para. 4) wrote “it does appear that the school has given seniors a reason or two to slack off).” The first reason is “unavoidable,” the seniors are leaving for good. They no longer need to impress teachers or worry about their reputations as good students. A second reason proposed by Thomas is that seniors are taking at least one class they do not need to graduate. They know how many credits are needed to graduate, making some courses inconsequential. Since most colleges have already accepted the senior, grades or GPA are no longer a concern. College counselor Marie Morris agrees. In her blog she suggests that students are bored (Morris, 2015); they are not engaged in learning because of lower workloads or easier classes.

She further discusses four other causes: parental apathy, fear of change, burnout, and excitement about graduation. Parental apathy, though usually unintentional, can be perceived by students as, since their parents are not constantly pestering them about school, their parents no longer value homework or test scores. Next she describes a fear of change from the high school environment to an uncertain future. It is also possible that some decrease in student motivation is to the result of their feelings of uncertainty about the future. Life after high school is vastly different from what students have experienced in twelve years of formal schooling. A relaxed attitude toward academics may be a way of avoiding the anxiety of contemplating life in the postsecondary world (Dreis & Rehage, 2008). This is a very intriguing proposition that may reveal that seniors employ

deeper thought processes than are suggested by the outwardly immature behavior observed by others.

After spending the first semester bombarded with numerous applications, fees, forms, essays, etc... new pressures surface at the beginning of the second semester. Topics in their math classes increase in difficulty. Pressure and tension builds as students await acceptance (or denial) letters from the colleges of their dreams. Weeks go by and, by time they receive that letter, they are filled with so much anxiety. Students are often met with “a barrage of unwelcome and inappropriate questions from prying adults” (Shellenbarger, 2017, para. 4). They can become overwhelmed and feel burnt out from all of the pressure, especially for students that plan to take an AP Calculus or AP Statistics exam. This feeling subsides over the semester and towards the end of the second semester the predominant feeling is one of excitement. They have taken their AP® exams and the future is about to open up for these students. College and careers will begin for them in a few short months. With all of these decisions and ranges of emotion, what drives a student to engage in achievement situations, particularly engaging in their second semester mathematics class?

Theoretical Framework

To better understand the high school senior’s purpose for engaging in achievement situations, this study views the student’s experiences through Achievement Goal Theory (AGT). AGT came to the forefront as a prominent achievement motivational theory in the early 1980s, pioneered by the individual and collaborative research of Martin Maehr, Carole Ames, John Nicholls, and Carol Dweck at the University of Illinois (for detailed history see Anderman & Patrick, 2012; Elliot, 2005).

AGT has been used in many achievement-oriented domains (e.g., business, sports), but its predominant use is in the field of educational research. For this study, I used the constructs of task orientation, ego orientation, and work avoidance (Nicholls, Patashnick, & Nolen, 1985).

Nicholls' and his colleagues' work on AGT explores how people, in achievement situations, evaluate their ability and define what would be a successful outcome for them in that situation (Duda, Chi, Newton, Walling, & Catley, 1995). Nichols (1984) describes two conceptions of ability. Students that use the differentiated conception of ability would evaluate their own ability based on their level of effort in a task in comparison to their peers. The undifferentiated conception would be more self-referenced when deciding about task difficulty and ability. Student would say that effort would lead towards more learning.

Students have a personal theory of achievement about what would be success in achievement tasks. The two dimensions of task and ego orientation “embody two different definitions of success, which is to say, different goals” (Nichols, Cobb, Wood, Yackel, & Patashnick, 1990, pg. 110). Their concepts of ability are embedded in within these achievement goal orientations, where goal orientations act as the purpose for engaging (Treasure & Roberts, 1994). Nichols, et al. (1990) describe these two orientations further:

To ego-oriented students, it was expected that the concept of ability would be very important and that success as they define it would be seen as dependent on superior ability. To task-oriented students, however, concepts of learning, understanding, and effort should be important and attempts to make sense of mathematics should appear essential for success. (p. 110)

Students that approach an activity as task oriented utilizing the undifferentiated conception of ability would focus on developing skills and demonstrating mastery based on maximum effort and self-references (Treasure & Roberts, 1994). These students would display positive achievement behaviors regardless of ability level (Duda, et al., 1995). Students that approach an activity as ego oriented utilizing the differentiated conception of ability would focus the amount of effort needed to demonstrate superior ability. When competence is in doubt, the result would be negative behaviors (e.g. lack of effort). However, when students are highly confident in their ability, the result would be positive achievement behaviors.

The addition of the construct of work avoidance is particularly useful, since some seniors seem to exhibit this goal as the end of the year approaches. Work avoidant students “deliberately avoid engaging in academic tasks or attempt to minimize the effort required to complete academic tasks” (Dowson & McInerney, 2001, p. 36). Depending on these conceptions of ability, a student would determine their level of cognitive, affective, and behavioral engagement in an achievement task. Therefore, I have incorporated the three achievement goal framework into the study in order to better understand how these achievement goals drive students’ definitions of success (their personal goals) and influence their levels of engagement.

Engagement is often conceptualized and used interchangeably with the ideas of commitment or investment in achievement activities (Fredricks, Blumenfeld, & Paris, 2004). Fredricks et al. (2004) posit school engagement as the unification of behavioral, emotional, and cognitive components and present engagement as malleable and ranging in levels within the three components of engagement. Behavioral engagement refers to a

student's positive or negative levels of participation in school-related activities, for example completing homework, participating in extracurricular activities, or misbehaving in class. Emotional engagement focuses on affective aspects of engagement such as boredom or interest. This component also includes students' feelings toward academics, peers, and the school. Cognitive engagement involves the thought processes involved in the decision to exert effort or go beyond the minimal requirements. Helme and Clarke (2001) define cognitive engagement as "the deliberate task-specific thinking that a student undertakes while participating in a classroom activity" (p.136). Cognitive engagement is similar to behavioral engagement in terms of the exertion of effort. The difference is that behavioral engagement refers to an action, and cognitive engagement refers to a desire to act (Sciarra & Seirup, 2008). The research on the desire to act and investment in learning has been shown to be related to motivational goals (Fredricks et al., 2004).

Statement of the Problem

In all three of the college prep schools where I taught, students were required to take four years of mathematics. In the seven years that I taught seniors, I noticed a pattern of behavior that intrigued me. A majority of the seniors began to slack off, to care less about, and do less in their study of mathematics. However, there were also students who pushed through to the last day. These students submitted homework on time, came after school for tutoring, devoted numerous hours to their final projects, and participated in class discussions. This disparity was not limited to students in low-level mathematics courses; both the academic and honors courses I taught had students who became less motivated and those who exhibited an increase, or were consistent, in their motivation.

The research site is a college preparatory school with a four year mathematics requirement. Every student takes a calculus based math course in his senior year and close to 100% of the school's graduates enrolled in postsecondary education after graduation. These graduates attend college with the habits learned in their first twelve years of education. Any bad habits developed in the second semester of their senior year due to senioritis may carry over into their college careers, forcing some of those students to drop out before graduating from college. Others with ingrained bad habits may find their scholarships reduced or revoked due to insufficient grades in their first years of college. During their first twelve years of schooling, students were cautioned by parents and teachers of the consequences of developing bad habits. Given that these students are cognizant of what may come, why do they avoid working hard, fail to submit homework, or refuse to study for tests in their mathematics courses? The answers may lie in their achievement goals for the semester.

For some students, the goal for the semester is to just get by, exerting the least amount of work until graduation. In contrast, students may have the goal of learning mathematics to prepare for college academics. They demonstrate good study habits and continue to work hard through accomplishments and defeats. They do not always earn the highest grades, but they participate and take interest in class. Their definition of success may offer a better understanding of why they continue to be engaged in their math courses. What insight into their goal constructs can be gleaned and used to strengthen the engagement of the students who become disengaged in mathematics?

Purpose of the Study

The purpose of the study is to describe the lived experiences of high school seniors at a college prep school who are enrolled in a fourth-year math course. More specifically, the study aims to understand and describe student engagement in their fourth-year math course as it relates to the students' definitions of success and their achievement goals. A qualitative inquiry was designed to collect students', parents', and teachers' definitions of success, revealing their achievement goals, and understand student engagement. The following questions were used to guide this inquiry:

1. How do students, their parents, and their teachers define personal success in mathematics as it relates to second-semester high school seniors who are in their fourth-year math course?
 - a. What is the relation among student, parent, and teacher definitions of student success in mathematics?
 - b. How do different definitions of success in mathematics relate to student behavioral, emotional, and cognitive engagement in the course?
 - c. Do these definitions reveal the phenomenon of senioritis and how does the phenomenon affect achievement goals and engagement outcomes?

Significance of the Study

I have seen many college-bound students focus on grades and define success in terms of the number of college acceptance letters they receive. As students in college preparatory schools become increasingly ego-oriented, they may exhibit a greater tendency to slack off in the second semester of their senior year. Some students apply for early action or for rolling admissions, and a majority of these students receive acceptance

decisions before they take their first-semester exams. With many colleges and universities making acceptance decisions by December (Kirst, 2000), the remaining students receive their acceptance (or denial) letters by March. Once their academic futures are known, students have accomplished their goal of being accepted to college, fulfilling what they had defined as success. Students then create new goals and consider the second semester a time to relax. This lack of motivation to do anything academically may come with repercussions that are irreversible, most notably the loss of an academically based financial scholarship or the rescission of admission to college altogether (Cecelia, 2005; Strauss, 2004).

The current study had a broad focus to not only include students, but also included their significant others (i.e. parents and teachers). Students who just want to get by in math class with little effort, students who want to learn as much mathematics as they can, and students looking to best their classmates in mathematics were examined. This will allow for a description and interpretation of differences in motivation to compare antecedents and engagement patterns. High school math teachers, future researchers, and other stakeholders can use the findings of this study to keep their seniors motivated and engaged in their second-semester math courses and to determine the importance of the fourth-year math course requirements. The literature suggests that students who complete an intensive math course, such as Precalculus or calculus, are more likely to earn a bachelor's degree (Trusty & Niles, 2003). Perhaps schools could conduct awareness programs about the academic rigor students will face in college or the utility of the fourth-year math course.

The scarcity of academic research on the achievement goals of high school seniors in a fourth-year math course has left a gap in the literature. A quick Internet search will provide a reader with hours of humorous anecdotes and opinion pieces on the goals of those “suffering from senioritis,” but little in the way of scholarly, peer-reviewed research. A qualitative study conducted by Urdan and Mestas (2006) on high school seniors focusing on performance (ego) goals is one of the few examples of scholarly research addressing similar research questions as research here. In that study, the authors interviewed 53 high school seniors to obtain purposes for pursuing performance goals. The current study expands on their discussion to include task and work avoidance orientations and describe how these goals mediate engagement outcomes.

Conclusion

A decrease in motivation or a change in goals in the second semester of senior year of high school can be seen across disciplines and begins at different times throughout the semester (Hoover, 2003). The current study looks at achievement goals and engagement in mathematics because my experience lies in teaching mathematics. Concentrating on how students make meaning of the phenomenon in senior mathematics courses, as well as limiting the duration and location of the study, exploits my knowledge and experience of teaching mathematics for eleven years. My knowledge, teaching experience, and familiarity with the research site allowed for a deeper understanding and more accurate interpretation of the lived experiences of the student participants.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The following literature review provides a discussion of relevant studies regarding the high school senior year, achievement goals of students, parents and teachers, and engagement outcomes of students with a focus on high school mathematics courses. Studies with primary or post-secondary school populations were limited in this review to include only those articles that provide support to claims made on a high school population. This chapter is broken down into parts to provide ease of reading: (a) importance of the senior year, (b) achievement goals and achievement goals theory, (c) engagement outcomes, and (d) conclusion.

Importance of the Senior Year

In the second semester of their senior year of high school, students find that they lack purpose (Sizer, 2006). College and job applications are sent off and all of the stress of the grade game no longer has its hold on students. In the last few months of the school year, students begin to show signs of disengagement. Some adults point the blame at the students and the students' tendency to be self-centered. Heller (2001) writes, "if [students] are disengaging, then one of two fallacies will occur: (a) the world will work harder to bring them back, or (b) the world never cared in the first place, which is why they disengaged" (p.17). Other scholars point towards the educational system and the discontinuity between high school and post-secondary endeavors (NCHSSY, 2001a). Students enroll in courses that are appealing for college admissions with little regard for

their own personal interests (Sizer, 2006). High schools, too, are reluctant to change their college preparatory curriculum because they feel it may have a negative effect on college acceptances (Conley, 2001). Students enroll in, and high schools offer, numerous Advanced Placement® (AP ®) courses to demonstrate success in college level academics with little or no intention to pursue those fields in their future studies.

National Commission on the High School Senior Year

In 2001, the National Commission on the High School Senior Year (NCHSSY) held three formal meetings to discuss the senior year. Attendees were leading experts and stakeholders from across the United States. During these meetings, attendees reviewed relevant literature, heard testimony from experts in the field of education, and discussed remediation for the issues that were discussed. The NCHSSY produced two documents: *The Lost Opportunity of the Senior Year* and *Raising Our Sights*. The first document described issues related to the high school senior year and mainly focused on a connection of curriculum from P–16, preschool to college graduation. In the second document, subtitled *No High School Senior Left Behind*, the commission proposed the “Triple A Program” as strategy to once again engage high school seniors. In this plan, alignment would be improved, achievement would be raised, and alternatives would be more rigorous. Similar calls for alignment, achievement and alternatives have been promoted by programs like the Common Core State Standards (www.corestandards.org) and the redesign of the SAT® (<http://deliveringopportunity.org>).

The NCHSSY (2001b), in clarifying their beliefs on the senior year, asserted that “instead of functioning as a rest stop between the demands of elementary and secondary education and whatever follows, the final year should serve as a consummation of what

already has been accomplished and a launching pad for what lies ahead” (p.11). The senior year should not be a repeat of the previous eleven years. The senior year, according to the NCHSSY, should be when a student synthesizes everything learned over the first eleven years into an outcome (capstone project, internship, college level courses) that will prepare the student for the following years.

Preparation for College

In the United States, the first year of college has the highest drop-out rate compared to any grade level before or after (Sizer, 2006). In a search for answers, resolutions are not focusing on first-year university students; rather, scholars point towards the high school senior year as the key to college success. The strongest predictor of bachelor’s degree completion is the intensity and quality of a student’s high school curriculum (Adelman, 1999). The senior year, specifically, “should be spent preparing for the rigorous coursework required in college” (Kowski, 2013, p.516). Taking challenging courses in the senior year instills in students numerous habits that are beneficial for college success.

Conley (2008) presented four facets of college readiness—key cognitive strategies, key content knowledge, academic behaviors, and contextual skills and knowledge. In terms of math learning, cognitive strategies include analysis, interpretation, problem solving, and reasoning. Key mathematical content knowledge refers to more than a formulaic understanding of math. A student should be able to extract relevant information from a problem, solve the problem, and interpret the solution in context. Academic behaviors describe study skills, persistence, utilization of resources, and time management. Context skill and knowledge focus on the ability to work with the

diverse populations found on college campuses, an understanding of the social norms and expectations expected of college students, and a demonstration of leadership skills.

All four facets described by Conley are developed in advanced course sequences in math. Students in Algebra II or higher require analyzing, interpreting, and problem solving in real world situations skills (Kowski, 2013) to be successful. In contrast, students who do not take an advanced course in math are more likely to struggle in their first college math course. Those who do not take a course beyond Algebra II are often required to take non-credit, remedial courses, and, according to Kowski, may score below their actual mathematics ability on placement exams.

Looking back, many students report feelings of disappointment in their own academic performance during their last year of high school (Sizer, 2006). The students reported their enjoyment of the freedoms afforded to them, but were surprised by the stress caused by the uncertainty of their future careers and finances. The students “found themselves unable to handle the number of deadlines and their own procrastination” (Sizer, 2006, p.154). Perhaps high school seniors are not emotionally ready for the stresses brought on by an impending graduation. Many challenges await the graduating senior, and, for those intending to transition to college, these challenges go beyond financial concerns.

Hernandez-Martinez et al. (2011) investigated the transition from secondary education to college of students continuing their math education from students’ perspectives before and after transition. They found that the stories of troubled or problematic transitions were balanced by positive challenge, growth, and achievement. Students in their study expressed concerns about the social aspects of the transition, the

continuity of the high school and post-secondary mathematics curricula, and their personal progression as individuals. These students faced similar issues at other transitional stages in their life (elementary to middle school, middle school to high school, etc...) but found the transition to college the most imposing in scope. With the transition comes a major change in the social scene and greater expectations for independent work than students had previously experienced in high school.

To adapt to these changes, students need to prepare prior to the high school to college transition. Students acknowledge that mathematics is important and useful, but mathematics in itself does not inspire students to continue to take mathematics courses (Middleton, 1995). Staying motivated and engaged in high school mathematics classes can prepare students intending, or required, to take a mathematics course in college. Those students that exhibit signs of senioritis and decrease their motivation may not be prepared for the transition into their college mathematics courses. Therefore it is important to understand the purpose students either engage or disengage in their second semester mathematics class

Achievement Goal Theory

In one of its early conceptions, achievement goal theory focused on students being task-oriented (i.e., focus on developing skills) or ego-oriented (i.e., focus on demonstrating superior ability). These orientations are the students' predispositions towards achievement situations. When a student is engaged in a specific task, for example in a sport, they would be task-involved or ego-involved in that task. Duda et al. (1995) explain:

When in a state of task involvement, perceptions of sport ability are self-referenced, the execution of the task at hand is of major concern, and

subjective success is based on personal improvement and learning. When ego-involved, individuals compare their performance and exerted effort to others in judging their own ability. In a state of ego involvement, the focus while performing is on the adequacy and demonstration of one's athletic ability and people feel successful when they have outperformed others (especially with less effort). (p. 41)

In recent years, the constructs of mastery goal orientation (similar to task orientation) and performance goal orientation (similar to ego orientation) have attracted a good amount of attention and are used to collectively describe the two conceptions of ability (Ames, 1992). Mastery-goal orientation, and by extension task orientation, has been often described as an adaptive form of motivation (Dweck, 1986), whereas the adaptiveness of performance (ego) goal orientation has been the center of many debates in the literature (Brophy, 2005; Grant & Dweck, 2003; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Midgley, Kaplan, & Middleton, 2001; Senko, Hulleman, & Harackiewicz, 2011). These goals have been further separated into approach and avoidance forms. A mastery-approach goal is a striving to improve skills whereas a mastery-avoidance goal is a striving to avoid losing skills. A performance approach goal is a striving to outperform others whereas a performance-avoidance goal is a striving to avoid doing worse than others (Senko et al., 2011). A third goal, work avoidance, has been considered to be maladaptive (Jarvis & Seifert, 2002; Seifert & O'Keefe, 2001).

Students who are task-oriented engage in achievement tasks for the sake of learning and bettering their understanding of the material (Meece, Blumenfeld, & Hoyle, 1988; Nicholls et al., 1985). These students see developing knowledge or skills, mastering a task, and improving on previous results as fulfilling and successful. Task-oriented students feel more intrinsically motivated, focus on trying hard, and succeed when working collaboratively (Nicholls, et al., 1985). These students are more willing to

take on challenging tasks (Dweck, 1986) and attribute success to effort (Ames, 1992). Task-oriented students have been shown to be persistent after failure (Elliot & Dweck, 1988) and value the process of learning for the attainment of comprehension (Ames & Archer, 1988). In the current study, students who define success in their math course as learning new mathematical concepts, building on previous knowledge or becoming better prepared for learning in college would be considered task-oriented. For example, a student in a calculus course may define success in the math course as seeing how calculus connects previous mathematics course and wanting to further explore these connections.

For ego-oriented students, success is judged by comparison of one's ability to that of others. An ego-oriented student attempts to outperform peers and attributes success to a comparison of effort (Thorkildsen & Nicholls, 1998). "When individuals are ego-involved, their chances of demonstrating ability depend on the ability of others" (Nicholls, 1984, p. 333). When the ability of the peer group is low, the ego-oriented student's goal is to demonstrate superior ability; however, if the ability level of the peer group is high and competence is in doubt, the ego-oriented student would exert less effort and put forth weak performance on the achievement task (Duda, et al., 1995). Dweck (1986) wrote that students who pursue ego-involved goals are "individuals [who] seek to gain favorable judgments of their competence or avoid negative judgments of their competence" (p. 1041). Competition, public attention, social evaluation, and the importance of grades increase the use of ego-oriented goals. Learning, therefore, becomes a means to an end for ego-oriented students. For the ego-oriented calculus student, they would be focused on displaying their superior ability on the next test with minimal effort.

Work avoidance as a goal orientation is found in many of the original conceptions of achievement goal theory (Meece, et al., 1988; Nicholls, et al., 1985). Students who are work-avoidant exert as little effort as possible with the intent of just getting by academically. These students may find the course material irrelevant, avoid taking on challenging tasks, and do just enough work to pass the course (Jarvis & Seifert, 2002; Meece et al., 1988; Nolen, 1988; Seifert & O’Keefe, 2001). These work-avoidant students have a preference for easy assignments and courses that do not assign homework (Nicholls, Cheung, Lauer, & Patashnick, 1989). Students who are enrolled in a fourth-year math course with no intention of pursuing a mathematics-based career may find topics covered in the course lacking in meaning and having no bearing on their futures.

Nicholls et al. (1985) found that work-avoidant students attributed success in school to luck, placing a low value on effort. For example, a work-avoidant student would suggest another student’s success in a course is because his teacher is easy, not that the other student studies more or seeks extra help when needed. The work-avoidant student has a preference toward memorization. This demonstrates low cognitive engagement as they just want to regurgitate facts and not analyze them in an attempt to understand the course material. Similarly, Koopman, Den Brok, Beijaard, and Teune (2011) found that work avoidance has an inverse effect on deep-processing learning strategies. These students were more likely to use memorization or put off work altogether.

Teacher and Parent Influence on Student Achievement Goals

Teachers and their classrooms play a role in the development of students’ personal achievement goals (Friedel, Cortina, Turner, & Midgley, 2007; Wolters &

Daugherty, 2007). These classroom goal structures have been defined in the literature using the terms mastery, performance approach, and performance avoidance goals, which I will follow here for consistency with the literature. Bong (2008) describes how the classroom goal structures define a students' personal goal adoption.

When students believe that their teachers deem mastery of the learning tasks and deep understanding of the material more important than test scores per se, they tend to embrace similar attitudes toward learning and espouse a personal mastery goal. When students feel their classroom and school cultures promote competition and reward better performers, then they are likely to internalize these values and personally adopt either a performance-approach or a performance-avoidance goal. (p. 194)

Teachers are responsible for manipulating classroom expectations, therefore manipulating how students perceive the goal structure of the class (Anderman & Patrick, 2012). Anderman, et al., (2001) found that in a performance-oriented classroom, students' value for math and reading declined. Interestingly, the authors did not find significance for mastery classroom goal structures' predictiveness of the value of math or reading. An increase in mastery goal focus in the classrooms did not increase the valuation of math or reading by the students. Wolters and Daugherty (2007) found that teachers with higher self-efficacy, in terms of their teaching ability, were more likely to exhibit mastery goal behaviors such as modifying instruction to fit student needs, focusing on individual student improvement, and encouraging students to learn as much as possible.

In addition to teacher influence, research indicates an effect from parental achievement goals on a student's choice of achievement goals. Studies on parental influences have shown that children adopt the same goals as the goals they perceive that their parents adopt (Friedel, et al., 2007; Gonida, Kiosseoglou, & Voulala, 2007). That is,

students who feel their parents focus on their child's grades and want their child to outperform his/her classmates are more likely to pursue ego-oriented goals. When students feel their parents are more interested in gaining knowledge, the student is more likely to be task-oriented. In a study where both teacher and parent goals were assessed together, Friedel et al. (2007) reported that parents' achievement orientations played a larger role in student's adoption of achievement goals than those of teachers, particularly regarding ego goals. The authors hypothesized that, since students change teachers each year (sometimes each class period), students have to adapt to different classroom goal structures, whereas parent-goal structures, mostly, were consistent over time (Gonida, et al., 2007). Students may perceive a goal structure change from either their teachers or parents in the second semester. This would play a role in the students' second semester goal adoption for their second semester senior year mathematics course.

Achievement Goals and Mathematics

Achievement goal orientations are an important determinant of math attitudes (Akin, 2012). In their longitudinal study of high school students' attitudes towards mathematics, Chouinard and Roy (2008) reported a significant decrease in mastery-approach goals over the three years studied. In addition, the study showed a decrease in the perceived value of mathematics, a decrease in student motivation to do mathematics, and a decrease in the perceived utility of mathematics. Jacobs, Lanza, Osgood, Eccles and Wigfield (2002) found a similar decrease in value and interest across three domains (mathematics, language arts, and sports). While value, interest, and mastery goals decrease over high school, performance and work avoidance goals have been shown to increase (Chouinard & Roy, 2008). As a student progresses through high school, the

student becomes more aware of his or her peer group leading to an increase in critical self-evaluation and competition among peers (Fredricks & Eccles, 2002) becoming more performance oriented. Negative attitudes towards mathematics increase, therefore, students are less likely to sustain effort and more likely to lose interest in mathematics (Chouinard & Roy, 2008).

In his review of the literature, Middleton (1995) reported that the decline of positive attitudes towards mathematics can be attributed to the class environment and a lack of teacher support. He later posited “motivations toward mathematics are developed early, are highly stable over time, and are influenced greatly by teacher actions and attitudes” (Middleton and Spanias, 1999, p. 80). By high school, students are less optimistic for success in mathematics and hold a significantly decreased value of mathematics (Chouinard & Roy, 2008). The perceived value of mathematics, according to Pokay and Blumenfeld (1990), influences the quality of learning strategies used and the amount of effort exerted by students throughout the semester.

In their study, Chouinard, Karsenti, and Roy (2007) focused on students’ perception of their own effort exertion. Mastery goals were the strongest predictor of high school students’ perceived effort in mathematics; whereas work avoidance goals had no effect on perceived effort and performance approach goals had negative effect on students’ perception of effort. Dweck (1986) suggested that students with performance goals believe intelligence is a fixed trait, that achievement is based on knowledge and not influenced by effort. Perhaps, these students point towards a lack of effort as a self-defense strategy to account for lower than expected achievement. Performance approach

oriented students may overestimate their math competence (Dupeyrat, Escribe, Huet, & Regner, 2011) setting the bar for achievement higher than their actual ability level.

Achievement Goals and Engagement Outcomes

Student motivation and engagement in learning have a major impact on academic achievement (Plenty & Heubeck, 2013) and have been linked to multiple signs of individual well-being (Corso, Bundick, Quaglia, Haywood, 2013). As a “predominant perspective used to understand students’ engagement in academics” (Anderman & Patrick, 2012, p. 173), achievement goal theory is a necessary lens through which engagement outcomes can be studied and understood. Engagement is multidimensional, generally considered to be composed of behavioral, emotional, and cognitive dimensions (Fredricks, et al., 2004). The three components are not disjoint subsets of engagement but interplay, along with achievement goals, to provide a richer understanding of student learning. Knowing what goals students adopt “leads to predictable cognitive, affective, and behavioral outcomes” (Anderman & Midgley, 2004, p.501).

Levels of engagement are regulated by a student’s goal orientation towards achievement tasks. These levels are made prior to and during achievement tasks (Anderman & Patrick, 2012). Engagement in an activity can vary in intensity and duration and is considered to be malleable (Fredricks, et al., 2004). By manipulating contexts (e.g. classroom environment, instruction strategies, task types), student engagement could possibly avert negative consequences (Finn & Voelkl, 1993) and promote positive attitudes towards the domain. Therefore, influencing the contexts around second semester seniors could help refocus the students experiencing senioritis.

Engagement Outcomes

Students exhibiting behavioral engagement are engaged in action (Corso et al., 2013). These are observable behaviors students may demonstrate such as hand raising, turning in homework, and staying on task. Emotional and cognitive engagements are more difficult to assess with observation. These components are often assessed through survey or interviews. A characteristic of emotional engagement is a student's sense of belonging to the school, teachers, other students, or to the academic domain (e.g. mathematics). Students that are cognitively engaged in academics are said to be engaged in thought (Corso et al., 2013). Evidence of cognitive engagement includes the utilization of various learning strategies, evaluating one's knowledge of the domain, and an investment in learning.

Behavioral Engagement

Behavioral engagement has been studied extensively in relation to student achievement (Gregory, Allen, Mikami, Hafen, & Pianta, 2014) and performance on standardized tests (Finn & Voelkl, 1993). Behavior is an observable measure in which a student may demonstrate desirable, school appropriate behavior; or a student may demonstrate behaviors not conducive to learning. Wang and Eccles (2012) describe behavioral engagement as an absence of disengaged behaviors (truancy, not paying attention or not completing homework). Students that are engaged will attend class, contribute to classroom discussions, and concentrate on a task or the teacher's directions. In the creation and validation of an instrument to assess student engagement, Kong, Wong, & Lam (2003) identified three dimensions of behavioral engagement:

attentiveness, diligence, and time spent (willingness to spend time inside and outside of class) on learning mathematics.

An increase in these engagement behaviors has potential to significantly improve student achievement (Gregory et al., 2014). Gonida, Voulala, & Kiosseoglou (2009) found that seventh and ninth grade students who perceive school and parent mastery goals were likely to demonstrate behavioral engagement. Student perceptions of their school's promotion of either performance approach or avoidance goals did not predict behavioral engagement in these students. Likewise, parental preferences for both valences of performance goals had little predictability in student behavioral engagement. In their study, Dowson and McInerney (2001) observed behavioral disengagement behaviors in students oriented towards work avoidance. Some observations—using a computer or lab equipment as a work avoidant tool—were classroom specific, whereas pretending to be incompetent or negotiating easier tasks were thought of by the authors as more universal forms of work avoidance. The authors concluded that these disengagement behaviors were maladaptive and limited engagement in learning.

Emotional Engagement

Student affect plays a critical role in their engagement in school related activities. These emotional responses can include enjoying class material, feeling safe at school, identifying with a subject, identifying with the school, or feeling a sense of belonging. These responses contribute to student motivation, effort and commitment to academic goals leading to academic achievement (Bryan et al., 2012; Goodenow, 1993; Walker & Greene, 2009). In a study of high school students, Walker and Greene (2009) found that a sense of belonging promoted adaptive learning strategies that focus on understanding and

are driven by effort. Bryan and colleagues (2012) reported similar results. Their study found a significant effect on academic achievement when students were emotionally engaged. Students with heightened levels of emotional and cognitive interests turned out to be more engaged in the classroom (Mazer, 2012). Motivation is directly linked to emotions (Hannula, 2006), evidenced through joy and interest, or anger and frustration, and is dependent on a student's preference of the situation or task.

Some scholars found that emotional engagement did not predict achievement (Sciarra & Seirup, 2008; Wang & Eccles 2012). These results are "somewhat surprising as a great deal of effort is dedicated to the creation of schools that are safe and that provide caring and nurturing relationships" (Sciarra and Seirup, 2008, p.223). Sciarra and Seirup recommend that schools focus less on the forms of engagement that deal with feelings of comfort and focus more on forms of engagement involving active participation and a commitment to learning. Efforts that increase behavioral and cognitive engagement will be more beneficial than those aimed at emotional engagement. These remediation strategies are seen in high performing schools which offer interventions that fall into behavioral and cognitive engagement categories. Students are taught that doing homework, participating, engaging in conversation outside of class, and connecting new information to prior knowledge will lead to academic achievement.

In recent years, Seifert and his colleagues have revived the focus on work avoidance as a goal orientation. They believe that emotions play a major part in work avoidance. Jarvis and Seifert (2002) posited that hostility is one reason students become work-avoidant. They refer to hostile students as passive-aggressive. These students stop working as a way to exact revenge or to antagonize the teacher in response to a perceived

slight. Seifert (2004) reported that the “literature from clinical studies of passive aggression suggest that these students may tend to make external attributions and, therefore, feel they have little control” (p.147). In an effort to regain control they feel they have lost, they act out by refusing to do their school work.

Cognitive Engagement

When a student is cognitively engaged, he or she thoughtfully and purposefully exerts effort to acquire new skills, knowledge, and abilities (Fredricks, 2011). There are a variety of levels of investment in the achievement task. Helme and Clarke (2001) argue that cognitive engagement can be inferred by linguistic and behavioral indicators in classroom situations. By grouping these behaviors, they posit that cognitive engagement is situation-specific. Therefore, students will use diverse cognitive strategies in different situations resulting in different levels of achievement.

Corno and Mandinach (1983) describe four forms of cognitive learning: self-regulated learning, resource management, task focused, and recipience. Self-regulated learning is thought of as the highest form of cognitive engagement. Self-regulated learning and the use of meta-cognitive strategies are particularly important for high school students (Wang & Eccles, 2012) as these meaningful strategies are important for students to assimilate new knowledge. Ainley (1993) found students that used meaningful strategies to prepare for midyear assessments showed higher achievement in their end of year 11 and year 12 grades. Shallow strategies, such as rote memorization, were found to limit memory retrieval (Greene, Miller, Crowson, Duke, & Akey, 2004).

Self-regulated learning can be further divided into five components (Corno & Mandinach, 1983). First, students are alert and monitor their learning while acquiring

new knowledge. They accomplish this by receiving and tracking new stimuli. The remaining three components, selectivity, connecting, and planning, transform learned information. Students apply these components when they distinguish relevant information from irrelevant information, link past knowledge to incoming information, and organize their approach to a task. Pokay and Blumenfeld (1990) report a similar set of learning strategies—meta-cognitive strategies that employ planning, monitoring and evaluation; cognitive strategies that utilize the integration of new material; and resource management, referring to effort, use of time, and help seeking.

Engaging in self-regulated learning for a specific task may be overwhelming for some students. These students may look to outside resources (e.g. teachers or peers) to help complete a learning task. Students who are resource managers may exhibit an “exceptional use of information acquisition and meta-level planning during some learning tasks” (Corno & Mandinach, 1983, p.96), but avoid the extra mental efforts of distinguishing, linking, and organizing required by self-regulated learning. The low level of information transformation is what distinguishes a student employing a self-regulated learning strategy versus a resource management strategy. Both strategies can be used to accomplish, and exert effort towards, a task; however, it is the level of cognitive engagement, or the way the task is accomplished, that differentiates the two forms of engagement.

The final two forms of engagement require a low amount of acquisition processes. A task-focused strategy is highly reliant on information transformational practices (selecting relevant information, linking to previous knowledge, task-specific planning). Recipience, the fourth form, is low in both acquisition and transformation processes.

Corno and Mandinach (1983) refer to recipient engagement as a passive form of engagement in which some transformation and acquisition processes are accomplished through instruction. Recipient engagement can be thought of as learning short-cuts requiring little mental investment from the student.

Mastery Goals and Cognitive Engagement. A student's perceived ability and promotion of mastery goals have been shown to be positively related to cognitive engagement (Greene & Miller, 1996). In their study of high school juniors in Tehran, Sedaghat, Abedin, Hejazi, & Hassanabadi (2011) reported that student goal orientations are based on their ability beliefs; thus, perceived ability precedes goal formation. Students who then pursue mastery goals generally use deep-level cognitive processing strategies (Urduan & Schoenfelder, 2006), such as the self-regulated learning strategies.

Students with mastery goals may have a vast array of learning strategies for which to employ strategically (Greene & Miller, 1996). Adoption of these different strategies becomes beneficial when they are known to students and the students can move easily among the strategies (Corno & Mandinach, 1983). Students may use a resource management strategy while working cooperatively with other students. A task-focused strategy can be beneficial for the variety of standardized tests students are required to take.

Cognitive engagement includes a willingness to exert effort (Fredricks, 2011) and the belief that effort and outcome work together is central to mastery goals (Ames, 1992). In her study on achievement goals and metacognitive processes Berger (2009) found a positive relation between mastery goals and vocational education students' effort in the domain of math problem solving and negative relation with estimate of effort

expenditure. Students that are cognitively engaged and are mastery oriented exert the required effort needed to accomplish a task, but do not feel taxed by the amount of effort exerted.

Performance Goals and Cognitive Engagement. Students who pursue performance goals, both approach and avoidance, often use shallow-level cognitive strategies in achievement situations (Greene & Miller, 1996; Urdan & Schoenfelder, 2006). These shallow-level cognitive strategies include rote memorization of mathematical formula and repetition of similar problems. Whereas the mastery oriented student is able to adapt learning strategies, it is the inflexibility in strategy use that may impede the performance goal learner (Greene & Miller, 1996). As Anderman and Patrick (2012) describe, inflexibility in strategy use is “when students are focused on their relative performance and are busy thinking about ability differences, they simply may not have the cognitive resources to devote to the use of effective cognitive and self-regulatory strategies” (p.180). It is easier to compare quantities of tasks completed (I completed 15 math problems while another student only completed 5) than it is to compare qualitative differences like comprehension.

Performance goals, both approach and avoidance, were found to predict academic achievement through the use of shallow learning strategies (Sedaghat et al., 2011). Interestingly, Berger (2009) reported that performance-avoidance goals were not detrimental to metacognitive experiences. She found performance-avoidance goals positively predicted feeling of liking and estimate of effort expenditure. Though students did not want to appear incompetent, they still enjoyed class and were able to accurately assess the amount of effort they put into learning. Those students identified as

performance approach, however, often underestimated their effort. Walker and Green (2009) noted that performance goals did not predict cognitive engagement in their study of high school students. The authors reported concurrency with Midgley et al.'s (2001) argument that age and culture may affect any positive effect of performance goal.

Work Avoidance and Cognitive Engagement. Seifert and his colleagues posit that boredom is a pattern of work avoidance. A bored student will lack curiosity in the subject and will not find the material useful to their future pursuits. They may skip assignments, hastily complete them, or copy off of other students. Bored students are perceived as capable and lazy, increasing the frustration level of their parents and teachers (Jarvis & Seifert, 2002; Seifert, 2004; Seifert & O'Keefe, 2001). If the student would put forth effort and feel a level of success, he would increase his interest in the mathematics.

Work avoidance goals are characterized by effort-minimizing strategies such as asking the teacher for help and engaging in off-task behaviors (Dowson & McInerney, 2001). Shell and Husman (2008) suggest that a student's work avoidance goal orientation is "a deliberate self-regulatory choice to be strategically inactive and disengaged from the class" (p.452). Work avoidant students ask low-level questions ("How do you multiply polynomials?") and offer repeated or meaningless answers ("I got what he got") to teacher's questions.

Cognitive Engagement in Context. Classroom features play a major role in a student's choice of cognitive processes (Corno & Mandinach, 1983). Teachers and students can influence these features through their interactions with each other. Helme and Clark (2001) found student to student interactions revealed the highest levels of cognitive engagement when compared to teacher to student interactions. Beyond the classroom,

out-of-school settings also contribute to engagement in meaningful ways (Fredricks, 2011). Schreiber and Chambers (2003) reported that a positive school climate and hard work positively related to mathematics literacy achievement. An increase in school participation and self-regulated learning corresponds to increases in overall GPA predicting educational aspirations (Wang & Eccles, 2011).

Conclusion

The second semester of the senior year of high school has been discussed throughout the chapter. Students in their second semester find that they lack a purpose. They enroll in classes not because they are interested in the topic but to boost their resume. The belief that taking challenging courses in high school would be beneficial for the students was verified in this literature review. While in their second semester mathematics courses, students form a theory about how they can achieve success in mathematics. Teachers and parents can influence these theories, and therefore increase (or decrease) engagement, by manipulating their goal structures. It was argued that Achievement Goal Theory is an important lens to view engagement. Achievement goals towards tasks, such as mathematics in the second semester of senior year, regulate levels of engagement in that task.

An understanding of students' achievement goals, and the recording and interpretation of their behavioral, emotional, and cognitive engagement, will shed light on second-semester seniors' academic achievement and answer the following questions:

1. How do students, their parents, and their teachers define personal success in mathematics as it relates to second-semester high school seniors who are in their fourth-year math course?

- a. What is the relation among student, parent, and teacher definitions of student success in mathematics?
- b. How do different definitions of success in mathematics relate to student behavioral, emotional, and cognitive engagement in the course?
- c. Do these definitions reveal the phenomenon of senioritis and how does the phenomenon affect achievement goals and engagement outcomes?

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Introduction

This chapter provides a detailed explanation of the research method used to study the phenomenon of interest. The chapter is organized into sections to provide structure for my research which includes: the rationale for my chosen methodology, descriptions of the sample, design, collection methods, and methods of analysis. A final section is included to summarize and highlight important points from the chapter.

Rationale for Qualitative Methods

A variety of definitions of qualitative research can be found in the literature. For example, Creswell (2008) describes qualitative research as a subjective inquiry relying on the views of participants, whereas Denzin and Lincoln (2000) present an admittedly generic definition of qualitative research as “a situated activity that locates the observer in the world” (p. 2). Though researchers differ in their definitions and methods of gathering and interpreting data, the main focus of qualitative research is to understand and interpret the lived experiences of participants in the study.

Qualitative methods best provide insight into the achievement goals of senior high school students in their fourth-year math course and how their goals relate to engagement in mathematics education. The use of qualitative methods for this study allowed me to identify the existence of the phenomenon and provide for rich details about the phenomenon. Interviews and observations uncovered how students construct their definitions of success in mathematics and explain their behavioral, emotional, and cognitive engagement in their math courses. Creswell (2008) recommends the use of

qualitative methods when “all of the complexities of a situation must be explored” (p. 62). The study aims to understand the complexities of the student participants’ engagement in their math courses, including their personal perspectives as well as those of the students’ parents and teachers.

In particular, students’ concept of success in their fourth-year math course is best understood through a phenomenological study. Phenomenology can be understood as both a philosophy and a method (Lichtman, 2010; see Groenewald, 2004 for detailed history). As a philosophy, phenomenology examines the essence of our consciousness and how objects in our world present themselves in our consciousness (Giorgi, 2012). It is how we perceive our surroundings that supports our understanding of a phenomenon. The research method evolved from the philosophy, therefore the purpose of a phenomenological study is to “identify phenomena through how they are perceived by the actors in the situation” (Lester, 1999, p.1). Moustakas (1994) summarizes phenomenological research as a study focused on the appearance of things, examined from many sides, until its essence is determined. This is precisely the goal of the current study, to understand the essence of student engagement and success definitions in mathematics, examined from many sides (student, teacher and parent perspectives) as they are perceived by those living in the phenomenon.

Phenomenological Presumptions

A phenomenological researcher is tasked with understanding a phenomenon through the lived experiences of the study participants, however, the researcher in a phenomenological study brings with him or herself their own presumptions. In contrast to a more positivist belief, phenomenologists do not detach from their presumptions

(Groenewald, 2004). Their presumptions allow for “empathy and connection, not elimination, replacement or substitution of perceived researcher bias” (Bendall, 2006, p.4). Recording these presumptions allows the researcher to place these presumptions in epoché, or a suspension of judgment, to recognize the essence of a phenomenon.

According to Ashworth (1999),

The researcher must suspend presuppositions *in order to enter the life-world* (and must continually practice the epoché in order to remain there). But it is once “within” the life-world that the work of laying open the phenomenon of interest has to be undertaken... At the start of phenomenological human science research and at every point during it, questions arising from positivist science such as cause, or the lawful relationships between “variables,” are of no relevance to the description of the phenomenon. And theories and findings relevant to such questions will only distort the description if they are allowed to enter consideration of the meanings within the person’s life-world which have to do with the phenomenon being described. (p.709)

The process of recording one’s own thoughts and beliefs prior to conducting a study is referred to as bracketing (Creswell, 2008; Lichtman, 2010). Bracketing is used to identify presumptions prior to conducting research and to then suspend them, epoché, in order to provide fairness to the data collected. Prior to conducting the current study I recorded my own thoughts from my experience as a student and as the teacher. The following section outlines the presumptions I held prior to this study.

Bracketing My Presumptions

Teaching at the school from which I graduated often stirred up memories and emotions. My memories of senior year are particularly important, as they will add another dimension to this research. Going into the second semester of my senior year, I had a 3.7 (out of 4.0) GPA and acceptances to every college I applied to; also, I was being recruited by colleges to play soccer. In December of my senior year, my grandfather passed away from cancer. He had lived with us for seven years and spent his

last months in a hospital bed in our living room. The next month, after the first day of midterm examinations, one of my classmates passed away from complications of juvenile diabetes.

At seventeen, I was too emotionally immature to handle all of the feelings and decisions I was presented with, and my grades suffered. I was no longer motivated by outperforming others and demonstrating my knowledge I just wanted to graduate with as little effort as possible. My lack of effort that last semester bled over to college where I no longer set a high standard for my academics. At my college graduation my roommate even joked, “Take a picture, Puleo is actually graduating in four years.” As a teacher, I would convey these stories to my students as a warning as to how slacking in high school can have an effect on college academics.

Teaching high school seniors can, at times, be trying. Most of the time, I was impressed by how much they had matured over their four years of high school; however there were times throughout the school year where they were less than impressive. I recall one year I was teaching four, fourth-year math courses. One of my students carried an F into the last week of classes. He never submitted homework. He rarely brought his books to class with him. Kids like him are the ones I tend to remember. Not the kid that stayed focus the entire year, but the kid who slacked off so much I lost sleep at night trying to find a way to get him engaged. I started to believe that every senior slacked off. Every senior had senioritis. I began this study wanting to know why these seniors were no longer engaged. Didn't these students want to be successful in their second-semester math class? What about their parents? They spent a lot of money to send their kids to this

school. Were they satisfied with their son who was just passing? I know as their teacher I was extremely frustrated with these kids. Were other teachers just as fed up?

In my teaching career I have had students who continued to work hard until the last day of the school year. While many of their classmates' motivation waned, these students continued to complete homework, study for assessments, participate in class, and discuss the course material outside of class with their peers. When asked what kept them motivated, some students pointed to being wait-listed at their first choice college, or looking to earn scholarships, as reasons they continue to work hard. Other students wanted (they would say "needed") to keep their GPA up for honors at graduation.

Research Site

The research data were collected at a single-sex Catholic, college preparatory school located in a suburb in Pennsylvania. The school enrolls approximately 500 young men, predominately white upper-middle-class individuals, in grades 9-12. Enrollment is composed of both urban and suburban students, with a small percentage of students from out of state. The school's sense of community, emphasis on academic excellence, and its Catholic identity shape the young men over the four years they are enrolled at the school.

Students at this school begin their high school experience with a two day freshman orientation where they meet their classmates, teachers, and approximately 50 upperclassmen. The upperclassmen are responsible for the planning and execution the day's events. Through games, activities, prayer, and talks given by the upperclassmen, a sense of community begins to take root in the new class. Over the next few years, most classes (cohorts) have their conflicts, but the students still refer to their school community as a "brotherhood." By senior year, classmates form close knit groups of friends but are

not constrained to their groups. In the locker room, students move from group to group engaging in various conversations. They attend each other's extracurricular activities—sporting events, plays, art shows, concerts—to support their classmates. In the classroom, the students are comfortable working in groups outside of their close friends.

Academics at the school are highly competitive. Eighty percent of the faculty hold a master's degree or higher and average more than 15 years' years teaching experience at the school. The school offers 20 Advanced Placement® (AP®) courses (three in mathematics—AP Calculus AB, AP Calculus BC, and AP Statistics), with 60% of the senior class earning college credit. The average SAT® verbal and math combined score is 1235, and 100% of graduating seniors attend college. All students are required to take four years of mathematics, with senior year placements of Precalculus, Honors Calculus, AP Calculus AB, or AP Calculus BC. Decisions about which course each student will be enrolled in are made by the previous year's math teacher with the approval of the department. The school also offers three math electives (AP Statistics, Probability and Statistics, and Numerical Politics) to be taken concurrently with one of the calculus-based courses.

The school has a culture of success in education, as evidenced above. Students admitted to this school have been successful academically in middle school and are able to articulate their definitions of success and future goals. By senior year, students have taken required courses in academic writing and public speaking, both include introspective projects. These projects require students to write and speak about their future academic plans and career aspirations. The academic program at the school develops students who are very insightful and display a high level of academic maturity.

As a result, the students that participated in this study produced rich, thought-out, and insightful responses to inform the study.

In addition to academics, students at the research site are required to complete 20 service hours each year as a graduation requirement. These service hours are completed off campus and must provide direct service and interaction with the disadvantaged. The school offers service trips to Africa, South America, and West Virginia over the summer months. Some students go beyond the school offered service opportunities by creating awareness groups, collecting and distributing non-perishables items, discuss their out-of-school service projects at all school assemblies, and hosting fundraising activities to support causes they are passionate about helping.

My familiarity with the culture of the research site, the values held by the school and the school community, and the rich, informed data provided by the participants verifies my choice for the research setting. My connection with the school would be an advantage. Since the participants had known me when I taught at the school and I did not work at the school at the time of the study, the participants would be comfortable opening up to me and sharing their experiences.

Participants

Teacher Participants

At the time of the study, five full time faculty members instructed mathematics to a senior class of 115 students. All five were asked to complete the teacher version of the survey described below. Of the five, four faculty members completed the survey and, because of their high interest and detailed responses to the survey, two math teachers were recruited to be interviewed to gain further insight into their survey answers. The

teacher survey responses and interview data helped provide context to compare with student and parent responses. After selecting the level of agreement or disagreement with a prompt in the survey, the teacher was asked to provide qualitative answers to clarify their choice. The teacher's responses were used to better focus each face-to-face interview. Teachers were reminded to give answers based on their experience with the seniors they are currently teaching, not to reflect on their overall teaching philosophy.

To maintain confidentiality, the two teachers that I interviewed will be referred to as Ms. Joseph and Mr. Carroll.

Ms. Joseph has been teaching mathematics for 5 years and has been in her current position for the last 3 years. Over her young career she has taught various levels of mathematics, from pre-Algebra in middle school to Advanced Placement Statistics in high school. At the time of the interview, three of her five classes were fourth-year math courses. In addition to her teaching duties, Ms. Joseph is involved in numerous extracurricular activities including founding and moderating the school's chapter of Mu Alpha Theta (a math honors society), moderating student government, and participating in the school's service trip to Tanzania in Africa.

Mr. Carroll is an alumnus of the school and has been teaching at the school for over 10 years. He has taught almost every mathematic course offered at the research site which range from Algebra I to AP Calculus BC. At the time of the study, Mr. Carroll taught three Algebra I courses and two fourth-year courses, Precalculus and Numerical Politics. In addition to his teaching duties, Mr. Carroll also coached two sports at the school, moderated Mathletes, and was on the Disciplinary Committee.

Student Participants

All seniors at the research site were invited to complete the student version of the survey described below in late April. I spoke to all of the seniors during their lunch period to introduce my study and call for volunteers. From the study population of 115 seniors, one student completed the survey within the first week. After many more attempts to gain participants (e.g. a description and link to the survey were added to the school's daily announcements for three weeks), a total of 14 students had completed the survey. From the 14 students, eight students were interviewed based on their interest in the study and their identification with achievement goals using their survey responses as the criterion. To maintain confidentiality, the student participants will be referred to as Tim, Nick, Andrew, Alex, Jake, Connor, Eric, and Drew.

Tim grew up in the city in a middle class neighborhood. His family received financial aid to attend high school. Over his four years, Tim was on the academic track in math and science and was in Mr. Carroll's Precalculus class in his senior year. Tim maintained a 3.6 GPA through high school and excelled in sports. He was a four year starter for the school's basketball and soccer teams. Tim never had the stress of worrying about where he would be going to college because he had committed to playing soccer at a small private university early in his senior year.

Nick also grew up in the city in a middle class neighborhood. He attended high school on an academic scholarship. Nick was one of the top students in the highest level of any class offered at his high school. He earned the top grade in nine advanced placement courses; four of those courses were in math and science—AP Calculus AB and AP Chemistry in 11th grade; AP Calculus BC and AP Physics in 12th grade. In April of

his senior year, Nick received his acceptance letter from an elite technical university where he later majored in Chemistry with a minor in mathematics. At his high school graduation, Nick received numerous academic awards, including the award given to the student with the highest GPA.

Andrew was from an upper-middle class suburban town and attended one of the top middle schools in the area. He did not attend high school on scholarship and his family did not need financial aid to pay the school's tuition. Andrew was in honors level mathematics his first three years of high school and attempted to skip AP Calculus AB by taking a Calculus course over the summer. Skipping AP Calculus AB would place Andrew in AP Calculus BC. Even though he earned an A in the Calculus course, Andrew was placed in AP Calculus AB based on his junior year math grade. This opened up a spot in his schedule which allowed him to take the two semester long mathematics electives taught by Mr. Carroll in addition to his AP Calculus AB course. Andrew later attended a small private university where he majored in Mechanical Engineering.

Alex grew up in a lower-middle class home in the suburb of a major city. His family received financial aid to help pay his tuition. Over his four years, Alex was on the academic track for mathematics and was in his second semester of Precalculus with Mr. Carroll at the time of our interview. Alex started off with a low GPA in his freshman year but was able to bring his final GPA up to a 3.6. He applied to a dozen colleges, including the United States Naval Academy, and later attended a large state university to major in Economics.

Jake was from a middle class family and grew up in a large suburban town. He was on the academic track in mathematics and had Mr. Carroll for Precalculus in his

senior year. Jake was very interested in sports and was on the high school's baseball team for all four years. In addition to playing for his high school team, Jake was also on two other baseball teams that travelled often for tournaments. Jake attended a small private university and transferred to a community college after his first semester.

Connor grew up in a middle class suburban town and attended one of the top middle schools in the area. He was awarded an academic scholarship to attend high school. In his sophomore year, Connor took two math courses so he would be in Honors Calculus and AP Statistics in his senior year. Those two courses were taught by Ms. Joseph. Connor was also involved in the two mathematics clubs at the school: Mu Alpha Theta and Mathletes. He attended a large state university and was accepted into the school's Honors College where he majored in Statistics.

Eric was from a lower-middle class family and grew up in an urban neighborhood. To afford the school's tuition, Eric's family was provided with financial aid. Eric was on the intermediate level for mathematics over his four years of high school and maintained a 3.4 GPA. He was in Ms. Josephs' Honors Calculus class at the time of the interview. Outside of school, Eric was a referee for youth hockey and bowled for the high school's bowling team. He later attended a large state university where he majored in Journalism.

Drew grew up in an upper class family in the suburbs of a major city. He attended an excellent middle school and was at the highest level of mathematics in grade school and freshman year of high school. However, due to his poor performance in his freshman year math class, he was placed in the intermediate level mathematics class for his sophomore year. In addition to taking the required fourth-year math course, Honors

Calculus, he signed up for the two semester-long mathematics electives taught by Mr. Carroll, Statistics and Numerical Politics.

Table 1 shows the following demographics regarding the eight student participants: pseudonyms, if they attended high school on scholarship or financial aid, a description of their hometown, their high school GPA, and the college they attended the year after this research study.

Table 1. Student demographics

Name	Scholarship	Financial Aid	Hometown	GPA	College
Alex	No	Yes	Suburban	3.6	Large State University
Andrew	No	No	Suburban	4.2	Small Private University
Connor	Yes	No	Suburban	4.4	Large State University
Drew	No	No	Suburban	2.8	Large Private University
Eric	No	Yes	Urban	3.4	Large State University
Jake	No	No	Suburban	3.2	Small Private University
Nick	Yes	No	Urban	4.7	Elite Technical Institution
Tim	No	Yes	Urban	3.6	Small Private School

In a synthesis of qualitative sampling methods, Suri (2011) describes the use of criterion-based sampling as a “comprehensive understanding of all the studies that meet certain pre-determined criteria” (p. 69). A purposeful, criterion-based sample of student participants provided information-rich discussions used for in-depth, qualitative analysis. Table 2 shows student participants’ results from the survey described below. Student responses were converted to numbers (Strongly Agree = 1; Neutral = 3; Strongly

Disagree = 5) and then these scores were averaged. These results were used to classify each student as task-oriented, ego-oriented, or work-avoidant in their mathematics classes.

Table 2. Student participant survey results

	Task-Involved Average	Ego-Involved Average	Work Avoidance Average
Alex	3.23	2.14	2.67
Andrew	2.87	2.43	2.58
Connor	3.66	1.86	3.34
Drew	3.82	3.29	1.68
Eric	3.35	2.56	2.11
Jake	4.21	3.81	1.40
Nick	1.98	3.59	3.21
Tim	2.02	3.12	2.43

Parent Participants

After identifying the eight participants, consent forms and invitations to participate in the study were sent home to the eight students’ parents. Although all eight parents consented to allow their sons to be interviewed, only three parents agreed to be interviewed. The most common reason the parents did not participate was due to work and family commitments. The three parents that participated were Andrew’s dad Mr. K, Connor’s father Mr. L, and Alex’s mother Mrs. G (all pseudonyms).

Mr. K is a mechanical engineer for a local firm. He is a father of three boys and is active in both their curricular and extracurricular lives. He and his sons started the school’s first sailing club. Andrew was his youngest son and graduated two years after his brothers. Mr. K stressed to his sons that learning and doing one’s best are important. Mr. K and his wife are often seen at school events and are involved in the parents associations.

Connor’s father, Mr. L, is a certified public accountant. Mr. L has his own firm and employees three other accountants working predominantly with small businesses. He and his wife have two boys and two girls, Connor being the oldest child. To afford private school tuition for their four children, Mr. L and his wife often work overtime relying on Connor to help out around the house.

Mrs. G is a graphic designer and works for a large, national company. She and her husband have two sons; both attended the high school being studied. Alex is the younger of the two brothers. Mrs. G would often pick up freelance jobs to help with the cost of her two son’s tuition.

Figure 1 shows the connections between participants organized by mathematics teacher. Each teacher participant taught two fourth-year mathematics courses. Student participants are listed under their math course(s). Parent participants are in parenthesis next to their son.

Mr. Carrol	Ms. Joseph	Other Math Faculty
<ul style="list-style-type: none"> •Precalculus •Alex (Mrs. G) •Jake •Tim •Numerical Politics •Andrew (Mr. K) •Drew 	<ul style="list-style-type: none"> •AP Statistics •Connor (Mr. L) •Honors Calculus •Connor •Eric 	<ul style="list-style-type: none"> •AP Calculus BC •Nick •AP Calculus AB •Andrew (Mr. K) •Honors Calculus •Drew

Figure 1. Connections between participants

Research Design

A phenomenological inquiry was conducted in order to understand and describe students’ achievement goals, evidenced by their definitions of success, toward their fourth-year math course and their engagement in their math courses. The data collection

for the study was completed using student and teacher surveys, interviews, and classroom observations.

Data-Collection Methods

Survey. Data collection began with an email distribution of a link to an online survey to the entire senior class and their math teachers in late April 2014. Participants were asked to complete the survey by the second week of May. During this time the online survey link was also included in the school's daily announcements. Both students and teachers were given adapted versions of the Patterns of Adaptive Learning Scales (PALS) used and validated by Midgley and her colleagues (Midgley et al., 2000), and adapted versions of the Motivational Orientation Questionnaire used by Nicholls and his colleagues (Nicholls et al., 1985; Nicholls, et al., 1990). The Nicholls' survey also included open ended responses for student and teacher participants to provide rationale for their scaled responses. The PALS survey, however, did not include open ended responses. The data from the scale portions of the two surveys were then used as criteria for participants to be included in the interview portion of the study. The data from the open ended questions were used to drive the one-on-one interview questions.

The teacher's version of the PALS given to the teachers was designed for, and used to, identify teachers' perceptions of the school's classroom goal structures, teachers' personal goals as they approach instruction, and to assess teachers' personal teaching efficacy in terms of mastery and performance goals (Midgley et al., 2000). The portion of the student version of the PALS used in this study assesses students' personal achievement goals (mastery, performance approach, and performance avoidance) and perceived parent goals (mastery and performance).

The Motivational Orientation Questionnaire was used by Nicholls et al., (1985) on 9th and 12th grade students. Nicholls et al., (1990) used an adapted for math version on a 2nd grade mathematics classroom. The use of this survey in addition to the PALS was preferable because “Nicholls’s format has the advantage of enabling the formulation of credible work-avoidance items” (Butler, 2007). As mentioned earlier, work avoidance was found to be relevant to second semester seniors. This survey aligns with the theoretical framework of Achievement Goal Theory that differentiates task, ego, and work avoidance goals used by this study. The purpose for using the Nicholls’ survey was to assess beliefs about the cause of success in mathematics, whereas the PALS offered insight into the reasons for engaging in achievement situations.

Students were asked to complete an online version of the surveys. Students were emailed a link to the surveys to be completed during their study hall, lunch, or other free period. The online surveys required students to have an email account to access; all students at the research site have access to email. The use of an online survey application ensured confidentiality of student responses. Survey information and any other collected personally identifying information were saved in a password-protected file on an external hard drive. All identifying information was stripped after selection of interview participants but prior to data analysis and reporting of findings.

In-depth Interviews. Semi-structured interviews were conducted at the end of the school year, before graduation in early June. I met with each participant individually and recorded our conversations to be reviewed during the data analysis phase of my study. In April 2014, I interviewed Nick, Drew, and Ms. Joseph. Nick and Drew were interviewed after school in the conference room in the school library on the day I observed Nick’s AP

Calculus BC class. I first interviewed Nick, made notes and ensured my recording was good and then interviewed Drew. The following day, I spoke with Ms. Joseph during her lunch period in the mathematics office. I had already observed one of her Honors Calculus sections and observed her AP Statistics class later that afternoon. Andrew, Connor, Eric, Jake and Mr. Carroll were interviewed during the last week of classes in May 2014. As I had done in April, I interviewed one student at a time, made notes and checked the recording before starting the following interview. I met with Andrew and Connor on Tuesday and Eric and Jake on Wednesday of the week of May 19th. I interviewed Mr. Carroll in his classroom the day after I observed his class during one of his prep periods on Wednesday May 21, 2014. Tim and Alex were interviewed after final exams but before graduation. These interviews took place in the school library in the afternoon. All parent interviews were conducted during the first week of June over the phone. I created a Google Voice account which allowed me to record each of the interviews and save the file to my Google Drive for future review. The purpose of interviewing students, teachers and parents was to gather their ideas of what would be a successful second semester in math class in the participants' own words.

Interviews were deemed appropriate for this purpose because they allowed the participants freedom in answering questions (as opposed to the rigidity of a survey) and allowed me as the interviewer an opportunity to follow up with questions relevant to the participant's story. In a semi-structured interview, questions are formed before the interview; however, as the interviewer I was able to guide the questions to probe deeper into the participant's responses. This allowed more flexibility, since the focus of the interview was on the participants' process of meaning-making and not on the order of the

questions. I was then able to direct the conversation to reveal more interesting areas and was able to follow the participant's interests or concerns (Smith & Eatough, 2007). All interviews were recorded using an audio recorder and transcribed by me. Both the recordings and transcriptions were password protected and saved on an external hard drive.

When possible, students were interviewed on the same day that I was able to observe their math class. This allowed us to discuss how their behavior in class related to their comments during the interview. All of the student participants were asked to respond to questions regarding their definitions of success and engagement in their math course. Students were asked to recall and describe what they were doing, feeling, and thinking during their math class. Interviews were conducted after school in the school library. Smith and Eatough (2007) recommend that a familiar setting allows the participants to feel most comfortable. Since these participants had been at the school for four academic years, they were very familiar with the environment. Also, they had known me in some capacity throughout their time at the school. The library offered a place with few distractions and affords privacy for our conversation. The interview protocol is attached as Appendix B.

Teacher interviewees were asked to respond to questions regarding their personal goal structure for the courses they instruct and their perception of student behavioral, emotional, and cognitive engagement in the courses; using the entire class as the unit of analysis (the interview protocol is included in Appendix C). Ms. Joseph and Mr. Carroll were asked to think about their classes as a whole, and not individual students, so I could understand their classroom goal structures. I want to understand their goals for the class

to compare to how the student participants perceive their teachers goals. For example, an interesting result may be if a teacher's goal is for each student to learn at their own pace and better themselves in mathematics but the students' perceptions of their teacher is that he or she compares one student to another.

Interview questions were phrased to collect data to discover Ms. Joseph's and Mr. Carroll's goals for their math classes. Both teachers were asked to provide anecdotal evidence to support their responses allowing me to further understand their goals and how they interpret their actions to achieve those goals. Questions were based on teacher versions of PALS and the School Engagement Scale (Fredricks, Blumenfeld, Friedel, & Paris, 2005). Since both Ms. Joseph and Mr. Carroll instructed multiple fourth-year math courses, I had the teachers respond to my questions while thinking of only one of the classes at a time. For example, I had asked Ms. Joseph to describe a typical student in her Honors Calculus classes and then describe a typical student in her AP Statistics class. This was done to compare students at different academic levels to check for difference in goals based on academic ability.

Parent interviews were conducted during the week of June 2-6, 2014. Parents were asked to respond to questions regarding their personal goals for their son's mathematics course and their perception of his behavioral, emotional, and cognitive engagement in the course (an interview protocol is included in Appendix D). Questions were an amalgam of student and teacher versions of PALS and the School Engagement Scale (Fredricks et al., 2005) adjusted to gain a parent's perspective. The three parent participants were interviewed over the phone and recorded using Google Voice.

Classroom Observations. Six class periods were observed over a three-week period measuring the behavioral engagement of the students. The entire class was observed, however, special attention was giving to the students who would be interviewed for this study. Prior to each observation, lesson plans and materials (e.g., syllabus, worksheets) were obtained from the instructor. For each class observation, field notes were taken with the goal of recording the engagement behaviors described in Appendix E. I was able to observe two classes per visit. On my first visit I had observed Nick in AP Calculus BC and Tim, Jake and Alex in their Precalculus course. The Precalculus course was taught by Mr. Carroll. The following visit I observed two of Ms. Joseph's classes, one of her Honors Calculus classes and her AP Statistics class. Connor was in this AP Statistics class. On my third visit I observed Mr. Carroll's math elective class with Drew and Andrew and sat in on Andrew's AP Calculus AB class. I was unable to observe Eric and Drew in their Honors Calculus classes since those classes met at the same time I was already observing other classes.

Data Analysis

Throughout the research process data were analyzed as close to the collection date as possible. The online survey application I used would email me notifications when a survey was completed. After each notification I would read through the responses and compiled the results into a spreadsheet. I used one worksheet to maintain a record of agree and disagree responses and a second worksheet to maintain a record of the respondents open ended responses. Open ended responses were used to aid in the interview process, often providing examples to help the interviewee develop their own examples to my questions.

As mentioned earlier, agree and disagree comments were converted into numerical values and averaged for each construct being assessed. Using the survey manuals, similar constructs (e.g. mastery and task) were grouped together and scores were averaged. Those scores were then used to identify which of the 14 students that completed the survey to invite to be interviewed. Nick's and Tim's responses indicated that they more strongly agreed to task-involved questions (averaging 1.98 and 2.02 respectively) than the other two constructs. I used similar logic to select the other participants with Jake and Drew representing work avoidant students since they had the lowest averages in that construct. Interviews and observations were analyzed and interpreted according to Storey's (2007) stages for analysis of phenomenological data:

1. Initial reading of the transcript (interview transcripts)
2. Identifying and labeling themes (coding)
3. Linking themes and identifying thematic clusters (categorizing)
4. Producing a summary table of themes with illustrative quotations

As interview data were collected, I transcribed the dialogue from each interview into individual, password-protected word processing documents. For efficiency, I used two devices for transcription, one to play back the interview file and one to type. Interview discussions were typed verbatim. Stewart, Shamdasani, & Rook (2007) argue that "too much editing and cleaning of the transcript is undesirable and counterproductive" (p. 111). Changing or editing what people say and how they say it detracts the true manner in which the participant constructs and describes his own meaning of the phenomenon. Each transcription was taken true to recordings to maintain each participant's voice.

During the collection process, I had often read through the transcripts to try to create a larger picture of the data. After an initial reading of the transcripts, I entered the

data in the participants own words into an excel spreadsheet, added any notes or thoughts I had in an adjacent cell and noted any themes. Themes were then tabulated to identify thematic clusters (Storey, 2007) or categories (Creswell 2008; Lichtman 2010). Thematic clusters were supported with the quotations from participants that were already listed on the spreadsheet. Some themes initially identified were collapsed into a larger category and again analyzed until all key concepts were identified. These key concepts reflect interpretations of the essence of the phenomenon.

Table 3 shows excerpts from my interviews with Nick and Drew. Nick's response was similar to the other student participants in defining success in his second semester math class. These responses were combined with students' definitions of success to form the thematic cluster Consistency in Definitions of Success. As shown in row 2 column 3, some of the original codes were later eliminated or renamed after multiple reviews of the data. Finally, the thematic cluster of Senioritis evolved, as shown in the last column.

Related codes, as shown in Appendix F, were used to show similarities or differences between participants' responses. The first table in Appendix F shows the similarities between what Andrew and his father said about their goals for the second semester in AP Calculus AB. The second table in Appendix F also includes Andrew's comments regarding success in AP Calculus AB and contrasts these comments with the ones he reported for Numerical Politics.

Data analysis concluded with an integration of the data sources. Each data source had a role in the final interpretation of the data. The survey results were used to select candidates for participation in the study. These initial categorizations along with the participants' responses to interview questions were used to understand the students',

parents’ and teachers’ definitions of success for the second semester mathematics courses. These definitions address research questions pertaining to definitions of success and the comparison of students’, parents’, and teachers’ definitions of success. Interview questions and observations were used to answer the research questions regarding engagement and senioritis.

Table 3. Coding process sample

Transcription	Notes	Code	Cluster
<p><i>Researcher: What would be a success for you? At the end of the second semester, you look back and say “I had a successful second semester because...this”</i></p> <p><i>Nick: Ok, I would say that because so far I have gotten good grades that I'm looking for something more from math at this point and so I just want to learn more stuff and I didn't (laughs) bother to learn series yet despite I've gone past Calc II, I still haven't learned that part of Calc II and that was little stupid of me.</i></p>	<p><i>Defines success as learning more than what is taught. He missed part of the curriculum to further his knowledge about tangential information. Not worried about grades.</i></p>	<p><i>Emphasis on learning (task); second semester definition of success; interest in mathematics (emotional engagement)</i></p>	<p><i>Consistency in Definitions of Success</i></p>
<p><i>Researcher: Was there anything you struggled with?</i></p> <p><i>Drew: Um, I didn't really struggle until the end of 8th grade, but that was just because I started to tail off cause I already knew where I was going. It was like a mini-senior slide (laughs).</i></p>	<p><i>Drew said math was easy in grade school but struggled with focus</i></p>	<p><i>Feelings toward math before high school Struggle with focus</i></p>	<p><i>Senioritis</i></p>

Issues of Trustworthiness

Credibility

Credibility in qualitative research is achieved if the interpretation of the researcher “describes the reality of the participants who informed the research in ways

that resonate with them” (Toma, 2011). This idea parallels the concept of internal validity in quantitative research. To ensure credibility, I explicitly state my phenomenological presumptions to separate my beliefs from those I aim to study. I have had substantial involvement with the phenomenon, research site, and population being employed in this school for eight years.

Creswell (2003, as cited by Toma, 2011) suggests presenting rival conclusions as a means of enhancing credibility. By explicitly stating my presumptions about senioritis and providing rich, detailed descriptions from the students’, parents’, and teachers’ perspective, I allow the reader to form his or her own interpretations of the phenomenon from different vantage points.

Dependability

A study would be dependable if, given the same context, participants, and methods, another researcher would draw similar findings (Toma, 2011). This would be akin to reliability in a quantitative study. In my research, I carefully recorded and reported all data and made clear any changes made during the study. This would allow another researcher to reanalyze the data and draw similar inferences. Lichtman (2010) writes “the researcher is responsible for describing the changes that occur in the setting and how these changes affected the way the researcher approached the study” (p.228).

Transferability

Transferability in qualitative research allows for the reader to apply the findings to a similar context (Bloomberg & Volpe, 2008). In other words, this study would be transferable if applied to another single-sex college-preparatory school of similar size. At the time of the study, the senior class was comprised of 115 students. The current study

occurred over two consecutive months in the second semester of their senior year. The intent of the study was to describe the lived experience of the eight student participant and not to generalize to all high school seniors. A description of the context of this study provided the setting and sample to allow the reader to compare with similar settings and make an informed decision with regard to my interpretations.

Conclusion

The methods outlined in this chapter were used to collect students' definitions of success and narratives regarding their engagement in their math courses. Bracketing my preconceptions allowed the data collected to be examined in the rigorous manner outlined above. Using student, parent, and teacher interviews in conjunction with classroom observations as methods of data collection gave me a better understanding of students' achievement goals for their fourth-year math course.

CHAPTER 4

RESULTS

The purpose of the study is to describe and understand student engagement in the second semester of their fourth-year math course as it relates to the students' definitions of success and their personal achievement goals. Additionally, the study aims to describe and understand the achievement goals, both actual and perceived, of the significant others (parents and teachers) that affect student goal adoption. The results discussed in the following chapter were collected through interviews and observations. The chapter is organized by the four major themes that evolved from coding described in Chapter 3 to provide insight into the study's research questions.

Student Definitions of Success Prior to their Senior Year

The student participants were asked to think back when they were younger and describe how they would define success in mathematics in middle school and their first three years of high school. These definitions provided me with some background information to later compare with their definitions of success in the second semester of their senior year with the aim of interpreting these definitions and identify the student participants' achievement goals and feelings of engagement at different times throughout their schooling. This section will describe the students' retrospective definitions of success prior to their senior year.

Tim

Tim's struggle to transition from 8th grade to high school mathematics began at the end of seventh grade. Tim had transferred schools during the summer after seventh grade when his parents moved their home closer to his dad's work in the city. The change

brought on new challenges for Tim. He still maintained friendships with his classmates from his former school and began building new friendships at his new school. He struggled to balance spending time with both groups.

Moreover, Tim said that at his new school he “got in with the wrong crowd in my 8th grade class.” Tim told me that his new school was much smaller than his previous school and that his new 8th grade classmates were either athletes or bookworms. He became friends with the athletes, even though they were the kids that were getting into trouble in and out of school. Tim tried not to get caught up with the trouble but “The principal even said to my mom that she saw a drop in my grades, my attitude, my work ethic.” Tim admits that his friends were not the best influence on him; however, he did not participate in what they were doing. His decision to go to a private high school and focus on his soccer talent was more important to Tim than partying with his friends.

Motivation for Tim never came from external sources, like his friends or parents. He felt his own “will and want to do something to reach the goal that you had set for yourself” was stronger than the influences of peers, parents or teachers. When Tim felt pressure from his parents to work hard, Tim would become more angry and annoyed than motivated. At times he would do less work, as if to get back at his parents. Tim felt that, if he sets his own goals, letting himself down would be more of a disappointment than letting someone else down. He explained, “If you don’t reach your goal, I feel like you have that, like, stuck with you until you do. Because you just want to work harder and harder. And that would motivate you.” The weight of disappointing himself and not reaching his own goals pushed him to work hard to achieve his own levels of success.

Since Tim defines success in self-referenced terms and attributes his successes in terms of effort I would classify Tim as task involved in mathematics. Over his first three years Tim would work hard until his grades went up. Once he felt that he was doing well, Tim would slack off and his grades would fall. His grades fluctuated over his first three years and in his senior year he decided to be more consistent.

I'd probably consider myself a pretty inconsistent student, I guess. I'd rather like to say consistent, but very inconsistent, where like one marking period maybe I'll do really well, the next I'll be like, "alright I did well," slack off a little and then back up again. But I think it takes for me to see my improvement that I realize that I can do better and that I do have that potential, but once I do see that improvement, I feel like I can kind of stay steady or even drop off a little and I'll be ok. But then that results in less and less improvement and then once again it goes back up. So overall, as a student, I think I have been inconsistent.

Tim also had the added pressure of being a highly sought after student athlete and was offered numerous scholarships to play soccer in college. He finished the first semester of his senior year with a B+ in math and said all of his math test grades were in the B to B+ range.

Nick

Whereas Tim fell in with the athletes in 8th grade, Nick would describe himself as one of the bookworms in his 8th grade class. When discussing his time before high school, Nick spoke more of the academics, math in particular, and less of the social aspects. Nick had always found that academics had always come easy to him, "It was kind of like coasting along for the most part." He was in the highest level offered by his school in all of his classes. Above all, Nick felt that he excelled in math because his teacher made math fun and especially interesting. He recalled a class discussion in which the teacher mentioned the existence of imaginary numbers. This conversation sparked his

interest in mathematics and gave him the sense that there is more to math than what he was learning at the time. Tim's focus on developing skills and interest in learning new skills in mathematics indicates that he was task-oriented towards mathematics.

After years of straight A's in math class, Nick started to look beyond the material that was covered in the classroom. He had already demonstrated mastery of mathematics at this point and said "I've decided now instead of just knowing how to plug it into equations, I want to be able to understand why we do these certain things." He continued, "So being able to do that will be a success for me." He would meet with his teachers after class to discuss where the day's topic is leading in the future and research the topic further at night. Some of the Calculus topics his class was discussing first semester spawned an interest in Linear Algebra and First Order Differential Equations.

And that's what got me interested in learning more math. And so I went off and learned some stuff that, like, wasn't in class. Mostly this year, and last, I've been doing that. But definitely high school has sparked a bigger interest in math for me.

He borrowed his teacher's old text books and read up on certain concepts during his free time. Nick continued reading math books for fun until a few weeks after our interview in February. Nick had to prepare for 5 AP exams. He was most excited for the AP Calculus BC and AP Chemistry exams.

Drew

Math was also interesting and easy for Drew before high school. He was always in advanced math classes and told me that whatever the teacher was explaining, he was able to "just get it." Drew didn't start to struggle in math until the end of 8th grade. He told me, "I started to tail off cause I already knew where I was going [to high school]. It was almost like a mini senior-slide." He really enjoyed his teacher and her teaching style

and despite his strong interest in math, he said he put very little effort in his studies at the end of his 8th grade year.

He began his freshman year in Algebra II Honors but struggled to shake his laziness from the end of the previous school year. “I struggled a little bit,” Drew said of his freshman year math class, “I finished with either a B or C+ first semester, I forget, and a C in the second semester.” After doing poorly in his freshman year math course, he was placed at a lower level for his sophomore year. “My parents gave me a semester to adjust; it wasn't enough,” recalled Drew, “and they said if I did poorly again in sophomore year I wasn't going to go back for my junior year.” Drew said he was able to pull his grade up in the lower level math course, especially in the second semester when the topics were similar to what he learned in his freshman year math course.

Alex

Alex too had struggled with the transition from 8th grade to high school math, but unlike Drew it was not due to lack of effort. Alex had always found math challenging and requiring a lot of effort. He told me, “I’m naturally not that good in math; at least I don’t think so.” Although he often struggled with math, he did point out that he has had excellent teachers that really helped him through the tough topics. Alex described his 5th grade teacher as “always enthusiastic, even though I remember specifically [that] I struggled with fractions, and like adding and multiplying fractions, she always helped me.” The extra time she put in working with Alex helped him progress through middle school math.

Alex felt that his effort translated into good grades indicating an undifferentiated concept of ability. He came into high school with high expectations; however, he did not

do well in most of his classes in his freshman year. He called the transition “a big shock.” His grades were lower than he had planned; most of his grades were below a C. The shock of poor grades motivated Alex to do better over the next three years. He told me:

I did pretty bad in every single subject, and, I still wanted like, still thought I could get all A's. But once I got here [to high school] I guess I thought I could never do well. But then after I didn't do well, then I was like, I need to get all A's.

After his freshman year, Alex brought up all of his grades and his goal in math was to demonstrate mastery of the subject. His definition of success revealed that his was task-oriented in mathematics since he defined success in terms of effort and self-improvement. He said that even though he found math as the least interesting, he spent most of his time working on math since he found it to be the most difficult.

Eric

Eric also spoke highly of his middle school math teacher. Eric had the same math teacher from 5th grade to 8th grade since he was in the honors level. He felt that she had prepared him well for high school math but he “wasn’t inspired by her. She made it fun, I guess.” For Eric math was easy but he lacked interest in the subject. “I just looked at math as something I didn’t necessarily enjoy doing,” Eric said, “but it was something that I was good at.” With his background he was able to do well in Intermediate Algebra I in his freshman year “without struggling at all.” He had a B+ average in my Geometry class as a sophomore and told me he enjoyed everything about Geometry except for the proofs. Eric complemented me on my teaching style and sense of humor but said his junior year teacher was the most inspiring math teacher to him. “I loved her teaching style,” he told me, “she broke everything down and made all of the steps to solve the problem visible

and easy to understand.” He spoke highly of all of his high school mathematic teachers and felt he was prepared for his senior year Honors Calculus course.

Andrew

Andrew found mathematics interesting and easy and thought that doing poorly on an assignment would be a failure. In middle school he really started to understand the importance of homework. In 7th grade Andrew said “I was in my groove” and really started to learn the material. His middle school teachers inspired him to enjoy learning mathematics. In high school, he continued to enjoy mathematics and attributed his successes in mathematics to his teachers. He told me, “I think the teachers are good enough to the point where they will kind of guide you.” Throughout his first three years of high school math he would compete with his best friend and they would try to outperform each other.

The fact that the kid next to me, that he can get it no problem. He’s just sitting there like, “Oh this is nothing but a peanut. I can just go right through it.” And I’m sitting there like Jesus, how the heck are you getting this. So I think it was classmate’s pressure and seeing how other people do and you struggle.

Andrew based his ability on how quickly and easily it seemed that his friend understood the material. For his first three years of high school, Andrew had a differentiated conception of ability. He espoused ego-oriented goals for his mathematics classes by demonstrating his ability and attributing success in mathematics to minimal effort.

Jake

Before high school, Jake felt that he did not have to put much effort into his school work and would still be one of the top students in his 8th grade class. Jake recalled his freshman year transition, “When I came here I realized how hard it is and I didn’t

transition well.” Jake had a difficult time adjusting to the demands of his courses, some of which were at the honors level. Jake continued, “I kind of schlepped off freshman year, like I thought I could get by without studying like I did in grade school. It didn't happen.” Even as a sophomore Jake struggled to put the necessary effort into his classes, especially math.

It wasn't until his junior year when Jake set the goal of doing well in all of his classes. Jake wanted to show his parents that he could be responsible and to prove to “everyone that was looking at me” that he could do well in school. He continued to be motivated in the first semester of his senior year to show his parents and teachers that doing well in his junior year was not a fluke. “I kind of want to say it was for me,” Jake recalled, “but mostly it was to show other people, like my parents, that I was responsible.” Jake found his drive to do something to demonstrate his abilities to others. He coasted through the first two years of high school and decided to put effort into his studies in his junior year. “Junior year, I did really well. I made honors,” Jake explained, “everyone's telling me junior year is the most important year. You are looking at colleges and colleges are looking at you and everything.” He carried this philosophy into the first semester of his senior year “so my parents would be proud of me.” The motivation to work hard for Jake increased when he felt he was being watched or judged by colleges or his parents.

Overall, when asked to compare their math learning experiences over the 8th grade-high school transition the students reported an increase in difficulty, strong teacher influence, and some increased interest while others found inspiration in other courses. For Eric, it was freshman year when he realized “This isn't basic stuff anymore.” Connor

noted about his freshman year math teacher “I had never been pushed so hard by a teacher, but I had also never felt so rewarded than I did at the end of the year.” For Drew, high school is “definitely more challenging.” He joked that he actually has to do his homework and pay attention in high school. Alex thrived under the increase of work stating “I think the greater amount of homework there was, the better I did, and the annoying amount of homework...I think it helped.” The overall feeling amongst the participants was that math was easy in grade school and very difficult in high school. They found the amount of work needed to understand the material and the connections of concepts as two of the biggest differences between grade school and high school mathematics. As Eric put it, “math became more of a challenge. Now it was using x from two weeks ago with y , what we just learned today, to make z , something we will use later on.”

Senior Year Definitions of Success

Student participants in this study tended to have the same definition of success in mathematics for each year prior to their senior year. When reflecting only on their definitions from freshman, sophomore and junior years of high school, most of the student participants were consistent in defining success as “to get the highest grades” or “to get all A’s.” Even when reflecting on their first semester of senior year, these students continued to strive for the “A”. As Alex put it:

I was extremely motivated from not doing so well in my freshman year, so the next three years I worked extremely hard... I was like, “I need to get all A's” and then I was really motivated to get the highest grade possible, that may not be the best answer, but that's what my goal was.

These definitions of success were the students’ short term goals for the semester or school year. Each student participant’s long term goal, and the long term goal of their

classmates, parents and teachers, was to get into a good college. The college application process for the students began at the end of their junior year. They wrote rough drafts of their college applications, researched different universities and majors, requested teacher recommendation letters, and completed surveys to determine what colleges and universities would be a good fit for them. Parents began preparing documents for financial aid and planning trips to visit colleges with their sons and teachers took time over the summer months to complete recommendation letters. When the students returned to school to begin their senior year, their application packages were almost complete. Recommendations, essays, standardized test scores, and some college visits were finalized within the first few months. All that remained for some of the participants was their first semester grades. By February, the participants started to receive acceptance letters. Some of the participants had sent in their deposits to their choice of college by March. I overheard a parent once say "it was done, over, in February. The college had already cashed my check!" Students, parents and teachers all found the beginning of the second semester to be a relief from pressure they had felt since beginning the application process.

This relief from pressure reveals a switch in the mindset of both parent and high school senior at the beginning of the second semester from where it was prior to receiving college acceptance letters. However, as will be discussed later, this switch did not occur with all of the participants in the study. The definitions of success in the second semester provided by the students in the study can be summarized as follows: Tim, Alex and Nick described success in terms of self-improvement, maintaining effort and focus, and learning to prepare for college; Andrew, Connor and Eric described success in terms

of demonstrating their ability above their classmates to the significant others they thought important; and Drew and Jake described success as doing as little work as possible while having the most fun. These descriptions are given in more detail below.

Tim

Tim admitted that there were times in the second semester where he was inconsistent and struggled to stay focused. He had just signed his letter of intent to play soccer in college and recently finished two long sports seasons; His soccer and basketball teams both progressed deep in district and state playoffs.

I had to go from soccer right into basketball and practice every day. Go home you're tired, you want to eat, you want to sleep, but you also have to do the work. But then, second semester, it would be like I would go home in the spring and I'd be like, alright I have nothing to do now so I would take a nap for two hours and then eat and by time I'm done all that, watch TV, its 9:30-10 o'clock at night. So then you're like, oh, well now you got to get this done. But the first semester you get home from practice, you're like alright, I'll do my homework, get it out of the way, use my free periods, but then in the spring, second semester it was like, well I have all this freedom, so it was like, I guess, it was harder transitioning from that, going from all that stuff to not doing stuff because then you have so much freedom that you think that you can get it done, but then like the free period before you're ah, I'll do it and then you realize you have like 28 problems to do and you only get half of them done. It was tough.

Even though Tim had his ups and downs in math, he managed to keep his grades at a level both he and his parents found acceptable. He felt that he balanced his academics and sports responsibilities. When Tim found himself slacking off on his school work at the beginning of the second semester and hanging out more with his friends during his free time he “switched a few things around with my study habits” and was able to bring his grades up before the end of the school year. He worked hard in the first semester to maintain a B+ average and was proud of his accomplishment. Tim said his goal for the

second semester was to keep that level of motivation, allowing for “a few slip-ups.” He had more free time after school and would complete his homework before it was due.

Alex

Similarly, Alex strived to maintain his first semester grade into the second semester. His goal for the second semester “again was to get the highest grade possible; all I wanted was an A.” Alex did not want to be the best in the class. He did not want to show others that he was smart. For Alex, the grade signified self-improvement. To further illustrate, Alex said there were two times he was frustrated in Precalculus. First, he found graphing trigonometric functions to be frustrating. Alex said “I was really frustrated about that, but that's just because I didn't fully grasp the concept yet.” After class, Alex went over the homework and notes to better understand the topic. The second time Alex felt frustrated was with his end of the semester grade. His final exam brought his semester grade down to a B+, which was lower than his definition of a successful second semester (to get an A). Although both instances frustrated Alex, he was happy knowing that he put in the effort and performed his best.

Nick

The final semester grade was not Nick's goal for AP Calculus BC. For Nick, “because so far I have gotten good grades, I'm looking for something more from math at this point.” He wanted to learn all he can about math and to go beyond what is taught in the classroom. Nick's goal was to “fully, completely comprehend” the math his was learning and “instead of just knowing how to plug it into equations”; he wanted to “be able to understand why we do these certain things.” To dive deep and understand the

roots of any given problem to better prepare him for college was how Nick defined a successful second semester.

Andrew

Although Nick and Andrew had similar interests in mathematics, Andrew's circumstances led him to have different ideas of success than Nick. Andrew had registered to be in the same AP Calculus BC as Nick. Andrew and his best friend took a Calculus course at a local college during the summer prior to their senior years in order to skip AP Calculus AB in his senior year. However, since Andrew earned a B+ in his junior year course, he was placed in AP Calculus AB. Being placed in the lower course (his friend was placed in BC) had a significant impact on Andrew and his motivation towards his senior year math course. He felt that he already knew the material that was covered in AP Calculus AB and would only be satisfied with an A in the course for both semesters and score a 5 on the AP test. He continued to adopt ego-oriented goals in his senior year, but instead of comparing his ability with his friend, he wanted to let the school know "Hey, I already know this, why are you making me take it again." Not being registered for BC, Andrew was able to take the math elective courses: Statistics in the first semester and Numerical Politics in the second semester.

Andrew had defined success in these courses as learning about the different aspects of math that he never considered thinking about prior to the class. For him, these electives were interesting and allowed him to explore mathematics without the pressure he felt in his other mathematics course. For these courses, Andrew wanted to develop his skills in mathematics indicating that he had task oriented goals for his elective classes. It is possible that Andrew would have been task-oriented had he been in AP Calculus BC or

if the interview had taken place while Andrew was in the summer Calculus course. In Numerical Politics, Andrew had no expectations or pressure for grades. He was free to learn the different aspects of mathematics presented in the class for the sake of learning.

Connor

When asked to define success in his second semester math courses, Connor said, “A successful second semester in my math courses would be to receive an A in both courses. Without sounding like a braggart, I always strive to receive an A in every course I take.” Connor focused on grades throughout their interviews and spoke of maintaining the high standards that he had been accustomed to in mathematics. Consistent with his definition of success prior to senior year, Connor continued to espouse ego oriented goals. He had a differentiated conception of ability and based his ability on understanding the material quickly and with little effort.

When the teacher shows us something new, and I get it right away, that makes me feel like I am ahead of the learning curve in class and eases stress for the test because I feel like I am better off than my peers.

Drew

Drew admitted that his standards for academics had fallen off in his senior year. He joked that he no longer had the threat from his parents to remove him from the school. His new goal was to pass with a grade high enough that his parents wouldn't take away his car indicating a work avoidance goal for mathematics. He defined a successful second semester as a C+/B. Drew said of his math classes, “I just try to get this over with, really. I mean it's not horrible. Basically, I'm there to get my grade; to get my diploma.” He found the math that he was learning more complicated than he would need for the rest of

his life. Drew felt that, after high school, he will never use math again. He did not see value in working harder in class.

Drew was not work avoidant in all of his classes. He reported different achievement goals for different classes. For example, had a task goal for his Journalism and Economics class but a work avoidant goal for his Honor Calculus and Numerical Politics class. “For sport’s media,” Drew joked, “there’s not much math involved there. I’m really just trying to get through this last math class in high school.” Since Drew had a stronger interest in writing than in math, he wanted to learn more in classes where he could express himself through his writing. He explained, “I like how you can write, like you can use your own words. In math, there’s really only one way to solve stuff.” Drew found that he was able to be more creative in English and history classes because he could use his writing talents and grading was more subjective.

Student Engagement Related to Achievement Goals

Behavioral Engagement

Task-oriented students like Nick, Tim, and Alex displayed behavioral engagement by doing their homework to further knowledge. They reported that they often paid attention in class, helped other students, and engaged in class discussions. During my observations, the task-oriented students were among the first students to dive into a problem and try to find their own solutions to novel math problems. They worked with other students and challenged themselves to work out feasible solutions.

The ego-oriented students, Andrew, Connor, and Eric, reported that they did their homework solely to improve their grade to demonstrate higher competence than their peers. Connor said:

We usually begin class discussing the homework from the night before by putting troublesome problems up on the board. I like to do the more difficult problems because I know I can solve them and explain my thinking to the other students. It's satisfying when I am the only one who can answer the question; however I want to help my classmates understand the topic as well.

From my observations, Andrew and Eric put forth more effort in class when they had an opportunity to demonstrate their ability in mathematics. Andrew would volunteer an answer to show his teacher how easy the question was for Andrew since he had already taken Calculus over the summer. Eric would volunteer an answer when he could show his friends that he understood the material without putting much effort into doing more sample problems.

Drew and Jake, the work avoidant students, did not pay attention often in class and disrupted other students. During their interviews they described students sleeping in class and classmates that no longer brought their books or pens to class. They pointed to other students' behaviors to validate their own. During my observations I witnessed that Drew and Jake were on their devices or trying to get their classmates to slack off. The general perception was that the second semester senior wanted to make the most of the last few months of high school by spending time with their friends and reliving memories from class or sports. The second semester of senior year was just an obligation the students needed to fulfill on their way to college.

Emotional Engagement

All of the participants spoke highly of the school and were emotionally engaged in the sense that they felt a strong bond to each other, the school, and the faculty and staff. However, not all of the student participants were emotionally engaged in mathematics. The participants and I spoke about their feelings towards mathematics and

while doing math. Nick, Connor, Andrew and Eric spoke of the feeling of accomplishment when solving a difficult or long problem. Nick describes his feelings towards math as:

I obviously, I legitimately enjoy math and that's been something I've had all four years here, but specifically this year because it has, it is that environment where I can do what I want, but do math, like, I just really enjoy it . Specifically, more towards the class, I find Calc real interesting. I know it's one of the easier maths, but I like looking towards some of the stuff I'll be seeing in college.

For Connor, he found math as an “opportunity to think freely and use my imagination to solve problems.” He enjoyed the exploratory style his teachers employed- the teacher presented an idea and allowed students to develop and test their ideas on how to solve the problems. This freedom made him feel more connected to the material.

For Andrew, math class was a relief from a stressful day of various classes. He said, “It could be really frustrating because sometimes you don't really understand or you're not exactly passionate about the topic you are learning about,” but in math class he felt that he could make sense of what was being discussed. There was a connection to everything he had already learned and he felt that he could see where a math problem led to a solution, “so it's like a big relief.” Eric too spoke of how math class provided time in his day where he could relax and the things he was learning made sense. He said:

Yeah, like when I can figure something out on my own or when the teacher gives a difficult problem and I find a way to get it correct. Knowing that I understand something that I'll need on a test, it's just one less thing to study. That's what makes me keep going in math: The hope that every day I can walk in and learn something new. Sometimes I get frustrated because I can't figure something out. Other times I am happy because I figured out something difficult.

He found a deep sense of accomplishment when the teacher gave the class a difficult problem and he figured a way to solve it.

The other participants found math to be boring, irrelevant or something they needed to get through to graduate. Alex felt bored in math class and would constantly fight against boredom. “I just felt like ‘Just do your best to pay attention even though it was really boring’.” I asked him what drives him to pay attention; what keeps him going when he lacks interest, and he replied “getting tests back with hundreds or one thing wrong, that really made me happy.” Both Drew and Alex battled boredom and used grades to motivate them to pay attention. The difference was that Alex tried to get the highest grade possible whereas Drew tried for the highest grade just to pass.

Tim said his interests dwindled in the second semester mostly because of the topics (trigonometry, exponential functions and logarithmic functions). “I mean, the teacher tried his best to make this stuff interesting but it wasn't something I really wanted to be doing.” It wasn't that he found the first semester topics more interesting, but rather he had to get the work done or else he couldn't play soccer. The threat of academic probation was no longer an issue for Tim in the second semester since he decided not to play a spring sport in his senior year.

Cognitive Engagement

The task-oriented students used critical thinking skills in mathematics class to explore material on a deep level, indicating cognitive engagement. Tim was able to self-regulate his learning by setting goals for himself, planning and implementing strategies, and then reflecting on the outcomes. Nick applied deeper learning strategies in mathematics as compared to his peers. He would delve deeper into a topic, research it, analyze what he has learned, and ask questions to further his understanding. “If I would

get bored during another class,” Nick said, “I would just create some random function and like integrate it.”

The more ego involved students demonstrate a very low level of cognitive engagement. These students only focus on the surface level learning to make sure they get the correct answers on their homework and tests. They often copy homework off of their classmates’ assignments. The ego-oriented students were the most grade driven students in the study. Eric said “I get frustrated when I am struggling to keep up with the notes. I just want to make sure that I have all of the things that I need to know to study from.” Other ego-oriented students would ask for extra credit, would not participate in class unless for they would be graded for their efforts and only completed tasks that were for credit. Connor based his ability, and the difficulty of concepts, on other students. He said about learning trigonometry, “I was frustrated because it was an extremely new concept, and everyone seemed to understand it but me.” Alex would not talk to other students during class because he didn't want to miss anything from the lecture.

Work avoidant students employed low level cognitive engagement. These students rarely thought about mathematics before, during, or after class. They were often off task, copied homework from classmates, and waited until the last minute to complete assignments. Jake, for example, said he completed his Precalculus project the night before it was due. He played on his computer during the days his teacher gave his class time to work on the project during class.

I'm going to be honest, me and like a few of all of my classmates thought [the project] was kind of, like a joke at first...A couple of classes I went in and thought it was just a free and I could just mess around go on the computer and do whatever. And then I realized how much work you actually have to put into it and realized I should have been doing a little bit every day instead of waiting until the last minute.

Jake had even calculated the exact percentage he needed to get correct on his final exam to pass for the semester. He would've been disappointed with himself if he did better than that percentage. Jake, and other work avoidant students that I witnessed, pointed towards senioritis as a reason for their disengagement.

Perception of and Experience with Senioritis

The descriptions above represent how each of the six students defined success in mathematics over the second semester. Some of the participants, however, described a time in the second semester where their definitions changed. These were times where their focus on their math course was not as strong as previous years. Interestingly, for some, this change in definition did not mean a complete drop in grades or motivation, but more of a self-perceived "slacking off". I have had numerous conversations over the years with seniors and colleagues regarding senioritis. Most students find the idea humorous and can point to dozens of their classmate who "suffer" from it. My colleagues often lament the fact that they have to teach second semester seniors. Some faculty feel that no matter what they do or say, seniors are checked out and it is useless trying to get anything accomplished in those classes. The following section describes the student participants' perceptions of and experiences with senioritis.

Jake

Jake indicated a decreasing interest in mathematics over his four years of high school. Jake spoke of how easy math was to him and that he never really had to work at it. He admitted to getting by in math without studying. As the second semester of his senior year approached, he said that he wanted to make the most out of the last months of school by going to parties and planning for the summer. Jake's goal was to have fun. Jake

found himself struggling to stay motivated throughout the second semester admitting that he should have cared more about school and get his work done. “And then second semester hit and senioritis just kinda got to me,” he said. So what is senioritis? As Jake put it:

Senioritis? It's I don't care. I just want to get out. That kind of hit me hit me in the fourth quarter. The third quarter was alright. I tried, got decent grades, but then fourth quarter, I didn't care. Which is a mistake, I should have cared but... I don't know, you're so close to getting out of high school and you been there for four years. You want to get out. You want to go to college because everyone's talking about college, it's so fun. There's parties every day and summer is coming up and this summer is the best summer ever and everybody keeps talking about that. Your motivation is just zero. You have no motivation to do any work at all. You just kind of come here and go through the motions.

I observed Jake in Mr. Carroll's Precalculus class. At this school, four years of mathematics are required and Precalculus is the lowest level of mathematics offered to the seniors. Many of the students in Precalculus have either struggled with math their whole lives or have no interest in math. In comparison to the other math courses I observed, the Precalculus class had more students blatantly disengaged than the others. One of the students was asleep the entire class I observed. Jake sat in the back of the classroom, but on the side of the room furthest from the teacher and next to the student who slept during class.

Jake was clearly disengaged throughout the entire lesson I observed. He would check the clock, check his phone, and then the clock again as if he didn't believe the clock on the wall was accurate. He told me that he used his laptop computer to take notes, but from my observation he appeared to be using the touchpad more than typing on his computer. To me this indicated that he was scrolling on the internet and not typing notes. I asked him about what I observed and he said, “My motivation in the first semester was

mediocre and second semester I just schlepped off altogether.” He told me that he found the material easy enough that he did not have to pay attention the entire class, “Precalculus isn’t like taking AP Calculus or nothing. I mean, it’s no walk in the park but it’s not like you can’t get a B+ or A.”

He felt that since he was already accepted to college that he did not have to work anymore and that no teacher was actually going to fail him. Jake pointed to his classmates and suggested that everyone had given up on school and that no one was working hard anymore. However, Jake could be overestimating the number of people that would agree with him; since Jake felt a lack of motivation he assumed that everyone around him also lacked motivation.

Nick

Nick, who has always been completely focused on his school work- doing his assigned work, getting every question right on assessments- said that during the semester he began to be lazy with all of his classes. He explained, “It’s not necessarily in my grades but the level of commitment I put into each of my classes.” Nick admits that his “slide” is not the typical senior slide that his classmates are experiencing. “I know one kid that was like ‘Oh yeah! I got a 50 on my math midterm’,” Nick told me, “He didn’t fail the class, but he just 100 percent does not care anymore.” He considers sliding, for himself, as not devoting the same amount of time to his studies as he did in years prior. “Now I know that I have everything pretty much done; it makes me not care as much about the work.” All he had left at the time of the interview was the AP tests.

When I observed Nick in his AP Calculus BC class, the highest level of math the school offers, I observed a wide range of engagement. As the students filtered into the

classroom, each student slowly got to their seats, unpacked their math books, and walked their assignment over to the teacher's desk. The teacher presented the class with a challenge problem. All but one student, who was playing a game on his iPad, got into groups and began working on the problem. My observation matches how Nick described a typical class.

Most people are like me and they do work and talk. And some people are 100% focused on the work because they don't feel like they know it and then they'll get the same grades as me, and the same grades as everyone else, it's just they have to put in more work. I'm thinking of like two people. So they will be more focused on what people are doing on the board and trying fully understanding that. I'm pretty sure [my classmate] just plays Sim City the entire time (laughs).

The class had thirteen students in it, which is smaller than most other classes at the school. Nick pointed to the small class size and the high ability of the students in the class as the reason they are able to cover the material quickly. Since they are able to cover a lot of material quickly, there is a lot of downtime.

Drew

Drew told me that he struggled at the end of 8th grade to stay focused. He already knew where he was going to high school and his studies tailed off. Drew had repeated his "slide" from 8th grade in his second semester of his senior year. He said of his priorities, "Deciding what I'm going to do for college is really the only distraction I have. I kind of like moved everything else out in my life, you know." One of Drew's two fourth-year math courses was Mr. Carroll's elective class. When I observed the class, Drew was the only student to have a laptop computer on his desk. He had spent the majority of class focused on the computer screen. During class, he would blurt out things he was finding online, particularly sports related news. More than once his classmates

would tell him to put the computer away and pay attention. It seemed like a running joke that he was always on his computer. Mr. Carroll would randomly call on Drew and ask him questions about the material and the class would laugh knowing Drew had no clue what they were talking about.

I asked Drew to describe a typical class in his math elective: “You know, I participate in the conversation, do a couple of (laughs) going on the Internet, ESPN, a little bit, but I mean I pay attention for the most part. My grade is not horrible. I’d like it to be a little bit higher, but I study for the test.” Mr. Carroll confirmed that there were times where Drew would be engaged in the conversation, but would often interrupt class with comments that were unrelated to math. “I am pretty laid back with my seniors. I guess that could encourage them a bit to slack-off, but I’m not here to kill them,” said Mr. Carroll about his class. The only reason he picks on Drew, he told me, was because Drew tries to draw attention and interrupts class discussions.

Due to scheduling conflicts, I was unable to observe Drew in his Calculus class to see if he exhibited the same behaviors in both of his math classes. I spoke with Drew about Calculus and asked him to describe a typical class. He told me that he began his senior slide a bit too early. On his first test of the second semester, he earned 0 out of 60 points because “I just wasn’t paying attention, you know, going on social media during class.” After that test, he told me, he refocused and has been paying more attention by staying off of his computer. Even without the distraction of social media, Drew found that his classmates were another distraction as they continue to slack off. Drew explained that since his classmates had been accepted to college “everything has fallen off.” He described his classmates as falling asleep, staring into space, or playing with their phones.

A few of his classmates would pay attention and take notes. Why a difference in engagement? “It really depends on the kid,” Drew explained, “where they sit, who they sit around, who else is in the class to affect their concentration.” Drew’s explanation seemed very accurate in all of the classes that I observed.

Andrew

The AP Calculus AB class that I observed was a perfect example of Drew’s explanation of engagement being influenced by the people around you. The class had both juniors and seniors; a dynamic that was different than the other fourth-year math courses offered at the school (the other fourth-year math courses had only seniors in the class). The juniors and seniors are at different points of their high school careers and, as such, have different ideas of success. The students’ engagement in the class depended on who they sat near. Andrew, who was in the class, described the juniors as competitive and under a lot of stress.

A lot of juniors, it’s like a big competition for them, you know. They are all obviously comparing grades after tests. They are always going after each other because they still have another year of school left. So I feel like amongst the juniors it’s a lot more competitive, amongst the seniors it’s a lot more relaxed, you know, you just do what you can do sort of thing and no one really cares how everyone else does.

He rationalized that since the juniors are in the most critical semester of high school, what they do in class will hopefully impress colleges. Andrew recalled his junior year and how he began to feel pressure from his parents to earn the highest grades possible. The seniors, in contrast, had already gone through the stresses of junior year. They had completed all of their college admissions materials and their first semester senior year grades were sent off to college admissions officers. The focus for them was to decide on a college to attend and a major to study. “Some of the seniors started to slack

off,” Andrew said of his class, “they don’t get too stressed out when they don’t do well.” Competing for grades in a high school math class was no longer a priority for the seniors.

Alex

Alex was in the same Precalculus class that I observed Jake. Alex sat in the back row and was taking out his notebook as class began. Alex’s description of the class was quite accurate when he said “There were definitely some people that were, you could tell didn't want to be there.” Alex did not speak much during class. He asked a few questions, listened to the teacher’s response, jotted notes in his book, and listened to other student questions and the teacher’s responses. When I asked Alex if he found Precalculus to be easy or a challenge he said, “I think for the most part people did ok. I think there were a couple bad grades in there; a couple of bad eggs.” The bad eggs that Alex was referring to were the students that were on their devices playing games or otherwise not paying attention to the class discussions.

Senioritis and Achievement Goals

There is a possible relationship between achievement goals and senioritis. In particular, the definitions of senioritis and work avoidance are similar. The work avoidant students were the hardest hit by senioritis. They reported significantly less pressure from their parents and teachers. Prior to his senior year, Drew’s parents had high expectations for him and threatened to transfer Drew to another school. With the threat gone, Drew felt that all he had to do was focus on not failing stating “I’m really just trying to get through the last math class in high school.” Although Drew said he paid attention in math classes and participated, when I observed him I noticed he spent a lot of time on his computer. He admitted to doing just enough work to pass and that his goal for the

semester was to get at least a “C”. Although there were times in his interview Drew spoke about being grade driven and trying to do well, I got the impression that he had always done just enough in his math classes to get a certain grade.

The work avoidant students use the term senioritis as an excuse to do nothing in the second semester. The work avoidant students, however, were not the only ones affected by senioritis. The task and ego-involved students also felt the decrease in purpose but were able to re-correct and refocus on their original goals. The decrease in motivation was not always the same in magnitude. Nick felt that decreasing his homework by an hour was sliding whereas Drew spoke of doing so little that he earned 0 out of 60 points on an assessment. Student participants talked about feeling the effects for days, weeks, and months indicating that the duration of senioritis can change from student to student. They claimed that even the smart kids started to slack off, but when I talked to the students about their own experiences, only a few actually said they slid. It was the students’ perception that everyone was slacking off, but, according to their teachers, grades, and self reporting, only a small percentage of students slid. Perhaps the students have that perception because it is easier to notice the kid sleeping in the locker room than the kid studying in the library. They no longer felt the pressure of getting into college and assumed everyone must be slacking off. Maybe that is the essence of senioritis: A lack of pressure to get into college—the other side of obtaining your goal.

Senioritis could be that time after obtaining the goals they had set forth from an early age. The level of relief then affects their learning goals. Those students, who struggled to work hard, struggled to maintain the high level of academics required, started to feel that pressure being removed from them. As Drew put it:

It's definitely fallen off. Even at the end of the first semester, like right before break you could tell everything has fallen off. Like people started getting into colleges and knowing where they're going, so everyone is paying attention a little bit less

They don't need to place an emphasis on grades or learning and in the second semester they can get away with not working at all. The students that once strived to outperform others would find relief in college acceptances. But the evidence collected in this study regarding those ego-oriented students point in the other direction. Connor still had an ego-oriented goal towards mathematics. He said:

For me, the greatest joy in math class is receiving a high mark on a test. In a very self-centered way, I feel extremely pleased when teachers commend good work individually or about specific individuals to the entire class.

Connor still needed to demonstrate his ability to others. He, and most of the other student participants, continued to work hard until the end of the semester. College acceptance was a major goal for the participants, and they were relieved to reach that goal, but their task and ego goals were still important as the second semester concluded. For example, after receiving acceptance to his first choice, Nick dedicated more time to things he found interesting.

I started working my way through Diff Eq, so that was, that was cool. Like um, initial value problems of second order differential equations. Like stuff like that, it's not, it's not horribly hard, but much harder than what we are doing right now, so as long as I had a challenge concurrent with whatever easy stuff we were doing during the year, I was happy.

Nick did not care about grades, but rather tried to absorb as much as he could in the last few months of his senior year.

Teachers' Perspective of Senioritis

The teacher participants told me the feeling amongst the faculty was that senior tardiness, absenteeism, and dress code violations increased in the second semester. Ms. Joseph and Mr. Carroll speculated that because seniors demonstrated characteristics of senioritis, the faculty responded by allowing seniors to submit late homework without penalty, use their textbook for assessments, and replaced tests with projects. Teachers describe the typical second semester senior as lazy, disengaged, and ready to move on. Students are on their phones more, doing less homework, and generally not caring how they do in the class. However, one teacher had an interesting take on the matter. He suggested that teachers were to blame for the students slacking off in the second semester. Teachers changed their expectations to accommodate student disengagement. For example, during my observation I saw a senior sleeping in the locker room and three teachers walked by without saying anything to the student. Teachers allow seniors to text or check their email during class, as long as they don't disrupt others. Perhaps that teacher was right; the teachers are allowing these kids to slack off.

Ms. Joseph. At the time of the interview, Ms. Joseph taught three fourth-year math classes: two honors level Calculus classes and one section of AP Statistics. The students enrolled in those courses had been placed by the math department in the honors level because of their high grades and hard work in previous years. As the second semester progressed, Ms. Joseph said she noticed a drop off in grades and hard work from some of her seniors. She did not use the term senioritis, but her description matches the characteristics of senioritis.

I would say, senior wise, just from experience, homework just drops off towards the end of their senior year so I don't like to put as much

emphasis on the homework. In the second semester, because the kids who really want to learn it are going to do the homework anyway, so I actually sometimes stop collecting homework towards the end of school as we are approaching AP exams, especially in AP Stat.

She recalled being extremely frustrated with her seniors in her first year that she no longer collected homework in the second semester. She joked with me that she thought her students' goals for the second semester was to just to make sure they passed on their way out of high school. But she had a much bigger goal for them.

I asked her if her AP students were immune to slacking off because they are preparing for the AP® test. Her AP Statistics students were among the top 5% in their class but she admitted that “they are the most grade focused students [in the school] and a lot of them [pause], I’ll plan these really cool activities around things and some of them couldn't care less, they just [say] ‘are we getting points for this’.” Instead of exploring the material, they would look up the answers online to make sure they are getting the correct calculations. They missed out on the actual reason why the project was assigned. Of course not all students were grade driven in her class. Ms. Joseph told me of a student who would meet with her outside of class time to go over class material and had taken a greater interest in statistics because of her class. She told me he planned on pursuing a career in a statistics-related field.

She described the seniors in both of her courses in a similar manner. In each class she said there would be a group of students that had their notebooks out, participated in class discussions, and took notes. These students were “thinking on the next level so they're ready to ask questions that move us further.” A second group of students also had their books out and took notes, but did not participate in class discussions. She said these students checked their phones often; for answers, to send a text, to check their email, or

to go on social media. They were more disengaged than the first group she described. “It was not that they're being rude,” she explained, “but more like they're ready to just be done and move on.” The last group of students she described as “falling asleep,” “constantly on their device,” and “constantly working on something else [for another class].” After she had this group of students put away all of their distractions, the students would sit in the class with blank stares. The students “were barely passing. They just really showed no interest from the very beginning. They were just doing what they had to do to get by.” And, according to Ms. Joseph, their grades reflected their lack of effort.

Mr. Carroll. Mr. Carroll said that in his fourth-year mathematics classes, his elective class and his Precalculus class, there was wide range of student ability and knowledge. Mr. Carroll classified his seniors into three categories: the typical student, the atypical underachiever, and the atypical overachiever. He considered most of his students “typical”. When asked to describe a typical student in his math class Mr. Carroll replied:

Again this varies because of the different levels of student in my class. Most of the kids would rather talk about something else than numerical politics, though I do try to keep things current and entertaining. We watch movies and discuss them in terms of the course material. One kid does get frustrated when we don't review enough for a test. I think a lot of the kids feel like they just want to socialize and not have to worry about math.

He felt that the typical student was attentive and interested in the course materials but they most likely did not think much about the course outside of the classroom. These students would participate in class discussions but their answers were based on their own existing knowledge, not based on the readings. For example, when discussing voting systems, his students would use what they had learned in their United States History or Government classes about the United States voting systems. The students were unable to provide details regarding voting systems in other countries because they did not read the

textbook. Mr. Carroll would laugh about his students not completing their assigned homework and then gave a lecture on what the students should have read the night before.

During these lectures Mr. Carroll would rely on the overachievers to interpret his lectures and the readings in a way their peers would comprehend. The overachievers in his class were the kids that worked hard, asked questions, searched on the internet for more information on certain topics, and were competitive with each assignment trying to outdo each other. They would ask for daily quizzes and extra credit assignments while the rest of the class would grumble. “Even in the second semester when their classmates have given up,” said Mr. Carroll, “they keep pushing.” Those were the students that kept Mr. Carroll inspired to teach during the long months of April and May. “I need to keep up with them,” he said of the overachievers, “they like to ask questions to make sure I know the answers. And plus, I think it is hilarious how upset their classmates get when these kids ask for more homework.” Mr. Carroll felt that all of his students will be very successful in college and their future careers, but the overachievers will be the leaders in their fields.

Mr. Carroll believed that all of his students had potential to be leaders in their future professions. The atypical underachievers, according to Mr. Carroll, had already proved to their parents and teachers that they had a lot of potential. However, in the second semester of their senior year these students would have considered a successful semester as “having a lot of fun and distracting me by talking about sports or movies.” Mr. Carroll said he would just go along with being distracted because the seniors were at the end of their high school years and had worked hard for the last twelve years. He gave

me an example of a student that took his elective course because they had a good relationship over four years. The student would work with Mr. Carroll after school over the first semester to prepare for the SAT®. Once the student received his acceptance letter to college “he rarely brings his books to class, doesn’t have his homework completed and randomly guesses on tests.” This student and the other students that Mr. Carroll would classify as underachievers were constantly on their devices during my observation.

Comparing his math elective to his other senior year course, Precalculus, Mr. Carroll described the typical student in Precalculus as students that had struggled with math for most of high school and were not motivated by learning or grades. “My Precalc kids just go through the motions basically,” he said. To peak interest in a difficult topic, Mr. Carroll used a project in which students would use real life data from the internet and apply concepts from class. Many of his students wasted class time and waited until the last minute to create their presentations. He told me that one of his students spent an entire class period working on a project for another class. When I asked him what he did, he told me, “I let him work on it. In a few months they are not going to have their parents or teachers watching their every move. They need to learn about consequences before they get to college.” He initially failed the student for the project and made him redo the project to get his grade above passing.

Teachers’ Definitions of Success

As discussed in previous chapters, research shows that teachers have a strong impact on student motivation and goal setting. I have witnessed this impact at the many schools I had taught at during my career. Teachers that post “Top 5” lists to compare

students have students that are driven by grades. These students want to be on the list of top performers. In a class where the teacher stresses effort and perseverance, the same student would take risks and focus on improving his or her knowledge and skill. A lot has changed over my teaching career. The math teachers at the research site defined success for their students in terms of adequately learning the material. These teachers no longer post “Top 5 Student” lists on their bulletin boards, although some of the elder faculty members believe the lists are motivation for students to be successful.

Ms. Joseph

The math faculty consists of veterans and early career teachers. The four veteran teachers have each been at the school for over 20 years and the other three math teachers have between 2 and 10 years of teaching experience. Years ago the seasoned teacher would lecture, demonstrate a few problems and then assign homework. Over the years, the younger teacher’s have influenced most of the elder faculty members as the latter adopted more student-centered teaching methods. These early career teachers, like Ms. Joseph, place more responsibilities for learning onto the students themselves. For example, Ms. Joseph likes to “pose the problem and let them work together to try and figure out how to solve it.” Ms. Joseph feels “that leads to a better long term memory of the topics.” She would define success in teaching as the students would master the material and remember it long term, not just for the test later that week. This indicates that Ms. Joseph promotes a mastery-classroom goal structure.

Although Ms. Joseph promotes the development and learning of new skills, not all of her students adopted her goals for her classes. Ms. Joseph believes that a typical student in her class would place more value on demonstrating ability with high grades

than on learning new material. These students would only place effort on a task if it could help his grade by doing it or hurt his grade by not doing the task. Ms. Joseph provided me with two contrasting students. The first student she described was Connor. The school had offered an AP United States History course over the summer but the teacher took another job before the class concluded. “Connor tried to withdraw from the summer course because the school changed the AP class to a regular politics class,” Ms. Joseph informed me, “He wanted the class removed from his transcript because the 4.0 he would get in the regular class would bring down his GPA by about 0.05 points.” Since the school weighs AP courses, the “A” that Connor earned in the non-honors course would bring down his cumulative GPA. Connor had hoped to have the highest cumulative GPA in his senior class.

In contrast to Connor’s desire to outperform his classmates, Ms. Joseph spoke of the rare student that puts value on learning. She did not offer a particular student’s name, but described the type of student that “sometimes ends up being like your B/B+ students because they just get really into the material.” The students she described are the ones that ask questions, explore the material beyond the lesson, and are not very concerned with their grade in the class. “Those ones, I think, are going to be more successful,” she said of those students. She has had a few students that would stay after class to discuss alternative solutions to homework problems or newspaper articles related to mathematics or math education. One of her students shared with her a lengthy document his group submitted for a math modeling competition in which they used content from her class to answer the problem.

Mr. Carroll

It was not always the case that a student's grade reflected their effort. Often the student who took his time to really understand the material did so after doing poorly on an assessment. Many teachers struggled with assigning a grade for students that mastered the material but did poorly on tests and quizzes. How can the teacher objectively assess a student's knowledge? When writing recommendation letters for colleges, the teacher needs to frame the student in comparison to his classmates. Teachers, students and parents place a heavy weight on grades when it comes to college admissions. As Mr. Carroll described, "Their first semester senior year grades could be a determining factor if they are to get into the colleges they want to get into." He said his priority for teaching was to make sure they are prepared for the college entrance exams and for their next mathematics course. Mr. Carroll's classroom had a performance goal structure and emphasized comparison to other students.

Mr. Carroll said he found it extremely difficult to take the time to explore the course material deeply or to allow time for every student to grasp the concepts. He had a curriculum he hoped to cover each semester and he had to schedule in days for quizzes and tests. "Students need to do well," he continued, "because their GPA and SAT® scores are how they will set themselves above other students vying for college acceptances." It was Mr. Carroll's opinion that there has to be some sort of measurable and objective outcomes. He would like to reward those students who worked very hard and progressed in learning the material, but those students did not perform as well as their peers on his tests.

Student Perceptions of their Teachers' Goals

Ms. Joseph and Mr. Carroll described all of their students as very perceptive. The students may not have always shown it, but they were fully aware of what their teachers were doing in the classroom to help students stay engaged. The student participants had a clear understanding of their teacher's expectations: their teachers either wanted them to not worry about their grades and enjoy learning or just pass the class and graduate. The student participants all agreed that their teachers were explicit in their expectations.

Nick knew that his AP Calculus teacher expected that he understand the material and demonstrate his knowledge on his tests. He went on to say, "What I expect from myself is what she expects from me and that is to do well even in the light of new material." During our interview Nick told me that he had just come from his teacher's office checking up on a test that he thought he had bombed. I was expecting that Nick would report a failing grade but he said "I had an A but I had like a 94." His definition of bombing a test was getting a question wrong on a test. Nick attributes his success in math to his teacher's style. He found that she was very knowledgeable about the subject and used teaching strategies that brought out the best in him and his classmates. The AP Calculus BC teacher, as Nick told me, was very focused but gave her students a bit of freedom. "If I'm like sitting on top of a desk, as you have noticed, and I don't have something in my hands, or if I haven't been up to the board to solve something yet, she'll be like 'Do some math'." He felt that his class was ahead of schedule and they had time to relax or further explore topics as needed.

As for the AP Calculus AB teacher, according to Andrew, "in the first semester he really got us broken in." He gave a lot of tests and demanded a lot from his students. If a

student did poorly “it’s kind of like ‘Oh geez, I’m not even good enough to be in this class right now’.” Andrew told me that in the second semester the focus switched to preparing for the AP® exam. The teacher would stress that they covered everything they needed and for the class to just focus on doing well on the exam. Describing his Numerical Politics teacher’s expectations, Andrew told me that Mr. Carroll expected each student to “give a solid effort and really figure it out, like pay attention, and appreciate the different aspects that mathematics has to offer.” Mr. Carroll was more laid back and easy going than Andrew’s AP Calculus teacher. Andrew guessed that because there was no set curriculum or standardized test at the end of his elective course, his teacher could cover whatever he wanted to during the semester. He said his teacher never seemed pressured to get through any topic.

Drew described Mr. Carroll’s expectations as “do the best we can in class, try to, you know, obviously, not fail the course (laughs). Um pay attention and be respectful.” Drew felt that Mr. Carroll was very easy going and allowed the class to do what they wanted and have fun. “He can be easily distracted. You just have to talk about something his likes,” Drew said of his teacher, “We learned a lot but there was also a lot of downtime.” In contrast, Drew described his Honors Calculus teacher’s expectations as demanding; he “still expected us to do our homework.” Drew also found the teacher’s lecture style to be difficult to follow as Drew would prefer a more hands-on approach to mathematics. He preferred to listen to lectures in the courses he enjoyed such as English or Economics.

The other instructor of Honors Calculus was Ms. Joseph. Eric and Connor found that she provided the class with everything the students will need to fully understand the

material and it was then up to the student to listen and take notes. Connor described Ms. Joseph's expectations for him and his classmates as "not necessarily high marks." He continued, "What she seeks is constant work and growth. She teaches us initiative and hard work." Connor said the first semester got him ready for the second semester. He felt that the more hard work he put into studying, the better he would meet his teacher's high expectations. Connor said Ms. Joseph was just as consistent in his AP Statistics class, not really interested in high marks, but rather she expected the students to leave the class with a depth of knowledge of statistics.

In Precalculus, the perceived goal was different than the goals Ms. Joseph's students described. Whereas Ms. Joseph stressed learning and thinking deeply about the subject, Alex perceived the goal for Precalculus was that no one failed the course. Mr. Carroll would warn against slacking off in the senior year and told the class that seniors have failed in the past. I got the impression that Alex did not believe that any senior has failed in the second semester; that teachers make up these stories to get seniors to work harder. Alex felt that Mr. Carroll was always willing to help his students that were working hard, but allowed the other kids to slack off.

Alex described Mr. Carroll as energetic and consistent, stating "he seemed really eager to help us" and "he was very enthusiastic." Alex said he would ask his teacher question after question and the teacher would not get annoyed. Alex worked hard because he liked his teacher.

My senior year teacher seemed like he wanted to help and when I would ask, I would sometimes ask a lot of questions like for the math review...I would ask him like 10 questions or more a day and he would answer all of them really happily and really quickly and even though I knew I was being annoying he still came over and helped me to the best of his ability and that really helped. So I felt like me doing well would also like, I thought me doing well would be good

because I liked him. I didn't want to, I didn't want to, you know, make him feel like he was doing a bad job.

Alex even appreciated his teacher's attempts at humor and how Mr. Carroll balanced the workload knowing that his students were not interested in working "super hard." Alex said that they were learning new material all the way until the last day but the teacher did things for the students to provide time for them to relax. For example, the teacher recording lessons and allowed students to complete their homework in class providing students with more free time.

Jake told me that no matter what Mr. Carroll did to help or keep him motivated, Jake had already checked out by the third quarter. He said, "Unless your GPA drastically drops, colleges don't even look at your second semester grades and I wasn't failing out." Since Mr. Carroll provided the entire semester's worth of homework with due dates and the number of points each assignment was worth, Jake was able to calculate which assignments he would need to complete and by when to keep a passing grade. Jake told me that he had planned on watching Mr. Carroll's online lessons at home, but often waited to watch the videos the night before a test. Jake was able to maintain a C average by watching the videos and doing a small amount of homework the night before the test.

The change in Mr. Carroll's expectations in the second semester also changed Tim's perspective of the class. Tim found that the pace of the second semester "felt different" than the pace of the first semester. The first semester, he thought, was more stressful. He recalled having homework every night and an assessment every other day. In the first semester "I would go home do the work and then I would study for tests, study for quizzes." When the second semester began, he felt like he had more freedom and more time to relax. If he missed a lecture he could watch it at home and for tests he could

just study the night before. “I didn’t feel obligated to do anything,” he told me. The semester was laid out for him and he was able to manage his time to keep his grades at an acceptable level for him and his parents.

Parents’ Definitions of Success

Tim and the other student participants provided this study with a student’s perception of their parents’ definitions of success in mathematics. In addition, three parents were interviewed. The parent participants described their own definitions and their perceptions of how they thought their sons would define success in mathematics in the second semester. The parents’ definitions and perspectives were quite similar to those expressed by the students during their interviews. The three parent participants reported that their son would still define success the same in the second semester of their senior year as they did in prior years. All three parents said that the motivation to do well was still there even though, as they had witnessed, some of their son’s friends began to slack off.

Mr. L

Connor was grade driven and felt a higher GPA would better his chances at getting into the college of his choice. Connor’s dad, Mr. L, confirmed that Connor defines success in terms of “performance; grades. That’s the measuring stick. He watches his grades, literally daily, so success would be measured by the numbers.” Mr. L went on to say that Connor would be disappointed with a B or B+ on a test and would be only be satisfied with an A. “That sounds really obvious,” Connor’s dad told me, “but that’s what it’s all about.” That was both father and son’s definition of success throughout high school, especially in mathematics.

At home, Mr. L would see Connor working on some projects for his classes and felt confident that Connor completed much of his school work during his free periods at school. Since math generally came easily to Connor, Mr. L thought that Connor spent more time on his other subjects at home. “Unless there was a big test coming up,” recalled Mr. L, “he usually got his math work done in school.” Mr. L never felt the need to check up on Connor’s work since his grades were all A’s in math. Mr. L attributed Connor’s high grades to Connor’s diligence and speculated that Connor would be very attentive and energetic in math class. He imagined that Connor would participate in class discussions and be focused on the topic. “He wouldn’t just be sitting there lost,” said Mr. L, “He would be interacting with what is going on.” Mr. L imagined that Connor would be sitting closer to the front of the classroom, the first to volunteer an answer, and diligently taking notes. Mr. L did suspect that Connor would be talking with his friends during any downtime in class, but would quickly regain his focus when the teacher began her lesson.

The push in the second semester of Connor’s senior year was still to get the best grades, “even though the next step is already locked up.” At the time of the interview, Connor had already been awarded scholarship money for college and Mr. L had sent in Connor’s deposit. He and Connor would be disappointed if the second semester grades were anything but his usual mid to high 90s. I asked Mr. L if he would be upset if Connor brought home a lower grade to which he responded, “If the effort was still there and the grade was low, then the material was probably harder, it wasn't for a lack of trying.” He knew that Connor would then do whatever he could to bring his grade back up. Mr. L often reinforced with Connor that the second semester was “a kickoff to the college

investment; not to let yourself lag or slack.” He wanted Connor to carry his hard work ethic into college.

Mr. K

Andrew’s dad also stressed hard work and good grades so that Andrew would be prepared for college. He said Andrew would define success as “a 5 on the AP exam and he certainly wanted A’s across the board in Calculus.” Since Andrew had completed a summer course in Calculus already, Mr. K felt his son would expect to do extremely well on all of his assessments. Mr. K was disappointed in the school’s placement of Andrew in AP Calculus AB and believed that his son used this disappointment as motivation to do well in AP Calculus. When discussing the elective class, Mr. K felt that Andrew would enjoy being in the class with his friends and learning new things about mathematics. He did not believe Andrew would have been pushing for grades in that class. He and Andrew often discussed what Andrew was learning in both of Andrew’s math classes at the dinner table. Mr. K has a background in mathematics and still had a great interest in the subject. He enjoyed discussing mathematics with Andrew and how the topics Andrew was learning applied outside of the classroom. Mr. K believed Andrew had the same enjoyment and affinity towards mathematics, so math had never been the sort of homework that Andrew would put off until the end, “it was typically the first homework he would do.” Mr. K would often overhear Andrew on the phone with his friends working on mathematics or helping them with their homework.

Mr. K described Andrew as both focused and easily distracted. Mr. K joked that Andrew “kind of has a split personality.” Mr. K witnessed a serious side of Andrew that was extremely focused on his work and “this goofy side to him where someone can say

something to him, stupid or goofy, and he might laugh for the next 5 minutes.” Mr. K knew that Andrew took the same classes as his best friend and the two students would most likely sit next to each other. Mr. K felt the boys had a good balance of friendship and rivalry; that they had a lot of fun together but pushed each other to do well in school.

In class, Mr. K imagined that Andrew would be engaged in his math classes and maintained effort in his studies for most of the second semester. “There was senioritis in the first couple of weeks of the second semester,” Mr. K said, “then he seemed to regain focus.” He described the signs of senioritis “Andrew did less work at home and had significant amount more free time” compared to previous years. Because of the school’s reputation of challenging its students, Mr. K knew that the teachers were not letting up. He worried about Andrew’s effort and attention into his work. “He turned things around pretty quickly, thank goodness,” said Mr. K. He and his wife were close to having a discussion about school work with Andrew but he “self-corrected.” Mr. K did not report any other instances of what he believed were signs of senioritis and was very proud of how Andrew finished off the school year.

Mrs. G

Alex’s mother, Mrs. G, also spoke of her pride in her son’s academics. Mrs. G said Alex “sets his own standards” and “wants to have a higher grade point average for later on.” She told me that Alex’s long term goal was to attend the US Naval Academy; however, she felt Alex’s struggles with mathematics could be a hurdle. She described her son as extremely motivated and that Alex strived for the highest grades possible. Mrs. G commended her son for his willingness to put time and effort into his studies to attain the goals he set for himself.

Mrs. G recalled a time in middle school when she asked Alex about his school work to which he replied, “Mom, I got it.” After that conversation, she never felt she needed to bother Alex about his work. She had always paid attention to what Alex was doing at home but never felt like she needed to intervene. Over the second semester of Alex’s senior year, she noticed that he did more reading and writing for his literature and history courses at home and less mathematics. She assumed that he finished his math homework during his free periods at school. “He handled a lot of things so I didn’t, you know, observe as many of the minutia of things, I observed him trying to balance everything,” she said. Math never came easy to Alex and since his math grades were high, she felt he was doing what he was supposed to be doing.

Mrs. G said of Alex “I could be wrong. I don't know. I think sometimes he might be a little intimidated by math.” Math has never been easy for Alex and Mrs. G did not feel he came into high school with a solid foundation in mathematics. “Because of that I think he would be 100% focused on everything the teacher was saying and asking loads of questions,” she speculated. Although she felt he struggled, she thought he would be sitting more towards the back of the class to not draw too much attention to himself. In the back he would be able to control his own level of participation. She thought he might get frustrated at times when his classmates goofed off, but would most likely take that time to go over his notes and prepare questions for the teacher.

Alex’s mother strongly supported Alex’s goal of attending the US Naval Academy, but also asked him to set other goals as well. She knew how difficult it was to gain acceptance to the US Naval Academy and that Alex would need to maintain a high grade point average. She realized that Alex had typically struggled with math and worked

extremely hard to get good grades in math. Mrs. G's goal for Alex was "more about wanting him to achieve for him" and not because of anyone else's success or goals. Even if Alex did not get into the Naval Academy, she felt he would need a firm foundation in mathematics since he plans on majoring in economics or finance. "I want him to do as well as he is capable of doing and learning as much as he can to get into college," she said of her expectations for Alex in the second semester, "I know he felt that 'oh, you know that senioritis' but he was trying to stay clear of that feeling." Mrs. G never felt like she needed to address Alex's work ethic or goals. She allowed him to manage his own academics and did not try to impose any of her own standards. To her, Alex's standards were high and he worked to maintain them.

Student Perceptions of Parents' Expectations

Students are influenced by what they perceive to be their parents' expectation for them academically. Each participant was asked about their parents' expectations for their academic success in the second semester. Every participant spoke of their parent as caring and supportive with the expectation that their sons do their best. For the second semester, Andrew said that his parents want him to "finish strong" and Jake's parents told him to "you still need to study...you still need to do well." The students all agreed that their parents expected their sons to keep working hard, stay focused, and do well in their math classes even if it was their last semester of high school.

Another commonality amongst the students was the importance they felt their parents place on grades. "They are more focused on grades," Nick told me, "I'm not going to say they don't care if I learn or not but if I have good grades to get into a college, that's what they want at this point." In Andrew's opinion, finishing strong meant

to continue to get A's in class and a 4 or 5 on the AP® test. Connor, Eric, Drew, and Alex all echoed that their parents wanted them to learn the material but the grade really mattered most in their homes. Drew said of his parents' expectations, "I'd say they qualify a success...they don't want any Cs on my report card. That's what it comes down to." Eric added that his parents expect that he learn as well as perform well on tests. "They want me to do well and get good grades," he said, "and at the same time understand the material. I'm going to need both to do well in college." The students all perceived an attention to grades and preparedness for college.

Regarding communication, the student participants reported that their parents no longer explicitly state their expectations. There seemed to be a silent understanding between parent and son that the son would work hard and their grades would be the evidence parents used to keep track. Nick and Alex's parents had completely stepped back and no longer managed their sons' school work. "My mom just kind of assumes that I'm getting good grades in school," Nick said, "they just let me go on my own at this point." Alex's experience was similar, "I think because I did well my last two years...they just expected me, and had faith that I would, do good and they never really questioned me." For Andrew, his parents were direct at the beginning of the school year. Andrew said his dad told him, "Do all of your work and I don't want to hear anything about you doing poorly." He told me they never had another conversation about grades since then.

Tim and Drew felt the pressure from their parents subside in their senior years. "My parents rode me all of freshman year and nothing changed," Tim laughed as he told me about his first three years. He said he would push back when his parents "got on him" about his grades and by senior year they gave him space. Tim found motivation within

himself to keep working hard in class. He told me that arguing with his parents and letting them down was not fun, but when he set his own goals he felt that letting himself down would be a bigger disappointment than letting his parents down. Drew's parents also were tough on him through his early years of high school and at one point threatened to pull him out of the school. "They said if I did poorly again in sophomore year, I wasn't going back to this school junior year, so I was able to get my grades up though," he told me. "Did that motivation carry over into your senior year?" I asked him to which he laughed as he replied "There's not that threat now." Drew felt that by the second semester he had all but graduated. He just needed to pass.

Comparison of Student, Parent and Teacher Goals

Perhaps the relationships between students, parents, and teachers fostered the perception of senioritis. If the students perceived a change in goals from their significant others, then it could be plausible that they too could change their goals to match. Parents that no longer pressured their children in their final semester in high might have been sending the message to their sons that the highest grade was no longer the goal. Teachers who no longer assigned homework or changed their teaching styles in the second semester may have induced the feeling of senioritis. Ms. Joseph was not one of those teachers. In the second semester Ms. Joseph continued to developed fun lessons, required her students to think through problems, posed challenging questions, and set high expectations for her students learning.

Ms. Joseph was task-oriented and expected her students to dive into the course material, ask questions and explore what they know. She didn't just give her students answers. She expected them to think for themselves and use their prior knowledge to

solve new problems. She was never worried about grades. Her students felt that she wanted them to be successful by learning the material, not by obtaining a high grade point average. Connor said of Ms. Joseph's expectations:

My math teacher's expectations for my classmates and me are not necessarily high marks. What she seeks is constant work and growth in her respective classes. For example, she offers daily extra help, not only to help our grades, but to also teach us initiative and hard work.

Ms. Joseph defined success in mathematics for the second semester in terms of her students learning something every day, putting effort into their studies, paying attention and thinking for themselves. She wanted her students to care for more than just a grade or a final solution. Connor and Eric both agreed that Ms. Joseph's goal was for them to learn and did not emphasize grades. Eric too described Ms. Joseph's expectations as learning focused.

I know she wants us to take her instructions and be able to clearly show our knowledge of the topic at hand. She gives us everything that we have to know and it's up to us to listen and take notes.

However, her goals were not adopted by Connor or Eric, as they were both ego-oriented.

Students not adopting the achievement goals consistent with the classroom goal structure could also be seen in Mr. Carroll's classes. Mr. Carroll placed a higher importance on grades and comparisons to students' peers to better ones chances for college acceptances. His main goal was to help his students set themselves apart from their competition.

I want to make sure that the students know exactly what was being instructed and are able to demonstrate what they know on my tests. Their first semester grades could be a determining factor if they are to get into the colleges they want to get into. So for those courses, successful teaching was making sure those students were prepared for the next level of Stats or Precalc, and that I covered any material they may need for the SAT that they hadn't already covered somewhere else. Students need to do

well because their GPA and SAT scores are how they will set themselves above other students competing for college acceptances.

This indicates that Mr. Carroll was ego-oriented; however, from my observations Mr. Carroll also demonstrated some work avoidant behaviors. He seemed to put little effort into his lesson plans and admitted to me that there were days he did not create lesson plans for his seniors. The lesson that I observed lasted for about 1/3 of the class period. The rest of the time I was there he spent discussing irrelevant things with me or his students.

Mr. Carroll seemed to have low expectations for his seniors. He posted his lessons online, allowed students time in class to finish their homework, and allowed students to sleep or be on their devices during class. The students knew they could take advantage and not do their homework.

It takes a bit of time for everyone to get into class and settled into their seats but once they do we get into the course material I had planned for the day. As I lecture the class, most of them have their books out and are taking notes. These kids are going to college next year and their professors aren't going to care if they take notes or sleep or whatever so I try to treat them the same way...The material can be dry sometimes, so I get it. I know that some of the kids are probably doing homework for another class or doodling or checking Facebook, but I don't mind as long as they do well on tests.

Not all of Mr. Carroll's students were ego-involved or work avoidant. Andrew was task-involved in Mr. Carroll's Numerical Politics class and strove to learn new material to better his understanding of the material.

The students that were work avoidant felt that their parents' expectations had subsided in the second semester. Jake felt watched over his first three years of high school by his parents, teachers, and college. In the second semester he thought that no one was looking at him anymore and what he did for the rest of the year no longer

mattered. He was going to college, which was what he felt his parents cared about, and colleges did not really care what he did in the second semester as long as he didn't fail. Drew too felt the pressure from his parents diminish. He thought as long as he maintained a "C" or better, his parents would accept his grades. He no longer had the threat of being transferred to another school for low grades.

The three parents that I interviewed were consistent in their definitions of success over the four years of high school and in the second semester of their son's senior year. Unfortunately I was unable to schedule a time to speak with any parents whose definitions of success may have changed over the semester. Perhaps some parents would define success in the second semester as "as long as my son passes" or "I would want my son to improve what he knows to better himself". However, most parents that I have spoken with in the past would say that grades are their priority and they expect their sons to continue to work hard until they graduate. Perhaps grades were so important to parents because that was all they saw regarding their sons education. Many of the student participants said that they completed their homework during their free periods during the day or during their drive to school each morning. Most parents did not see their sons working with mathematics and many of those parents did not feel comfortable enough with mathematics to discuss the material with their sons.

Mr. K and Mr. L had some responses to indicate a task goal for their sons. They spoke of their sons learning a lot to better prepare for college and that success would be a product of effort. However, for the most part, their responses focused on grades and demonstrating ability as compared to others. Therefore, their definitions indicated that they were ego-oriented. Mr. L defined success for Connor in terms of demonstrating

knowledge to his teachers and to colleges. After Connor had secured his place in college, Mr. L said the push was still to get the highest grade possible. His definition for success had not changed over the second semester transition. He would be disappointed with Connor if his grades slipped and felt that the second semester was important to prepare for college.

Both Mr. L and Connor espoused the same achievement goal for the second semester in AP Statistics and Honors Calculus. Not only did they both have the same definition of success, they both were correct in their perceptions of the other's goal. Mr. L said that Connor defined success the same way he does. He told me that Connor checks his grades often and wants the highest grade possible. Connor said that Mr. L defined success as setting himself apart from his classmates by paying attention in class and getting an "A" on every test.

Andrew and his father both shared the same achievement goals for Andrew's second semester AP Calculus and Numerical Politics courses. Mr. K defined success as hard work and good grades, both attributes he felt Andrew would need in college as Engineering major. In AP Calculus, Mr. K knew that Andrew had a point to prove to the school for not placing Andrew in AP Calculus BC. Mr. K's felt that Andrew would define success in Calculus as all A's and a perfect AP® exam. Andrew said his dad defined success as finishing off the year strong. His parents put a lot of time and money into Andrew's education and they didn't want to see Andrew slack off in the last semester. However, Mr. K believed that Andrew would define success in Numerical Politics as having fun and learning new material. This would indicate that Andrew and

his father have two different goal orientations for two math courses during the same semester.

Mr. K told me during our conversation something I believe sums up how most parents at the research site feel about their sons. Mr. K said “Andrew, his mother and I all were hoping for great things this year and he more or less hit a homerun.”

Conclusion

This qualitative study was conducted using interviews and observations to collect definitions of success in mathematics which were then coded into major themes. These themes were analyzed using the Achievement Goal Theory constructs of task-orientation, ego-orientation, and work avoidance. The participants’ definitions of success in mathematics suggested four themes. First, student participants defined success in mathematics consistently as they recalled their four years of high school and transition into the second semester of their senior year. Although some of the participants admitted to changes in motivation at different times in their four years, most of the participants were able to refocus themselves back to their goals prior to their drop in motivation.

Second, the phenomenon of senioritis was found to be more perceived than real for most of the participants. Student participants reported that they felt everyone was slacking off; however, when they reporting their own purpose for studying, the task-oriented students wanted to develop new skills and the ego-oriented students wanted to demonstrate their ability. Most student participants admitted to times during the second semester where their motivation had waned, usually after receiving college acceptance letters, but would regain focus and finish the semester with their original goal. The work-avoidant students, however, were the hardest hit by senioritis. These students never

seemed to regain their focus and pointed towards other slacking students as validation for their own disengagement.

Third, students' achievement goals in mathematics were found to be more closely aligned to their parents' goals and less aligned to their teachers' goals. The results of this study suggest that the three parent participants and their sons had similar achievement goals for the second semester in mathematics. Additionally, parent participants and their sons were accurate in their perceptions of each other's goals. The study also suggested that student and teacher goals were not always aligned. Connor and Eric pursued ego-involved goals and were not influenced by Ms. Joseph's task-oriented classroom. However, Connor and Eric were only two of Ms. Joseph's students so no conclusion should be made as to her classroom goal structure or if any other students had adopted a task goal because of her class.

The last theme produced by data analysis was that students adopted different achievement goals from one class to another during the same semester. For Drew his goals were directly related to his level of interest. He pursued a task-goal for English and History classes and a work-avoidant goal for mathematics. Surprisingly, some goal shifts happened in the same discipline. Andrew's goal in AP Calculus was different than his goal in Numerical Politics. Andrew pursued ego-involved goals in AP Calculus but, in Numerical Politics, Andrew espoused task-involved goals.

CHAPTER 5

DISCUSSION

The objective of the study was to understand and compare students', their parents' and their teachers' definitions of success in a fourth-year math course in the second semester. Data from eight students, three parents and two teachers regarding how they constructed their definitions for success were analyzed through the theoretical lens of Achievement Goal Theory. In the previous chapter, I discussed how the different definitions of success compared to each other and related to the definitions to the students' behavioral, emotional, and cognitive engagement. Lastly, I explored the phenomenon of senioritis as experienced by the student participants.

Summary of Findings

Student participants were consistent in their definitions of success as they recalled their experiences in their high school math courses. Their definitions of success revealed their conceptions of ability, which were embedded in their achievement goal orientations. The task-oriented students described ability in self-referenced terms and attributed success to effort. Their goals for mathematics were to demonstrate mastery of the subject relative to their own ability. The students that were task-oriented in mathematics participated in class, had an affinity towards mathematics, and used self-regulated learning techniques to delve deeper into the content. The ego-oriented students tended to describe a differentiated conception of ability and judged their own ability on the performance of others. They participated in class when they could demonstrate they were more able than others to complete a task and used surface level learning strategies like rote memorization. The work avoidant students wanted to have fun and do as little work

as possible in their last semester. They were often off task, described being bored in class, and memorized just enough information to pass a test.

Parent participants defined success for their sons in the second semester as maintaining their focus until the end. They all wanted their sons to learn and get high grades. Mr. L wanted Connor to set himself apart from the other students to better his chances at gaining admission to top-tier universities. Mr. K wanted Andrew to finish strong and echoed Andrew's disappointment in being in AP Calculus AB. Mrs. G supported her son's ambition of attending the Naval Academy and knew he would have to distinguish himself in relation to other students. Connor's, Andrew's, and Alex's achievement goal orientations for the second semester in math class aligned with their parents' orientations.

The goal orientations of the student participants in this study mostly differed from the teacher participants' reported achievement goal orientations. Ms. Joseph defined success as her students would be able to master the subject and put forth effort to learn more about calculus or statistics. The two students in this study who were in her class were both ego-oriented, not task-oriented like Ms. Joseph. Mr. Carroll defined success for his students as setting themselves apart to gain college acceptances. Alex too wanted to distinguish himself above others to gain acceptance into the highly competitive Naval Academy. However, Mr. Carroll also taught a task-oriented and the two work avoidant student participants from this study.

The teacher participants described the atypical students as those who continued to work hard while their classmates slack off. The results from my interviews and observations indicated that the opposite. The student participants were able to identify

some of their classmates who were slacking off; however, with the exception of Jake, the participants did not suggest that they themselves were slacking. The atypical student was the student that slept through class. There was a general feeling of senioritis amongst the participants, some felt it stronger than others, but for the most part the student participants continued to demonstrate mastery or demonstrate superior ability in their second semester mathematics courses.

Senioritis affected each of the student participants in different ways. There was an element of perspective varying the degree and duration the phenomenon. From one student's perspective, senioritis was real and the reason why he wanted to coast through his second semester math course with little or no effort. He was entrenched in his ways and asserted that no one could change his ways. Another perspective came from the student that thought he was slacking because he felt like he did less work than previous semesters. This change in study habit may not be evident to others, especially if that student continued to receive high grades and participated in class discussions. Although this student would not be as blatantly disengaged as the first student, the phenomenon of senioritis would be real to him. A third student's perspective was that no matter what his classmates did, he would finish the year without fail. He could identify students that no longer cared, and possibly find himself temporarily distracted, but would continue to be task or ego involved in his mathematics class.

During my observations, I witnessed behaviors consistent with the phenomenon of senioritis at the research site; however, the majority of students that I observed were engaged in their mathematics classes, despite their peers' behaviors. This was supported by interview data which indicated that the majority of student participants maintained

their goal orientation. Research has shown that peers have less influence on achievement goals than parents and teachers (Gonida, Voulala & Kiosseoglou, 2009). The students that were grade driven as underclassmen were still striving to outperform their classmates in their final semester. They wanted to show their superior ability in mathematics by getting the highest grade in the class or the least number of questions wrong.

Implications for Practice

The findings from this study have several implications for instruction. The findings suggest the importance of identifying goal orientations early in the schooling process and providing an atmosphere for students to adopt more task-oriented goals. A task orientation will more likely keep students engaged in their last semester of high school. The ego-oriented and work avoidant students in this study reported a higher number of times being disengaged in mathematics over the second semester of their senior year in mathematics as compared to the task-oriented students. However, there is a challenge to convince parents, teachers and colleges that learning is more important than focusing on outperforming other high school students for college admissions. Although college admissions tests like the SAT® are evolving to “measure the essential ingredients for college and career readiness and success” (“About the SAT Suite of Assessments,” 2014), I feel many parents, teachers and college admissions officers focus on the scores. Changing the atmosphere would need to include changing the mindsets of parents, teachers and college admissions.

The findings suggest that not all students slack off at the end of their senior year. Although many students talk about senioritis, and claim they suffer from it, it appears to be more of an excuse for a few students to use to get by with doing as little work as

possible. Students receive influence from those around them and assume their classmates are coasting through the semester and having so much fun. This study highlighted a few work avoidant students who used this perception as an excuse to relax. However, this study also highlighted students that pointed to those relaxing, claimed they also found their motivation drop, but their actions indicated that they continued to work hard and pursue their achievement goals. Student achievement goals vary in degree and from class to class. The students that continued to pursue their goals and stay engaged may not have been as demanding as they were in previous years but were not completely turned off to achievement in mathematics.

Teachers, parents, and students should be aware that there will be moments in the senior year of relaxation after eleven years focused on grades and college acceptances. Students have spent their education creating short and long term goals, found the best way to achieve these goals, and then created new ones. In the second semester of their senior year, their biggest and perceived most important long term goal of college acceptance has now been achieved. Parents and teachers should be aware of this, and as people of influence on these seniors, they should embrace these moments. After a short time of relaxation, parents and teachers should aim to refocus these seniors onto new short and long term goals. It is easy for parents and teachers to get swept up in the excitement, the second semester should be a celebration of twelve years of hard work; however, with an understanding of a student's achievement goal for the second semester, gleaned from their own definitions of success, parents and teachers can address each student's needs on an individual basis. I will describe my recommendations for the task-oriented, ego-oriented and work avoidant student in the following paragraphs.

The task-oriented student in my study aimed to better himself each math class. He wanted to learn more mathematics, improve his math grade, and make connections between the day's topic and the real world. He used critical thinking and self-regulated learning skills daily. These students, for the most part, continued through the second semester to create those daily goals of self improvement. They were driven by these daily goals and not by the long term goal of college acceptances. Parents and teachers should foster these daily goals and help the student maintain focus on self-improvement. They can do this by reinforcing effort, offering challenging assignments that promote high levels of cognitive engagement, and deemphasizing grades as a way to compare one student to another.

The ego-oriented students in my study aimed to outperform other students each math class. They would only put forth effort into their class work if it meant they could increase their overall grade. The ego centered students had a more difficult time refocusing on their short term goals after receiving their college acceptance letters when compared to the task-oriented students. Parents and teachers should help these students by creating more short term goals and maintaining high standards for the ego-oriented student. By maintaining high standards, these students will continue to work hard to demonstrate their ability. If the standards are lowered by either parent or teacher, the student would not have to work hard to meet the standard and find more time to get distracted.

The work avoidant students in my study claimed that there was no way for them to refocus on mathematics and that the second semester was a lost cause for them. They are bored and lack interest in the subject. Perhaps a change in the four year mathematics

requirement would be beneficial for these students and their peers. The work avoidant students would not be bored and they will not be distracting other students in class.

However, at the research site, I do not think that this would alleviate the issue, but would rather exacerbate it. Since these students would have already met their graduation requirement, they would not have to enroll in a sixth course. These students would then have more free time and be less challenged. My suggestion would be to increase parent and teacher expectations for these students early in the semester by no longer grading on a curve and teaching the students how to overcome failure. I often hear from my colleagues, "Johnny should've failed my class. He did nothing all second semester."

What message are the students receiving when a student passes a class when they should have failed? Students that do not fear failing a class will do as little work as possible and assume the teacher will just give them a D. Instead, if parents and teachers communicate their high expectations and follow through with consequences, they will be able to teach students how to overcome failure and learn from their mistakes. Not only will this improve the second semester, but it would be a valuable lesson for these kids as they progress into adulthood.

Unfortunately, I feel students think that they have gotten to the point that they will just get a good grade based on past performance. The work avoidant students coast by and get C's or D's for the semester and other students struggle to keep their GPA up to their normal standard. I would argue for a cultural change to take place in the second semester. Students would benefit from teachers coaching parents and other teachers on maintaining their high expectations and requiring teachers to accurately assess each student. This can be done school wide starting with a letter from the principal and

followed up at the beginning of each marking period. When a child fails an assessment during his second semester because of lack of effort, both parents and teachers could reinforce to the student that working hard would bring his grade up. I suggest that college counselors and admissions officials maintain a constant eye on these students and demand consistency. If a student shows a significant drop in GPA or withdraws from challenging courses, a meeting could be set up with the student and his parents to get him back on track.

Limitations of the Study

The current study involved one college preparatory school that enrolls approximately 500 male students from middle to upper socioeconomic status (SES). At the time of the study, the senior class was comprised of 115 students. From this population, only 14 students filled out the initial survey. A limitation to the study would be that the students may have not known about the study, knew about the study and forgot to fill out the survey, or did not want extra work during their last semester of high school. The link to the survey was sent to the students' school-provided email accounts; however, most students were still using their personal email accounts and rarely checked their school account. Even the inclusion of the survey's link in the daily announcements did not ensure that all students knew about the survey. Announcements are read by classroom teachers at the beginning of first period, usually while students are taking out their books for class or studying for an upcoming test.

The students who may have been interested in participating in the study could have put off filling out the survey until later in the day when they had more time. Then they would either have forgotten about the survey or did not want to fill out the survey

because it was too long. I had a strong rapport with a few students that I taught or coached as freshmen. Those few students helped recruit some of their friends to fill out the survey and agree to be interviewed for the study. This presented another limitation to the study.

For example, a student who was a hard worker in my class as a freshman may have felt embarrassed to report that he coasted through his last semester of high school. The converse may also be true. A student who was lazy as a freshman may have misinformed the study by reporting excellent study habits. Both types of error are possible in any study. The effects of these errors were minimized with the inclusion of parent and teacher participants and my observations of the student in his math class.

Another limitation was that data collection occurred over two consecutive months in the second semester of their senior year. Students, parents, and teachers were asked to recall their definitions of success during a time of heightened excitement and stress. The participants' definitions may have been different during the first semester or earlier in the second semester. However, the intent of the study was to analyze and describe these students' lived experiences, as they understood them, and not to generalize to all high school seniors.

Suggestions for Future Research

The research presented in this paper was exploratory and the findings are specific to the one school. Researchers could replicate my methods to collect data from other schools, (i.e. private, public, homeschooling) to find the extent to which the phenomenon occurs in other institutions. The research site was a private, college preparatory school with the expectation that graduates would continue onto post-secondary education before

entering the workforce. The current study looks at the phenomenon by foregrounding the psychological aspects of senioritis. Future research could analyze senioritis from a sociocultural viewpoint, perhaps using ethnographical research methods. A multisite investigation could show if a culture of senioritis exists and goes beyond the research site. The addition of different types of schools, specifically schools where students enter the workforce immediately after high school graduation, would provide the researcher a comparison of students with different post-secondary trajectories. Would a student's post-high school graduation trajectory affect their achievement goals in the second semester of their senior year of high school? Does the type of school promote (or dissuade) a change in achievement goals over the second semester transition?

Another option for future research would be to extend the timeline. A longitudinal study could be conducted where students' achievement goals are assessed at different points in their education, starting at the beginning of high school and ending while the student is in college or in their post-secondary career. Understanding why achievement goals change (or stay the same) as students mature would aid educators in creating a curriculum to meet the students needs. If students do adopt different achievement goals, knowing when their goals change would be important. Do student that were work avoidant in high school refocus in college? Were the task-oriented students still trying to better themselves by learning as much as they could or was the change in environment a cause for change in goal choice? In college they are now with other students with the same majors and maybe they feel they are competing for internships or jobs with their peers. This competitive environment may promote the need to demonstrate one's ability above others.

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APPENDIX A
CONSENT FORMS

Title of the research study:

Achievement goals and engagement outcomes in the second semester of fourth-year high school mathematics courses

Name and Department of investigator:

Dr. Kristie Newton, Department of Education: Teaching and Learning

This study involves research. The purpose of the research is to describe the lived experiences of high school seniors at a college prep school who are enrolled in a fourth-year math course. More specifically, the study aims to understand and describe student engagement in their fourth-year math course as it relates to the students' definitions of success and their achievement goals.

What you should know about a research study:

- Someone will explain this research study to you.
- You volunteer to be in a research study.
- Whether you take part is up to you.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide, it will not be held against you.
- Feel free to ask all the questions you want before and after you decide.
- By signing this consent form, you are not waiving any of the legal rights that you otherwise would have as a participant in a research study.

The estimated duration of your study participation is at most 3 hours: one hour for each of 2 surveys and, if selected, one hour for an interview.

The study procedures consist of surveys, interviews, and classroom observations. The entire senior class and their mathematics faculty will be asked to complete a survey at the end of April, 2014. From that group, 6 students, their parents, and 2 mathematics faculty members will be asked to participate in a one hour interview over the first three weeks of May, 2014. A second survey will be administered in May, 2014 to the entire senior class. Over the last four weeks of the school year, the researcher will conduct 9 classroom observations. The researcher will videotape the class and keep notes.

There are no reasonably foreseeable risks or discomforts.

The benefit you will obtain from the research is knowing that you have contributed to the understanding of this topic.

The alternative to participating is not to participate.

Please contact the research team with questions, concerns, or complaints about the research and any research-related injuries by calling (267) 202-6339 or e-mailing ppuleo01@gmail.com.

This research has been reviewed and approved by the Temple University Institutional Review Board. Please contact them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following: questions, concerns, or complaints about the research; questions about your rights; to obtain information; or to offer input.

Please check one.

I consent for my son to be videotaped if interviewed and if his classroom is being observed.

I would prefer my son not to be videotaped if interviewed or if his class is observed, but consent for my son to be audiotaped while being interviewed. I understand the researcher will position the camera to capture other students in his class which may require him to sit in a different desk than usual.

I would prefer my son not to be recorded. I understand the researcher will position the camera to capture other students in his class which may require him to sit in a different desk than usual.

Confidentiality: Efforts will be made to limit the disclosure of your personal information, including research study records, to people who have a need to review this information. However, the study team cannot promise complete secrecy. For example, although the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. There are several organizations that may inspect and copy your information to make sure that the study team is following the rules and regulations regarding research and the protection of human subjects. These organizations include the IRB, Temple University, its affiliates and agents, Temple University Health System, Inc., its affiliates and agents, the study sponsor and its agents, and the Office for Human Research Protections.

APPENDIX B
STUDENT INTERVIEW PROTOCOL

Part One

- Think back to when you were younger. How would you describe your experience in mathematics? Was there a topic that interested you or that you struggled with? Can you remember a turning point in your experience learning math? Was there a math teacher that inspired you?
- What was your first math course at this school? Were you successful in it? Over the last four years, did you follow the traditional sequence or were you moved up (to honors) or down (to the academic level)? Compare your experience in mathematics before and after starting at this school.

Part Two

- Describe what you would consider to be a successful second semester in your current math course? How does it compare with your previous definitions?
- What are your math teacher's expectations for you and your classmates? How does his instruction reflect, or not reflect, his expectations?
- What are your parents' expectations for you in your math course? How do they communicate their expectations to you?

Part Three

- Describe a typical math class over the last week. What do you usually do during instruction? What observations have you made about your teacher or classmates?
- How do you feel about being in math class? What about your feelings while doing math? Do you feel connected to the subject, to the teacher, to the class?

- How often do you think about math or do math-related activities outside of class?

Can you provide examples?

- I'm going to show you a few seconds of video from today's class. What are some details you can give me about this situation? (The phrasing of the question will depend on the situation. If the student is putting forth effort but is struggling with a math problem, then the question can prompt for his emotions and thoughts. If the student is engaged in off-task behavior, questions can be directed towards the aspects of the class that caused him to disengage)

APPENDIX C
TEACHER INTERVIEW PROTOCOL

- How would you define success, in terms of your teaching and student learning in the second semester, in Precalculus?
- What would a typical student in your Precalculus class consider to be a successful second semester?
- Give an anecdotal example of a student you believe shares your definition of success in Precalculus.
- Give an anecdotal example of a student you believe does not share your definition of success in Precalculus.
- In general, what behaviors do you observe from your Precalculus students during instructional time?
- How would a typical student in your Precalculus course describe his feelings about learning math in the second semester?
- What levels of math-specific thinking take place in and out of your Precalculus classroom?

*Questions are repeated replacing *Precalculus* with each course taught by the participant.

APPENDIX D
PARENT INTERVIEW PROTOCOL

- How would you define success for your son in his math class in the second semester?
- What would your son consider to be a successful second semester in math?
- Comparing the two definitions, what do you attribute to the similarities? What do you attribute to the differences?
- What behaviors do you observe from your son at home that are related to his math class?
- If you could sit in on his math class, what behaviors do you think you would observe?
- How would you describe your son's feelings toward learning math in the second semester? How do you feel about math?
- What math-specific thinking, outside of your son's required math work, have you observed from your son at home? For example, is he interested in solving logic problems, keeping statistics for sporting events, or does he talk to you or others about the math he is learning?

APPENDIX E
OBSERVATION PROTOCOL

1. Obtain lesson plan from instructor (e.g., PowerPoint file) ahead of time.
2. Sit in a location that provides an unobstructed view of each student's face and desk.
3. Every few minutes, observe a student for 2–10 seconds and record the following information directly in the instructor's lesson plan (e.g., the "Notes" section of a PowerPoint file)
 - a. Time
 - b. Number of students engaged, based on criteria in table below
 - c. Classroom activity at the time (e.g., in-class discussion, lecture)
 - d. Any relevant instructor actions (e.g., Socratic questioning, humor, real-world examples)
 - e. Any extenuating circumstances (e.g., classroom temperature, technical issues)
4. Record time of any instructor questions to the class and any student questions to the instructor

ENGAGED BEHAVIOR		DISENGAGED BEHAVIOR	
Listening	Student is looking at the instructor and is responsive to the lecture (e.g., nods in agreement, student's eyes are following notes).	Settling in/packing up	Student is unpacking, downloading class material, organizing notes, finding a seat or packing up and leaving classroom.
Writing	Student is listening to the instructor and is taking notes or working on a math problem.	Unresponsive	Student is not responsive to the lecture (e.g., student is sleeping or daydreaming, student's eyes are not following lecture notes, and student is unresponsive to instructor questions or cues).

Reading	Student is following along with class, reading slides or preprinted notes. Or student is reading ahead when asked a question.	Off-task	Student is working on homework or studying for another course, playing with phone, listening to music, or reading non-class-related material.
Engaged technology (phone, tablet, calculator) use	Student is following along with lecture, taking class notes, or performing calculations with phone, tablet, laptop, or calculator.	Disengaged technology (phone, tablet, calculator) use	Student is surfing the Web, playing a game, chatting online, texting, or checking e-mail.
Engaged student interactions	Student is engaging with other students about class material (listening or explaining) (e.g., student is using hand gestures, pointing at notes, or can be heard discussing material),	Disengaged student interactions	Student is engaging with other students about non-class-related material (e.g., student is laughing, there is a constant back and forth-between students, or can be heard conversing with other students).
Engaged interaction with instructor	Student is asking or answering a question or participating in class discussions.	Distracted by another student	Student is observing other student(s) and is distracted by an off-task conversation or by another student's computer or phone.

Note. Adapted from

Quantifying student behavioral engagement based on teaching practices in a large class by E. Lane and S. Harris, July 2009. Poster presented at the Improving University Teaching (IUT) 34th International Conference, Vancouver, BC.

APPENDIX F
ADDITIONAL CODING SAMPLE

Table 4. Additional coding sample

Transcription	Notes	Code	Cluster
<p><i>Researcher: What were your parents' expectations for you in the second semester?</i></p> <p><i>Andrew: My parents are really into like, finishing strong, like finishing out with a bang, so, and their previous investment in my summer course for Calculus, they expected me to do all the more, just continue to get the grades, if not even better than I did first semester.</i></p>	<p>Andrew discusses his parent's expectations. His parents define success in terms demonstrating ability. Use to compare with their definition.</p>	<p>Student perception of his parents' definition of success</p>	<p>Alignment of student and parent definition of success</p>
<p><i>Researcher: What would you say would be a successful second semester for Andrew in his math class?</i></p> <p><i>Mr. K: Primarily, I would say the grade, an A, since he took Calculus over the summer, and aced it there so he should get an A at [his high school] and then secondarily would be to, you know have all that manifest itself in a 4 or a 5 on the AP exam so that he could potentially get at least one semester's credit for math in college.</i></p>	<p>Mr. K also mentions the summer course and how that should translate into a successful second semester.</p>	<p>Parent's definition of success for his son in the second semester</p>	<p>Alignment of student and parent definition of success</p>

Transcription	Notes	Code	Cluster
<p><i>Researcher: What would you have considered, in Calc, a successful second semester?</i></p> <p><i>Andrew: I kind of knew all of the information before the teacher even taught it, so I think the biggest thing, the goal that I wanted was to be able to reflect how I already knew the information, was to get an A in the class and also to do well in the AP test and continue to hold up my test scores throughout the year to say "Hey, I already know this, why are you making me take it again."</i></p>	<p>Disappointed in where he was placed for math, Andrew wanted to prove to the school that he was put into the wrong class and he should have been in BC.</p>	<p>Second semester definition of success in Calculus</p>	<p>Definitions of success across classes</p>
<p><i>Researcher: And what about numerical politics?</i></p> <p><i>Andrew: My motivation in numerical politics is pretty much just study the different aspects of math because I never knew the different aspects.</i></p>	<p>This is different than his definition of success for Calculus. He is not trying to prove anything but really enjoys learning</p>	<p>Second semester definition of success in NP.</p>	<p>Definitions of success across classes</p>