DISSERTATION

MIDDLE SCHOOL STUDENT MOTIVATIONAL EXPERIENCES IN MATHEMATICS:

A NARRATIVE INQUIRY

Submitted by

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ABSTRACT

MIDDLE SCHOOL STUDENT MOTIVATIONAL EXPERIENCES IN MATHEMATICS:

A NARRATIVE INQUIRY

Among middle school students there is thought to be a lack of motivation toward academic achievement in math. Ames expressed this thought in 1990 when mentioning this as one of the biggest problems in education. Motivation to learn and grow through mathematic understanding gives students' purpose. Due to this thought, the focus of the study was to use a narrative inquiry experience-centered approach to gain insight into five middle school students' motivational experiences in mathematics at the end of eighth grade. Each student was interviewed over the course of three different sessions, taking place over a three week span of time. These interviews were conducted during their normal school day at a time deemed by the school as not academically hindering (i.e., a study hall or open block).

To help with analysis, interview sessions were audio recorded and transcribed into a basic word processor. Nvivo software was then used to create common themes (or nodes) and connect them to common reference points within each student's interview dialogue. Some themes like intrinsic and extrinsic motivation were created prior to analysis and looked for specifically, while other themes were created after being mentioned by multiple students or in multiple interviews. These added themes were noticeably of value to the participants when speaking of their motivational experiences.

Data collection and analysis concluded that personal motivators, both intrinsic and extrinsic, were mentioned by all students over the course of their three interview sessions. Student's desire for accomplishment, esteem, and support were all revealed as common motivators. Interview responses reinforced the view that motivation is supported through small,

challenging but achievable goals. Students expressed not wanting simple math problems, they wanted to feel challenged. Therefore, benefits for students may be found if teachers are able to balance mathematics challenges with supporting student's current abilities and academic competence.

What was also concluded is a definite relationship between the various levels of Maslow's Hierarchy of Needs being satisfied and an increase in student motivation. Recommendations for research include looking further into whether students are motivated to satisfy their needs, as Maslow suggests, or rather if the act of feeling calm over a need being met creates further motivation toward academic achievement. Future research into this concept would help formulate true connections between satisfied needs and motivational desire.

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Chapter 1: Introduction

Anyone working with young people has an interest in what motivates them. Why do children think, feel and behave as they do? Motivation is at the heart of teaching learners of all ages and abilities. With a clearer understanding of motivation in school we are better able to understand and support those young people who find learning at best a chore and at worst something to be actively fought againt. Yet, while many students are quickly labelled [sic] as 'demotivated', they can seem incredibly motivated –not to be motivated. (Long, 2005, p 1)

The passage above describes very concisely the complexity, mystery, and necessity in understanding academic motivation for students and how to better support students' motivation toward their academics. "Experiences that students have as they pass through the educational system either affirm or alter their evolving motivational patterns and associations with learning" (Lumsden, 1999, p. 15). These experiences help students form who they are and who they become. Each experience students have either fosters or deters a passion for education and their academic growth. "Decisions made during one's adolescence can have serious consequences for one's future education and career" (Holmbeck, 1994, p. 23). Classroom experiences generated early in education can ultimately impact students' post-secondary academic endeavors and career choices. Roeser and Lau (2002) state that students undergo rapid changes in their middle school years, "all of these changes, individually and collectively, contribute to the defining life task of adolescence – the question of discovering who one is, who one belongs with, what one is good at, and where one is going in the future" (p. 93). This is accomplished through interactions with peers, teachers, parents, and academic experiences.

Students spend a good portion of their school day in classrooms with teachers. Roeser and Lau (2002) query: "Can educators cultivate adolescents' motivation to learn and identification with school by the ways in which they design middle school learning environments, and thereby direct more adolescents onto favorable developmental pathways?" (p. 105).   This narrative inquiry, an examination of the experiences, looks at academic motivational interactions between teachers and students. From the perspective of students, it examines what classroom motivational techniques they identify as most effective. Middle school students' personal experiences may provide some insights into changing Roeser and Lau's (2002) question from "Can educators cultivate adolescents' motivation?" to "How do educators cultivate adolescents' motivation?"

The intention of my research is to provide teachers with useful knowledge to support students' academic motivation in mathematical topics from the students' perspective. This study looks at students' mathematic experiences specifically; however, some motivational findings may transfer to other subjects. With regard to the study's findings, when I refer to *teachers*, I include all those who would find the academic motivators mentioned by the interviewed students in some way useful in their efforts to improve academic motivation in middle school students.

For the purpose of this study, I use the terms *motivation* or *academic motivation* to represent a 'push' or 'drive' propelling students to engage in their academic educational growth (Marx, 1960). Academic educational growth should be something measurable. This may include items such as students' class grades, achievements, test scores, and accomplished assignments. Data collected may provide teachers with additional guidance as to what is lacking in the classroom, what is working within the classroom setup, and provide instruction to help foster additional motivation for middle school students receiving instruction in math topics.   Through

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the students' stories discussed in Chapter 3, teachers can read what has been successful motivating middle school students in math.

Statement of Problem

As students mature, their relationship to "achievement gets more negative with increasing age… the decline is especially marked between kindergarten and grade one, and again at about grades six, seven, and eight" (Eccles, Midgeley, & Adler, 1984, p. 285). Many teachers concentrating their work among the middle school age group, children ten to fourteen years of age, may see student apathy emerge and a decline in achievement. Adolescent students may seem unengaged, or unable, to be academically driven to accomplish classroom tasks. Some teachers may even feel frustrations about the lack of effort students exert to learn and to retain knowledge. As Urdan, Ryan, Anderman, and Gheen (2002) explain, teachers describe frustration at seeing students use avoidance behaviors when they encounter challenging academic tasks. Avoidance behaviors are any characteristic a student exhibits to avoid subject work or academic exercises given them to complete. Avoidance behaviors may include using electronics, sharpening pencils, talking to peers, or asking to use the bathroom. "There is little that is more frustrating to teachers than when students perform beneath their capabilities." (Urdan et al., 2002, p. 72) Avoidance behaviors are linked to lower academic accomplishment and feelings of low self-efficacy (Urdan et al., 2002) or self-confidence.

In mathematics, students may feel a concern about how their academic performance compares to their peers (Ames, 1990). Teachers may tell low-performing students, who may feel they are 'giving it their all', that they should try even harder. According to Ames (1990) teacher-pressure could further withdrawal as avoidance lowers students' self-confidence. Findings from a

college student study found similar challenges faced with student motivation as seen in middle school adolescents. Lack of student motivation and lack of student effort has a direct influence on academic success or failure in classes. One college student respondent stated:

> I'm just not spending the time that I should to do it - that's probably the main thing. I don't know why I'm not doing that. I thought that I would be really motivated but I don't seem to be. I think what it is, is that I started off with the best of intentions, but I wasn't quick enough off the mark in the first week and now I seem to be forever panicking and tying [sic] to catch up. (Anthony, 2000, p. 8)

College students may be at a different place on a motivational continuum; however, if motivational struggles influence college students then it may be plausible to assume middle school students may also be affected. Is it that students, middle or college level, do not *want* to be motivated or are there other reasons they fall behind and quickly give up? Adolescents may experience feelings similar to these college students, feeling too far behind to catch up in the 'education race'.

"Student motivation has, for some time, been described as one of the foremost problems in education… motivation is important because it contributes to achievement, but is also important itself as an outcome" (Ames, 1990, p. 410). Motivation acts as a 'driving force.' It is determination to succeed even when struggles must be overcome or obstacles stand in the way. Barker (1998) defines motivation as "an individual's desire to succeed with respect to the various activities in which he or she becomes involved" (p. 11). Motivation provides students with a purpose and enthusiasm to persist through academic challenges.

Motivation types. There are two types of motivation, intrinsic and extrinsic. Intrinsic motivation occurs within a student as an internal drive or desire to complete a given task for the purpose of completing it. Extrinsic motivation is an external reward received at the end of the task being accomplished. An easy way to tell the difference between them is that extrinsic motivation is usually tangible, while intrinsic motivation normally leaves a good feeling when the work is accomplished and is not a tangible reward given solely for task accomplishment. According to Lumsden (1994), students can be taught strategies to increase their motivation and improve their views of their abilities.

Purpose of Study

"The middle school years have been identified as the most crucial in influencing membership in the math/ science talent pool" (Clewell & Braddock, 2000, p. 90). Data collected in middle school student populations may help provide guidance toward understanding student motivational needs and beneficial classroom structures to meet these needs. I desire to help students build their academic motivation early in their educational careers, starting in the elementary and middle school years. If students are able to internalize these skills, using them frequently and, in turn, engraining such intrinsic skills into their knowledge base, it may make academic trials less overwhelming, and may help middle school students arrive at a post-secondary school equipped with internalized (intrinsic) motivation fueling their learning. Analysis and review of my findings will allow teachers insights into students' perspectives on increasing academic motivation. "Well-motivated students have always succeeded in higher education and will continue to do so: the challenge has always been to stimulate, engender, and

enhance the motivation of those students whose enthusiasm for learning cannot be taken for granted" (Brown, Armstrong & Thompson, 1998, p. 1).

Successful students see value in their academic accomplishments. "Early adolescents' motivation to learn, level of achievement, and identity as a student are powerful marker variables that probabilistically forecast later life outcomes" (Roeser & Lau, 2002, p. 105). Students need educational successes and attainable but advanced goals. If students push themselves to attain high goals they have a better chance of achieving their goals. Educational successes encompass students' self-recognized accomplishment of:

1) Competency and understanding of the skill, task, or subject matter at hand.

2) Confirmed ability through verbal recognition, praise, or academic grades within a subject, by a teacher or administrator.

3) Growth in personal knowledge and understanding over a period of time.

4) Mastery of content knowledge.

Significance of Research

Young children most often begin school academically motivated and enthusiastic both about learning and participating in classroom activities. They are optimistic about their abilities, anticipate success, and view expending effort and practice as the key to overcoming difficult academic struggles (Dockett & Perry, 1999). Young students tend to see success as a reward in their efforts, increasing intrinsic motivation. When children are young they are likely to link effort with ability, therefore children who work harder are seen as smarter (Ames, 1990). In adolescent years (10 to 14 years old) this view starts to change. As students begin middle school they often seem to lose determination to persevere through their academic struggles. An

academic disconnect occurs (Eccles et al., 1984) and unreinforced intrinsic motivation may lessen or disappear.

Students who have focus and personal goals, beyond the academic task at hand, tend to keep motivated, and therefore push themselves to achieve higher academic achievement goals. On the other hand, as students lose academic motivation or determination and are unable to see the *value* or usefulness in their education, they can be diverted away from reaching their academic potential. Academic motivation promotes learning and relates positively to present and, ultimately, future achievement (Nelson & DeBacker, 2008). Gains a student makes in middle school benefit their growth in education overall.

Choice of focus. I have chosen to conduct my research in a qualitative manner to provide a personalized, in-depth look at how students perceive their classroom environment. To accomplish this, I interviewed exiting eighth grade students about their academic motivational experiences in various mathematics classes throughout middle school. I use experience-centered narrative inquiry (Squire, 2008) to capture each student's personal stories.

Interview questions were used to prompt students' memories of their motivational experiences in math. What is uncovered through students' recollections is what students bring with them to the interview on that day. Stories told are the critical incidences students chose to share. This study is a purposeful look into what middle school students experience as a motivational reality in their math classes. According to Carroll and Leander (2001) what motivates students and to what extent they are motivated are important for educators to understand. Improving student motivational levels can inspire active learning.

Guiding Questions

To create a guide for asking students about their experiences, a research question and underlying questions were used.

Research question. This study focuses on the research question and sub-question:

- What are students' experiences of motivation in math during middle school?

    o How are they motivated to achieve academically in math?

Underlying questions and considerations. If intrinsic or extrinsic motivations are present in students' stories, where and how are they recalled?

- Do students imply sustainable academic motivation within their stories?

    o If so, is it intrinsic or extrinsic?

Additional considerations. Questions listed below may influence student motivation:

- How do middle school students think about math influencing their future endeavors?

- What role do middle school students see math having for their future after middle school/high school?

- What thought do middle school math students give to their post high school endeavors?

- How do students view academic experiences they have now assisting them in their future?

Assumptions

1. Students need continuing motivation, be it internal or external, to achieve set academic goals.

2. The goal of K-12 schools and instruction is to help students be a contributing addition to society and to produce students ready to tackle and obtain skills needed to fulfill their academic and career desires.

Educational Interest

Teachers cite instilling and maintaining motivation as a big problem observed in education (Ames, 1990). This has been discussed during Professional Development (PD) trainings I have attended as a failure to adequately motivate and demonstrated by low achievement scores of students. These PD presentations normally stress concern over the methods in place to raise low standardized test scores. Many different tactics are discussed in these meetings, but the ultimate goal remains the same: get all staff on board to help students better achieve. *School-wide* initiatives, at least theoretically, are more impactful, conveying an outward importance and sense of worth to staff and students (Maehr & Midgley, 1991, p. 415). As collective units, schools and districts strive to better the educational outcome of their students. Understanding students' current academic motivational levels in math and academic achievement could be of interest to schools striving to increase their students' educational advancement.

Researcher's Perspective

According to Galloway, Rogers, Armstrong, and Leo (1998), "There is a cultural norm that teaching should be more than mere transmission of facts; it should involve children in an interactive process with each other and with the teacher. This *is* a cultural norm" (p. 16). In agreement with this cultural norm, I believe that a student's educational experience is what he or she makes of it. Teaching is more than just a transmission of facts, it must involve the students. I have heard many times in my teaching career, "Why are we learning this?" or "What does this do for me?" I believe students need to be able to answer these questions themselves and personalize their own education. Each student needs to make each academic experience internally personal and individually relevant to their academic goals, creating a drive within them to accomplish something bigger, a future career or academic goal.

Many students require guidance and direction from some external sources; be it teacher, parent, or peer. Students have their own internal understanding about what motivates them, even if it is only a realization of their personal likes and dislikes. I believe students must be guided to create personalized skill sets in order to best succeed as academic learners. Teachers should guide students, helping to foster and focus internal motivations where this 'staying power' is lacking, so students do not give up at the first sign of academic struggle. Many middle school students do not come into the classroom with a 'natural' internal motivation. Students need support in their motivational growth, especially when it comes to accomplishing tasks they feel are difficult. They may need to be taught how to keep their motivation going even when they dislike an assignment or to take ownership and pride in their academic growth and accomplishment.

As a topic I have heard discussed frequently around teachers lounges: teachers' aspire to have motivated students. However, teachers just can't hand out motivation to students. The student must internalize motivation (Riggs & Gholar, 2009; Ryan & Deci, 2000b). They need to have interests, goals, or some sort of 'buy in' to increase motivation. Developing an internal or intrinsic motivation in students' for academics are not as easy as telling a student he or she needs to set goals. Setting goals can be a hard concept for middle school students. I strive to figure out the best ways to help *each* student internalize stamina for difficult tasks. I would like to find even more effective ways to support students' efforts with internalizing higher academic motivation, so later in their experiences they will not give up on their endeavors at the first sign of difficulty. I believe, if students are able to create an internal academic motivation then these students will have the skills to overcome academic challenges.

Delimitations

This study is confined by the following characteristics: Interviews were conducted with exiting eighth graders at the end of the year and in a school following a more traditional middle school model of 6th – 8th grades. There were five 8th grade students interviewed from a public school in Colorado. The premise was to construct a view of adolescent students' motivation as they pass between middle and high school instructional years. Exiting eighth graders were chosen as a sample to ensure the interviewees would have enough middle school math experience and that these experiences were in the forefront of their memory.

This study looks at one middle school model (6th thru 8th grade) within a public school district servicing K-12 education. Within this model students transition from classroom to classroom for various subjects throughout the day. Students within this middle school model

have been exposed to multiple math teachers and different teaching methods and styles during 6th, 7th, and 8th grades. The school classrooms are all housed within the same building and share many of the same resources. It is publicly funded and any student within its district's boundaries is eligible to attend. The school district boundaries encompass rural and suburban settings. Colorado's statewide distribution of free and reduced meals, fall 2010 numbers, are 40.3% of the total student population. The population served at the research location is below the overall state distribution, at 32.2% of the district's population being serviced (Colorado Department of Education, 2010).

Definition of Terms

Achievement. For the purposes of this study, achievement focuses on growing educational knowledge and academic understanding as it pertains to each individual subject area and current grade level of each student.

Extrinsic motivation. A desire to accomplish a task increased through external stimuli. For example: Monetary rewards, prizes, etc. may be given to increase motivation to get work accomplished.

Intrinsic motivation. A desire to accomplish a task increased or enhanced through an internal drive. For example: A personal desire to succeed or persist to the end of a difficult task, with no reward other than knowing the task has been accomplished.

Middle school student. This phrase incorporates any student attending school as a 6th, 7th, or 8th grade student; generally between ages 10 and 14 years.

Motivation. An individual's personal drive to accomplish something (Riggs & Gholar, 2009), a goal or task, despite trials or struggles they may have accomplishing the task.

Narrative. A story being told (Riessman, 2008). In this study, narrative is referring to middle school students' stories of their academic motivational experiences.

Narrative inquiry. An analysis of the stories being told (Riessman, 2008). In this study it is an analysis of middle school students' stories of academic motivation in math.

Potential. What a student is capable of achieving within an academic realm (Wiseman & Hunt, 2008).

Public school. The term public school includes any school deemed "public" and free to enter and attend by the State of Colorado.

List of Acronyms

AMLE: Association for Middle Level Education

MAP: Measures of Academic Progress

NCTM: National Council of Teachers of Mathematics

PD: Professional Development

STEM: Science, Technology, Engineering & Mathematics

Chapter 2: Literature Review

Research conducted by Blum, McNeeley, and Rinehart (2002) indicates there may be up to *two-thirds* of any public school population who feel unconnected or disengaged from their K-12 education. "These students report feelings about school ranging from apathy to anger; they report being bored and frustrated most of the school day" (Schreck, 2011, p. 67). There is a problem in classrooms if *two-thirds* of the student population feels bored or academically frustrated every day. Students should feel connected to their learning and moved by a self-driven or school supported motivation of educational growth. If a student is interested in the lesson and engaged in their learning, then his/her motivation is likely high (Graham & Weiner, 1996, p. 63). Achieving this high level of motivation may provide an alternate educational experience for disengaged students who might otherwise feel apathy or boredom in school.

This literature review connects background knowledge about adolescent behaviors, academics, motivation, and mathematics to provide a foundation for study of middle school adolescent motivation in mathematics. Low academic motivation is not the only influence of student-school detachment, but may be linked as one of the key factors influencing students' academic disconnect (Eccles et al., 1984). This review examines the relationships of intrinsic (internal) and extrinsic (external) motivation to middle school students' academic achievement and academic struggles in math.

Attribution (Self-Determination) Theory

To assist students' quest for motivation is to find their personal values through the use of *attribution theory* (Graham & Weiner, 1996)*,* also referred to by Deci and Ryan (1985) as *self-determination theory*. "This theory presumes that motivation is best represented as a temporal

process initiated with an event and ending with some behavior or behavioral intention" (Graham & Weiner, 1996, p. 71). Self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000a) assumes that humans inherently desire to possess some form of intrinsic motivation. To strengthen self-concept, the child must feel that he or she is making valid contributions to a task or something greater than self. External motivation, be it either reward or to avoid punishment, falls short in allowing students to feel part of a needed, contributing team. Intrinsic motivation is able to give students a feeling of being a contributing 'team' member.

There are three different factors of attribution theory that contribute to students' perceptions around academic success or failure in endeavors and whether or not they will exert effort toward a similar activity in the future. These factors are External (Extrinsic) or Internal (Intrinsic), Stable or Unstable, and Controllable or Uncontrollable (Boruchovitch, 2004). Using these three sets of factors people tend to create explanations about their successes or failures in a way that helps them maintain a positive self-perception (Boruchovitch, 2004). Ferguson (2000) asserts that extrinsic punishments pale in comparison to natural consequences. Natural consequences provide intrinsic ends. Human desire to integrate into larger society promotes intrinsic motivation (Ryan & Deci, 2000b). Through this desire, an internal drive and curiosity takes over and students who may feel classroom tasks are chores may learn to view academic assignments as a means to an interesting and appealing end result.

Most motivations or motivational strategies fall into one of two categories: intrinsic or extrinsic motivation. This section will examine these two forms of motivation among middle school adolescent students, and how students relate to motivating factors within the classroom setting. Ferguson (2000) describes intrinsic motivation as an incentive toward an internal

outcome or feeling, and equates extrinsic motivation to something that includes an external product.

Students may feel compelled to complete an academic task from either their intrinsic or extrinsic motivation. When motivated intrinsically students feel "a response to needs that exist within the student, such as curiosity, the need to know, and feelings of competence or growth" (Burden, 2000, p. 3). These students choose "…to do an activity for no compelling reason, beyond the satisfaction derived from the activity itself—it's what motivates [them] to do something when [they] *don't have* to do anything" (Raffini, 1996, p. 3). Students may not be able to recall when their 'drive' first started or why they *must* accomplish the task, but they feel an inner need to persist through to its completion. This motivational desire satisfies a psychological need to be competent, an innate curiosity, or even a personal interest. Intrinsic motivation energizes young children to explore and manipulate concepts as a natural tendency (Deci & Ryan, 1992; Heckhausen, 1984). This internal motivation is called *intrinsic motivation*.

To satisfy extrinsic motivations, student may need external encouragement; something additional to give motivation a clearer, defined purpose. Something outside of students' intrinsic motivation; such as a payment or some reward may be needed to enhance the value to complete an academic task. This 'drive' pushed with external pressures is extrinsic. It is when a person is merely accomplishing an academic task for a promised, readily available, external tangible reward at its completion. The goal is to eventually move away from the need to rely on immediate extrinsic rewards and move toward intrinsic to bring out a need for students to achieve academically because *they* desire to achieve and to have a "…tendency to be active in [their] encounters with the environment" (Deci & Ryan, 1992, p. 31).

There is a great emphasis on doing something merely for obtaining of money, image, honor, or fame (Ferguson, 2000; Ryan & Deci, 2000b) in U.S. society and culture. The attainment of 'things' as a cultural emphasis may create societal pressures that push students toward extrinsic rewards. However, there are students who, when American society presents "strong cultural emphasis on extrinsic values" (Ryan & Deci, 2000b, p. 45), hold a strong intrinsic motivation to fulfill tasks.

The use of extrinsic motivation techniques may be a valuable short-term tool to effectively focus 'hard to reach' students. Most examples of extrinsic motivation are tangible. However, there are some extrinsic motivation methods that are not. Praise is one of the most powerful extrinsic tools, which when used appropriately has the ability to work hand-in-hand with intrinsic motivation efforts (Ferguson, 2000). Praise for desired academic accomplishment falls under extrinsic motivation since it is normally utilized as immediate feedback and once received students may be prompted to complete their work for the positive feedback they receive at the end. However, praise supports a longer-term, lasting intrinsic motivation for students. According to a study of extrinsic rewards on free choice, conducted in Ryan and Deci (2000b), "…positive feedback generally enhanced intrinsic motivation whereas tangible rewards undermined it" (p. 30).

Extrinsic motivation. As discussed there are two different strategies a teacher can use to build students' academic motivations; intrinsic and extrinsic. When looking at extrinsic motivation, learning takes place because a valued external incentive is promised (Burden, 2000; Riggs & Gholar, 2009). Extrinsic motivation includes praise from the teacher, grades, rewards, prizes, or anything the student may see as added value or privilege received for their effort (i.e.,

an academic task). In some instances an external incentive might include avoidance of a negative experience (i.e., *keeping* a student's lunch recess since they do not have to make up unfinished classwork).

According to Diana Benzing (Burden, 2000), a junior high teacher in Iowa awards 'earned' points to her students, 'earning' points helped quality of performance within the classroom. Points given to students depend on their scores. One 'point' is given for each 10 percentage points earned on an assignment (rounded to the nearest 10). "Double points are given for quizzes; triple points for tests" (Burden, 2000, pp. 3-4). Benzing instituted her classroom 'point' system as a means of motivation while simultaneously building students' academic knowledge. This dual emphasis on motivation toward task completion and encouragement of concept understanding is meant to lead students to deeper intrinsic motivation. Students may feel achievement with more 'points.' Higher points reflect student earned grades and academic understanding, concurrently fostering student intrinsic motivation.

Earned rewards in the classroom should always be sincerely recognized. Extrinsic motivations lose their effectiveness if the meaning behind the reward breaks down. "When incentives, including praise, are given as rewards following actions, they can serve to affirm one's self-concept" (Ferguson, 2000, p. 207). Praise should be genuinely given, at an appropriate time, when students' have earned it. This way students' self-concept is positively affected. Insincerity may create doubts about personal abilities or create thoughts of unearned praise. Praise should not be given in a manner to make students believe that a teacher has no confidence in their abilities or that the teacher is surprised at their completion of a task.

Intrinsic motivation. Although praise is considered extrinsic motivation, "positive feedback will enhance intrinsic motivation," (Ryan & Deci, 2000b, p. 22) especially if academic praise given is unexpected and accepted as genuine. Ryan and Deci (2000b) examined positive feedback given to students and "results indicated that positive feedback significantly enhances intrinsic motivation" (p. 22). When rewards are given unexpectedly the surprising nature helps students internalize the reward as more of an intrinsic motivator. Through changing a traditionally extrinsic motivator to having an intrinsic effect it can have a positive impact on students' already present intrinsic motivation (Ryan & Deci, 2000b). Negative impacts occur only when students come to expect an extrinsic reward for their actions.

Students who possess intrinsic motivation for a particular topic feel an internal drive to complete a task (Riggs & Gholar, 2009), despite its difficulty. Students with "...well-developed individual interest are motivated learners, in the sense that their activity appears purposeful, sustainable, and ever deepening" (Renninger, 2000, p. 390). Many teachers enjoy working with students who hold this intrinsic motivational quality for the subject they are teaching. These students have an internal drive that helps them have less 'off-task' avoidance behaviors. Education, for these students, is full engagement in an ongoing discussion of content not 'learning' as a matter of learning goals and doing tasks. It is an opportunity to support their curiosity for a subject (Renninger, 2000). Students arriving in class with inherent intrinsic motivation need this academic drive to be maintained; for those not entering with it, intrinsic motivation must be fostered. The creation of intrinsic motivation is a consolidation of knowledge and an appreciation of value that a student may hold for a subject (Renninger, 2000). Students' interest must be found and, in some way, tied to the content or subject being studied.

Intrinsic versus extrinsic. The debate between the extent of uses of intrinsic and extrinsic motivation in the classroom has a long history. Research conducted by Deci (1972) and Lepper, Greene, and Nisbett (1973) conclude that students previously motivated by their own intrinsic motivation, once given a reward (or extrinsic motivational encouragement) were less likely to accomplish the task again once the extrinsic motivation was no longer offered (Deci, 1972; Lepper et al., 1973; Ryan & Deci, 2000b; Sansone & Harackiewicz, 2000). In their 1972 research, Deci mentions the difference between employees working merely for the cash 'reward' and employees intrinsically motivated to perform their job effectively. Suggesting "when individuals have both sufficient extrinsic (the reward) and intrinsic (interest) reasons to perform a behavior, they will discount the intrinsic reason and attribute their behavior to the extrinsic reward" (Sansone & Harackiewicz, 2000, p. 2). Therefore, when the reward vanishes it appears so does a student's effort, no longer bound with the same intrinsic foundation.

There is a fine balance between intrinsic motivation and extrinsic rewards. An ideal setting allows for intrinsic motivation to be more prevalent then extrinsic, but both may be present. As Schreck (2011) points out, extrinsic rewards may only catch students' attention for a brief time. If teachers desire a "deeper, long-lasting intrinsic motivation that will carry a child the entire distance of his or her life—the motivation to persevere, to make wise choices, to put off immediate gratification for the benefit of reaching future goals—carnival toys and payoffs aren't going to do the trick" (Schreck, 2011, p. 64). The availability of many extrinsic rewards assists students in the loss of their intrinsic motivation. Too many extrinsic rewards cause students to demand a reward for each task completed. If extrinsic rewards are the norm within a classroom environment, students lose their self-determination to start or persist in the effort to complete a task without a promise of reward (Deci & Ryan, 1987; Pittman & Boggiano, 1992). Extrinsic

motivation is a surface level motivation; as soon as that external reward is gone, so is the desire to persevere to the end. Moreover, extrinsic payments cause feelings of entitlement, lessening possible intrinsic motivation students may have had.

Getting rid of extrinsic *payoffs* may be ideal, but it is unrealistic to assume intrinsic motivation will act solely as a driving force all-day long (Brophy, 2004). It may be more realistic that teachers reduce extrinsic rewards and build up intrinsic motivations within students for academic subjects and tasks. Teachers encourage students "to use thoughtful information-processing and skill-building strategies when they are learning" (Brophy, 2004, p. 15) to help sustain students' interest and motivation toward academic tasks. Activities viewed as meaningful can intrinsically motivate students.

Blending intrinsic and extrinsic motivation. Instilling, developing, and focusing intrinsic motivation prove difficult, compared to using extrinsic motivation techniques. However, extrinsic rewards cannot act as the sole motivational tool if the intent is to create long-lasting motivational results. Extrinsic rewards may work well at first, but may lose incentive value over time. The best long-term results are created through the eventual movement from extrinsic to intrinsic motivations. Try to "make everything [taught] as intrinsically interesting as possible, and avoid handing out material rewards when they are unnecessary" (Burden, 2000, p. 3). Incorporating intrinsic motivation into the classroom may be as easy as changing the way teachers present an assignment to their students (Shah & Kruglanski, 2000).

An example of how teachers incorporate intrinsic and extrinsic motivation into their classrooms is seen in Boggiano and Main's 1986 study. Through teachers "providing an activity as a bonus or reward for performing a different activity…[it] produced increased interest in the

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bonus activity" the children were given. Teachers were able to create an 'intrinsic swing' on the academic tasks. This is accomplished with two consecutive assignments; one assignment contingent on the second assignment being completed. Redefining and placing value on the second assignment naturally raises students' intrinsic motivation for both assignments.

Certain academic activities naturally support intrinsic motivation. Intrinsic motivation tends to lend itself to activities that work within a "context that are experienced as autonomy supportive (i.e., informational) and away from those encountered in contexts that are experienced as either controlling or amotivating" (Deci & Ryan, 1992, p. 24). Teachers may find it easier to enhance intrinsic motivation if they use activities that are supportive of autonomy and save the extrinsic rewards for activities students find less interesting or less self-rewarding (Burden, 2000). If used correctly, intrinsic and extrinsic motivational techniques support one another. Students' motivational success supported through a gradual positive reinforcement that begins with extrinsic motivational rewards transitions into intrinsic motivation being internalized.

Learning Theories of Motivation

There are many learning theories in education. Five are discussed in this section, these include theories around *self-efficacy*, *behavioral theory*, *cognitive theory*, *humanistic theory*, and the theory of motivation from the stance of *Maslow's hierarchy of needs*.

Self-efficacy. Research documented by Schunk (1995) supports the view that self-efficacy, or academic self-confidence, affects students' academic motivation as measured in terms of students' effort and persistence to attain academic achievement. "Perceived self-efficacy is concerned with judgments of personal capability" (Bandura, 1997, p. 11). Commonly self-

efficacy is outlined as a belief in one's abilities to achieve a desired result or goal. This belief "is affected by one's actual performances, vicarious experiences, verbal persuasion, and emotional responses" (Schunk & Meece, 2006, p. 87). It is difficult to discuss the effect on student motivation, by learning self-regulation, action, or accomplishment without discussing the role played by self-efficacy beliefs (Bandura, 2006, p. 34; Pajares & Urdan, 2006, p. ix). Self-efficacy is the foundation behind a person's motivation and academic accomplishment (Pajares, 2002).

According to Bandura (1997) the stronger self-efficacy students feel, the greater the motivation or determination they have toward their goals (p. 43) (See *Student Driven Goals*). Successes of middle school adolescents have an effect on their future endeavors and goal setting. If students believe strongly in their abilities, their perceived self-efficacy, they will set high goals for accomplishment and feel a strong push to achieve them (Bandura & Jourden, 1991).

Adolescents' beliefs about individual abilities affect how they will feel, act, or think in different academic settings, reflecting in their academic motivation and perseverance. Bandura (1997) articulates "people need firm confidence in their efficacy to mount and sustain the effort required to succeed" (p. 11). Azmitia (2002) uses the term self-esteem instead of self-efficacy or self-worth toward the same means. Making the point that students with greater self-efficacy or "self-esteem place more importance in their strengths than their weaknesses and the opposite is true for those with low self-esteem" (p. 169). If students' lack self-esteem (or self-efficacy) or lack effort due to low confidence, it may be harder for them to persist in their motivation to academically succeed.

Behavioral theory. Behavioral theorists contend if students have a behavior reinforced, that behavior will continue, whether or not the behavior is positive or negative. Therefore, reinforcement of a positive or favorable on-task behavior will strengthen academic motivation for that student (Burden, 2000). This favorable behavior is reinforced through either intrinsic or extrinsic motivation. Promoting positive academic accomplishments help to encourage students' willingness and likelihood to continue the favorable action. This also works in the opposite way. Negative actions can be easily encouraged. If unfavorable behavior is reinforced through acknowledgement by teacher or peers, the student may continue on a disruptive academic path.

Cognitive theory. Burden (2000) discusses cognitive theory. Individuals are "motivated when they experience a *cognitive disequilibrium*" (Burden, 2000, p. 5). By experiencing this disequilibrium students feel unsettled and are prompted to solve the problem, feeling motivated until a resolution is found. People have a cognitive need to explore and satisfy curiosities. Motivation then satisfies students' need to control their own path in life. Cognitive theory asserts there is no need for extrinsic motivation, because students' internal (intrinsic) unrest is what drives their persistence to complete academic tasks. Students observe others, role play, and are motivated through satisfying expectations (McDevitt & Ormrod, 2002). Cleary and Chen (2009) take the concept one step further creating s*ocial-cognitive theory,* which revolves around both classroom structures and individual student motivational beliefs influencing behavioral engagement in school.

Humanistic theory. The humanistic view of motivation, much like the cognitive view, favors intrinsic motivation over its extrinsic counterpart. This view "suggests that individuals are

motivated by a need for growth and the development of self" (Burden, 2000, p. 6), exemplifying the belief that an internal drive is at the core of desiring to develop one's self and that all humans have this drive within themselves. It is very personal and individualized by each person's wants and desires for themselves and their future.

To reach students' internal drive and increase students' intrinsic motivation Raffini (1996) suggests that teachers engage students' minds with the construction of meaning and integration of ideas and skills. This engagement should help students who are unmotivated or avoidant become more than observers, allowing them to become integral participants in acquiring academic knowledge. Within their learning students must be stimulated and encouraged to think for themselves using *thoughtful skill-building strategies* (Brophy, 2004). Teachers should strive to give students opportunities to show their competence in situations where they feel a sense of pride for their demonstrated abilities. As Deci and Ryan (1992) explain if students view themselves as competent, it will "enhance their intrinsic motivation" (p. 13). Likewise anything that furthers students' feelings of incompetence will reduce their intrinsic motivation and be a deflating psychological experience, reducing self-confidence in their work ability (Deci & Ryan, 1992; Kytle, 2004; Schreck, 2011). According to Schreck (2011), teachers have "known students who were able to do much better work but simply didn't see themselves as capable. On the flip side, [teachers have] also seen students with a more limited range of native talent who outperform other students because of their intense confidence in their own abilities" (Schreck, 2011, p. 95). "Thus the differentiation of intrinsic motivation is hypothesized to be influenced by people's experiences of competence…" (Deci & Ryan, 1992, p. 13). Ultimately, their motivations are being formed around those subjects in which they feel competent.

Maslow's hierarchy of needs. In Maslow's Hierarchy of Need, humans are said to have many different levels of need (i.e., Physical, Safety, etc.). These needs range from lower to higher levels. If humans are unable to satisfy their most basic, lower level needs, they will cease to thrive. "Some theorists relate intrinsic motivation to other basic human needs" (Ferguson, 2000, p. 199). As intrinsic motivation is one of the basic needs or a driving force to meet basic needs, it is important for teachers to help students satisfy these needs. Students carry adolescent experiences with them throughout their academic years and these experiences set the tone for the rest of their educational career. It is important for students to attain a solid foundation with motivational strategies and perseverance tactics. Strategies students learn in early and adolescent years become "implications for their motivation and engagement at school. Adolescents' developing perceptions of themselves – who they are, what they are good at, and what they want to invest time and energy in, are influenced by their interactions with others" (Patrick, Anderman, & Ryan, 2002, p. 88).

Abraham Maslow identified five categories of needs (in order of priority): *Physical*, *Safety*, *Belongingness* (*Social*), *Esteem*, and *Self-actualization* (Fitzgerald, 1977). Each category acts as a group of similar needs. Maslow's Hierarchy does not encompass *all* needs that a person may possess, but serves as a compilation of the needs "that all men potentially have" (Fitzgerald, 1977, p. 37).

Physical and safety needs. When helping to meet student needs, not all needs may require help being met. The goal should be to ensure that lower-level needs, relative to the current tasks, have been met. *Physical* and *Safety* needs are considered the most primary and basic in Maslow's Hierarchy of Needs, which act to create a foundation for the *Social* or

Belongingness needs that follows. Needs that fall under the *Physical* category are those "which serve to sustain [us]" (Huizinga, 1970, p. 21). These include food, air, and sleep [the most basic needs a person can have]. Most students enter school with these needs met. The ability to meet these basic needs might be out of teachers' control; however, teachers do hold reasonable power over the next level of basic needs, *Safety*. In Maslow's Hierarchy, *Safety* encompasses the feelings of being safe and comfortable within their surroundings, which suggests the classroom needs to be a safe space for students to feel a sense of belonging, acceptance, and have the opportunity to build friendships. A teacher who can make a student feel safe within the classroom environment enables that student to focus on higher level socialization, building friendships and *belongingness*.

Belongingness needs. Middle school students tend to place high value on satisfying belongingness, the *Social* level of Maslow's Hierarchy of Needs. Social interaction proves challenging for many students. They strive to fulfill "needs to *be* loved, to belong, to be 'accepted'… [and] to be a responsible member of the community" (Huizinga, 1970, p. 22). When students are less focused on satisfying lower order needs it becomes easier to deal with higher-order topics such as *esteem* and *self-actualization*, the next levels of Maslow's Hierarchy.

Esteem needs. Esteem can be labeled by many terms: self-esteem, confidence, or self-efficacy. However, no matter the label the word esteem encompasses one's belief about their abilities (Maslow, 1970). Adolescents' beliefs about individual abilities affect how they will feel, act, or think in different academic settings, reflecting in their academic motivation and perseverance. Bandura (1997) articulates "people need firm confidence in their efficacy to mount

and sustain the effort required to succeed" (p. 11). Azmitia (2002) uses the term self-esteem instead of self-efficacy or self-worth toward the same means. Making the point that students with greater self-efficacy or "self-esteem place more importance in their strengths than their weaknesses and the opposite is true for those with low self-esteem" (p. 169). If students' lack self-esteem (or self-efficacy) or lack effort due to low confidence, it may be harder for them to persist in their motivation to academically succeed. "Students' self-confidence as successful doers of science and mathematics affects their attitudes towards these subjects" (Clewell & Braddock, 2000, p. 95).

Self-actualization needs. When thinking about self-actualization think of acceptance of truth. A person knows who they are and can achieve his or her potential (though this potential may be ever changing).

Academic Motivation

Academic motivation can be demonstrated through teacher modeling and students' peer surroundings. How students perceive the rewards of their efforts to learn affects how they approach the work, the end result, and the knowledge they acquire from each task (Anthony, 2000). As students transition into middle school and eventually to high school, teachers' approval as a motivator toward mastery goals starts to matter less than peer approval. "Mastery and performance goal orientations are associated with different beliefs about intelligence and ability, it is logical to assume that these different types of goals would also be associated with students' perceptions about their own ability levels (i.e., perceived ability)" (Kaplan, Middleton, Urdan, & Midgley, 2002, p. 29). Nelson et al. (2008) compared middle school and high school

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students and found middle school students connected with mastery goals, performance goals, and mentioned more belongingness then their high school counterparts (pp. 178-179).

Interpersonal and intrapersonal motivation. "Success and failure in achievement settings do not occur in a vacuum" (Weiner, 2000, p. 7). Students show happiness or sadness, anger or sympathy, rewards or punishments, and assistance or abandonment (Weiner, 2000) following an academic success or failure. Rather, student academic achievement and performance can be affected by various social environments. At school these social environments include their teachers, peer groups (Weiner, 2000), and themselves individually (as an intrapersonal motivational factor). These social interactions are reactive to students' academic success or failure and affect students' motivation and future performance.

Teachers. Teachers think of motives, which beget strategies, which in turn beget goals. "For example, a person responds to hunger (motive) by going to a restaurant (strategy) to get food (goal)" (Brophy, 2004, p. 4). Motives, or students' motivations, act as a 'driving force' to accomplish their goals. Students have goals for themselves that *they* believe *they* can achieve. Students must have confidence that their perseverance through struggles create the ends they desire or they may not have reason to persist through them (Pajares, 2002). Teachers help students put into perspective strategies and accomplishments needed to eventually attain their goals.

From early age, children learn and grow through modeling. They watch and mimic the actions of their parents and those around them; as young children grow into middle school adolescents this does not change. While motivation cannot be 'given' to students, teachers and

other influences help foster motivation. Students develop their own motivation by watching and adopting successful models of motivation around them. Teachers help to provide and enhance "key insights and cognitive strategies [for their students] that are learned primarily as a result of sophisticated socialization at home and instruction at school" (Brophy, 2004, p. 18). Teachers can model this academic motivation for their students at school.

One way for teachers to assist instilling and focusing motivation is to analyze students' values through an *achievement view.* The achievement view helps organize "the reasons people have for wanting to achieve something" (Burden, 2000, p. 8). In this view academic motivation is contingent on discovering why each student wants to achieve academically and promotes that reason with the student. Therefore, if students' individual interests are known and connected in a way that helps the students see value in achieving an academic exercise, students may take that 'drive' and understanding to activities that resemble the content outside of the classroom. If students use an academic topic of interest in other aspects of their lives, then students start to see value in their efforts. This leads to students searching for more information on that topic, feeding their intrinsic motivation. Renninger (2000) describes these occurrences as "a deepening of interest over time" (p. 379). This deep interest of a subject, content, or topic feeds students' intrinsic motivation and helps them to persist through difficult tasks related to their interests.

Peers. As young students grow and start middle school they begin to analyze their personal academic abilities. "Children's [positive] attitudes toward school and toward their own academic competence decline with age, until the late high school years" (Eccles et al., 1984, p. 289). Students compare their success to that of their peers and their personal achievements are possibly affected by their focus on peer-influenced views concerning their academic abilities as

they enter middle school (Ames, 1990; Nelson et al., 2008; Urdan et al., 2002). "High-achieving children who seek out other high achievers as friends develop even more positive academic motivation over time" (Wigfield, Cambria & Eccles, 2012, p. 469). When students surrounded themselves with low-achieving students they may not receive the same reinforced academic motivation. Students at this age must be motivated by positive reinforcement in a way that can withstand negative peer pressures and academic stresses. Motivational influences for adolescents have a direct connection to their social environments (Nelson et al., 2008). A possible positive academic motivator for students may be to switch negative peer pressures to positive through combining peer interactions with positive academic completion. "Interactions and social support may serve important motivational functions in supporting persistence and allaying frustration during complex and challenging long-term projects" (Patrick et al., 2002, p. 103).

Socialization among peers affects effort and academic success for students. The school environment includes the classrooms, the teachers they see on a regular basis, and their peers. Peers can have a crucial influence on students' influencing motivation and desire to succeed academically. "Peer relationships are likely to be important to motivation and engagement for students of all ages, [but] they may be particularly important for young adolescent students" (Patrick et al., 2002, p. 87). Teachers do not have direct control over peer influences, but contend with the influences of this element of student life. "The nature of social relationships undergoes significant change during [early and middle adolescent years], and many of these changes have implications for students' motivation for, and engagement in, school" (Patrick et al., 2002, p. 87).

Self. There are two important, yet different theories about how innate intelligence may affect students' academic motivation—entity theory and incremental theory. "Entity theorists believe in fixed intelligence and tend to see achievement tasks as having power to measure this fixed intelligence. In contrast, incremental theorists believe in malleable, acquirable intelligence and see achievement tasks as either vehicles for increasing intellectual skills or as vehicles for assessing their present, task-specific skills" (Molden & Dweck, 2000, p. 143). Students bring their views concerning academic achievement and achievement goals to any situations. Their beliefs about the flexibility of their academic ability affects their motivation to accomplish or persist through a task's completion. According to Burden (2000) "low achievers attribute failure to lack of ability, and success to luck. High achievers attribute failure to lack of effort, and success to effort and ability" (p. 9).

Ames and Ames (1984) explain that motivation is primarily "a function of a person's thoughts rather than some instinct, need, drive, or state of arousal" (pp. 1-2). Teachers cannot create motivation for each student; rather, motivation must be fostered from within each student (McCarty & Siccone, 2001). "Humans are by innate inclination active, curious, and desirous of challenges" (Deci & Ryan, 1992, p. 32). To activate student's motivation a teacher must "understand and attempt to connect with their feelings, concerns, values, experiences, and unmet needs. All humans are motivated by their unmet needs or unfulfilled wants" (McCarty & Siccone, 2001, p. 2). Students have interests and desires. It is the teachers' challenge to personalize (where possible) an approach to the curriculum to help support individuals' desires and experiences. To tap into or discover the inner motivation and desires within each student. . Teachers "must make curriculum engaging, thus motivating the students to learn" (Schreck, 2011, p. 61) through 'tapping' into what already interests the students. Motivation can be

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enhanced through relating the new content to what students already know and with which they feel comfortable.

The successful motivational teacher doesn't motivate students in the sense of giving them something they didn't have, painting motivation on their surface. Instead, he or she reaches the students, finds their major motivations or those most appropriate to his or her own educational objectives, and taps into them, using those motivations as the core components of the lesson. (McCarty & Siccone, 2001, p. 5)

Motivation in math. While there will always be students who demonstrate innate ability in math, if a student is *not* considered 'a natural' at math he or she *can* succeed and increase their own mathematical understanding. Students' self-perceptions of a subject's worth and their personal motivations toward academic success in that subject make the difference when it comes to their educational outcomes. If a student believes that he or she cannot learn math because the individual is not 'a natural' or does not feel that math has active use in life, then the struggling student might stop trying to learn and become stagnant at a stage in their mathematical understanding. "When students see themselves as capable of doing well in mathematics, they tend to value mathematics more than students who do not see themselves as capable of doing well" (Middleton & Spanias, 1999, p. 67).

When entering college a student usually has solidified a firm opinion of their abilities, successes and failures, when it comes to mathematics (Middleton & Spanias, 1999). Gunn, Richburg, and Smilkstein (2007) suggest that classroom math environments can affect students' experiences and attitudes toward math as they grow into adulthood. Students will continue to remember math experiences they have, whether positive or negative. These experiences promote

and evolve students' motivation and attitudes toward mathematics. Teachers' actions and personal feelings toward math help to mold students' motivational attitudes toward math, which seem to solidify during their middle school years (Middleton & Spanias, 1999).

According to Sullivan and McDonough (2007) under-participation in mathematics can be directly linked to some students' lack of confidence in their mathematical abilities and a lack of connection seen between mathematics and how it will affect their future goals. Students "tend to have the impression that math and science have little to do with real life" (Harvey & Chickie-Wolfe, 2007, p. 214), which may be a deterrent for motivation in math. In a study conducted by Sullivan and McDonough (2007) with year 8 students, "only one third of the students listed a career aspiration that would be associated with success in mathematics at school" (p. 706). To counteract this negative perception about mathematics and math related fields of study, brain-friendly experiences have been suggested. When "brain-friendly experiences for [young] students carry a power of suggestion that is highly motivating and accelerates learning" (Gunn et al., 2007, p. 85), students are able to connect personally with their mathematical education. Brain-friendly experiences include real-life examples of math or patterns seen in art, music, or nature.

The National Research Council Institute of Medicine (2004) states that students need to be able to use math and mathematical thought to manipulate everyday information they encounter in their daily lives. Whether or not students see mathematical thought and reasoning as a need in 'real life,' they will encounter it. People see and have to interpret events using math every day in interest rates, weather reports, election results, and even assessing medical risks. "To meet the demands of our rapidly changing world, students need to have sophisticated skills in math, science, and technology" (Harvey & Chickie-Wolfe, 2007, p. 209). "Achievement in

mathematics has serious consequences for life opportunities, earning potential, and the ability to participate fully in society" (National Research Council, Institute of Medicine, 2004, p. 75).

Students use strategies "to avoid undesirable outcomes in performance" (Pasztor & Slater, 2000, p. 246). Environmental factors, including social and classroom factors, impact students' behavior and motivation in school settings (Cleary & Chen, 2009). To avoid undesirable outcomes or 'failures' in math, Pasztor and Slater (2000) offer three useful strategies: self-handicapping, depressive pessimism, and depressive self-focus. These strategies include telling oneself that there are limitations, setting lower expectations so they are easily achieved, and thinking about the goal but taking no actions towards them (p. 246). Effective personal goal-setting and "challenging goals raise the level of motivation and performance success…" (Pasztor & Slater, 2000, p. 249) and help alleviate students feeling the need to use these strategies or other behavior avoidance skills (Mentioned in *Avoidance Behaviors*).

Classroom atmosphere. According to Walter and Hart's contextual motivation theory (2009), students make motivational decisions based on a supporting web of intellectual-mathematical and social-personal motivations. These "motivations come in varieties: There are positive and negative motivations; social, physical, emotional, spiritual, and intellectual motivations" (McCarty & Siccone, 2001, p. 11). Teachers support positive and negative motivational atmospheres within the classroom. Here, teacher-controlled environment and social structures help to promote or to hinder student motivation. "A focus on mutual respect in the classroom should help create an environment where students communicate positively with one another, are not afraid to share their thoughts and ideas even when tentative, and are not fearful of ridicule when experiencing difficulty" (Patrick et al., 2002, p. 98). Students respond positively

when allowed to feel comfortable within their surroundings, especially if they have the responsibility to exercise choice over their own learning. Students who feel they somewhat control their learning pace and experiences have higher positive feelings of self-worth, motivating them to explore and learn more on their own (DeCharms, 1968; Eccles et al., 1984; Pittman & Boggiano, 1992). Input into their learning and the ability to fail without fear of peer derision, laughter, or mockery provides students with positive academic growth. These "environments are most conducive to student exploration, problem solving, and cognitive risk-taking processes that are integral to both motivation and self-regulated learning" (Patrick et al., 2002, p. 98).

Student academic tools and support. There is a "clear assumption that with higher motivation and/or better teaching, under-achieving pupils could raise their performance" (Galloway et al., 1998, p. 11). In an enhanced environment students could be better challenged and they might achieve even higher academic goals. According to Meece et al. (2003; Schunk & Meece, 2006), adolescents who believe their teachers encourage high-level thinking within their classrooms, hold students to high expectations, and value student voices, reported higher respect for their own capabilities than those who did not feel this academic push or support from their teachers. Teachers play a valuable role in articulating high, achievable expectations for all students.

Student Driven Goals

It is important for students to have aspirations for their lives and involve themselves in activities they feel are worth doing. Setting goals is one way to accomplish this. Even if the

student's goal or focus is an ever 'moving target,' always changing or developing, having goals to strive toward help provide motivation. Students without personal commitment to achieve goals having value to themselves become unmotivated or bored (Bandura, 2006). "A vision of a desired future helps to organize their lives, provides meaning to their activities, motivates them, and enables them to tolerate hassles of getting there" (Bandura, 2006, p. 10). In their adolescent years students may not *truly* know what direction they would like for their lives' paths. Students' directions may not formulate until later years; however, they are capable of setting desired goals or aspirations. Many goals become the reason to persevere through school subjects, which may cause stress along students' educational journey. Having goals provides adolescent students with ways to achieve and helps them develop a sense of accomplishment.

Achievement goals. Students' achievements are affected by their personal goals and their motivation viewed as a "goal-directed activity" (Graham & Wiener, 1996, p. 77). "Personal goals represent the goals that individuals pursue in general or in specific achievement situations" (Kaplan et al., 2002, p. 24). Questions of motivation around academic achievement, brought up by Graham and Wiener (1996), include "why some students complete tasks despite enormous difficulty, while others give up at the slightest provocation" (p. 63). Or why others set such unnaturally high goals for themselves that failure is almost inevitable. According to Kaplan et al. (2002), there are significant messages given to students within different settings, in this instance school or classroom settings, that influence personal goals and personal goal setting. There are many names researchers have given to these goals, which can be compiled into two main themes "one type is labeled a *mastery goal*, *learning goal*, or *task goal*. The other type is labeled a *performance goal*, *ego goal*, or *ability goal*" (Kaplan et al., 2002, p. 23). Mastery goals involve

academic engaging behavior that develops students' academic competence. Performance goals are defined as behaviors demonstrating or validating individual academic competence. Performance goals are not considered students' personal academic achievement goals. They are motivational goals, the type to move students toward successfully accomplishing an immediate academic task. For the purpose of this study, the terms *mastery goals* and *performance goals* are used for these two motivational goal themes.

Mastery goals. A mastery goal represents a goal in which there is a focus on presently assigned tasks (Kaplan et al., 2002, p. 23) and it pushes students to want to learn and fully understand the academic material. Students achieving mastery goals complete their classwork in a timely manner, but this is not an end, but a byproduct of their interest in completing the task. Students work toward academic understanding and give their best to completing an assignment so that they know they absorbed the lesson's concepts. Students do not accomplish a task to prove their skills, but to gain skills through the act of accomplishing the task.

Performance goals. A performance goal represents focus on performing a task within one's personal ability. Students with a performance goal are striving to achieve but create success with as little effort as possible (Kaplan et al., 2002). "Performance goal orientation is often associated with a belief that intelligence and ability are fixed qualities that are difficult to change" (Kaplan et al., 2002, p. 29). For instance, students motivated by performance goals may be influenced by personal beliefs in their capabilities in a school subject or class. When students are focused on performance goals within a classroom they believe their ability and intellect are resolute or cannot be changed. These students may even work very hard to demonstrate they

have a high intelligence or ability by accomplishing their work within each subject (Kaplan et al., 2002).

Avoidance Behaviors

Urdan, Ryan, Anderman, and Gheen (2002) designated student tactics for avoiding their class assignments as *avoidance behaviors.* Urdan et al. (2002) place avoidance behaviors used by students into four categories (pp. 55-83): self-handicapping, avoidance of self-helping, avoidance of novelty, and cheating. Students use various behaviors that help reduce or altogether avoid academic challenges. Student behaviors can be influenced for many reasons and through different stimuli. "Learning is often regarded as either a temporary or a permanent change in behaviour [sic] and knowledge that arises as a consequence of some internal or external stimulus" (Barker, 1998, p. 7). Students need to be provided with internal and/or external motivational stimuli on a consistent basis. Their reasons for accomplishing an academic task may provide a motivational venue.

In some cases it may even be that students are only vaguely aware of an assignment's purpose (Lumsden, 1994). To a student an assignment given without having clear understanding of its purpose may feel like a useless teacher-imposed demand, rather than a necessary learning opportunity. If the task is understood to be a valuable learning opportunity, students will be less likely to engage in work-avoidant behaviors (Brophy, 2004). Students without a foreseen purpose may lose any academic motivation they had and start using avoidance behaviors.

Nearly every upper-elementary classroom has a few students engaged in *failure-avoidance behaviors* (Stipek, 1984). When students use avoidance behaviors "they are not only robbing themselves of opportunities to learn; they are also telling [their teachers] they are trying

to avoid failure and embarrassment" (Urdan et al., 2002, p. 78). Teachers need to be alert for avoidance behaviors and upon discovery, immediately try to combat them. If student avoidance behaviors become ingrained they "are likely to undermine performance and promote embarrassment in the future, creating a vicious cycle of failure and avoidance behavior" (Urdan et al., 2002, pp. 78-79). Students who do not ask for help when they face an unfamiliar concept will likely continue without key understanding. This lack of conceptual understanding may hinder them when they need to call on stored knowledge and understanding to accomplish tasks. This will encourage further avoidance behaviors to hide the fact that they have not grasped the original key understanding. This cycle could go on until an internal or external factor changes.

Self-handicapping. Avoidance behaviors are used for many reasons. Students occasionally use these tactics to help when they are feeling overwhelmed or to help survive an uncomfortable academic situation. Teachers may notice 'busywork,' that some students within their classrooms "appear to be working diligently on a task, [however,] the quality of their investment may be quite different" (Kaplan et al., 2002, p. 22). Students may be going through 'the motions' or doing enough to look busy. When they do the bare minimum work there is a good chance they do not gain much academic growth from the assignment. These students put minimal effort into accomplishing tasks and are very skilled at acting as if they are working efficiently.

Self-handicapping behaviors stand in the way of students' educational growth as they are not trying or are procrastinating, this gives them excuses besides lack of ability as to why they were unable to or 'failed,' to complete their assigned task (Ames & Ames, 1984; Covington,

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1984; Urdan et al., 2002). Covington (1984) calls self-handicapping behavior a *failure-avoiding* strategy. It is used to avoid failure instead of striving toward success.

Avoidance of self-helping. Peer pressures focus students on or deter students away from demonstrating academic success. Students create social goals "associated with different patterns of academically related beliefs and behaviors" (Patrick et al., 2002, p. 88). Students' social goals include responsibility, intimacy, or relationships with others and status goals (Urdan et al., 2002). Therefore, "…students concerned with gaining social status [are] more likely to avoid seeking [academic] help [where] those concerned with developing intimate social relationships [are] less likely to avoid seeking help" (Urdan et al., 2002, p.72). These students may have avoidance of self-help behaviors influencing their academic growth (Urdan et al., 2002). Students seeking social relationships may seek adult approval as well as peer approval. These students may desire to create a bond with their teachers and may be more likely to ask for teachers' assistance (Urdan et al., 2002). "Confidence in one's ability to relate effectively to the teacher is associated with motivation for, and engagement in, academics" (Patrick et al., 2002, p. 94).

When students avoid self-helping, they choose to not ask for help when they are struggling or are in need of guidance. "When students become aware that they need help, they must decide whether to actually seek help" (Urdan et al., 2002, p. 61). This can be a critical juncture in their decision-making processes, whether or not to avoid a challenging [academic] task.

Avoidance of novelty. According to Urdan et al. (2002), students often choose to avoid novel or challenging academic work. "Although teachers are often encouraged to create

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academic work that is moderately challenging for all students, they often find that students

actively resist engaging in such activities because there is a real possibility that they may fail"

(2002, p. 62). Students would rather not openly show their struggles to others, their peers, and

teachers included. "Because ability is perceived to be a central ingredient to academic success, it

is understandable that efforts to protect a sense of ability is a major preoccupation among

students" (Covington, 1984, p. 81).

Cheating. Some students may go to the extreme of hiding their academic struggles by

cheating or copying others answers instead of trusting their own thought processes and

discovering the correct solutions. Depending on the purpose behind cheating, it may fall into the

realm of an avoidance behavior. "If avoidance behaviors are driven by avoidance motives such

as fear of failure and wanting to avoid the feelings of shame that accompany failure, then

cheating is certainly an avoidance behavior" (Urdan et al., 2002, p. 64).

Counteracting avoidance behaviors. The conclusions of Urdan et al. (2002) "suggest

that avoidance behavior is more common in schools and classrooms where performance goals

are emphasized primarily by making ability differences between students and competition salient

features of the learning environment" (p. 72). Their suggestions include teachers not posting

students' academic rankings within the classroom, but rather creating a classroom environment

that promotes student growth over time, despite students' initial ability level (Urdan et al., 2002).

In such a learning environment, celebrations are given for making progress and not for the level

of the end result. Such a system of reward for progress helps minimize the message that only

grades and academic standing are important and allow for the quality of students' work to also hold importance (Urdan et al., 2002).

According to Deci and Ryan (1992) if competition is set up correctly it can be used as a positive tool within the classroom environment. "Competition can foster intrinsic motivation… [unless] defeating another takes on central importance" (p. 18). Students perceive their middle school classroom environments are less focused on mastering concepts and more concerned with ability variances and task completion, as compared to their elementary classroom environment (Anderman, Maehr, & Midgley, 1999; Anderman & Midgley, 1997; Schunk & Meece, 2006; Urdan & Midgley, 2003; Urdan, Midgley, & Anderman, 1998). This perceived more competitive environment is also discussed by Urdan et al. (2002). Competition contributing to avoidance behavior is perceived by students as more of a solidified feature within the classroom providing yet another tool to academically defeat others, rather than a skillset to instill intrinsic motivation (Deci & Ryan, 1992).

Strategies for motivation of low achievers. A teacher can find some difficulties when addressing students' group versus individual needs in the classroom. Many students' needs may be intertwined, which can provide difficulty in pinpointing which individual need requires assistance or which need is not being met (Burden, 2000). Teachers can best assist students with growth, development, and ultimately academic motivation by addressing the most common adolescent need first, then, address the next level of progressive need; adolescent values of "belongingness, acceptance, and friendship" (Burden, 2000, p. 8).

Steps taken to assist low-achieving students to become higher-achieving may include "designing lesson plans utilizing graphic organizers [to] help students organize and remember

information that they are learning" (Carroll & Leander, 2001, p. 38). Teachers provide means to assist students' growth as learners through "the implementation of cooperative learning structures, graphic organizers, and questioning techniques" (Carroll & Leander, 2001, p. 28) to support student motivation. As Galloway et al. state, "Most pupils are highly co-operative; if we expect them to have low achievements they duly oblige" (1998, p. 14). To help maintain motivation with low achieving or struggling students Brophy (2004) suggests:

> [Teachers should] provide encouragement and positive comments on papers; help low achievers to establish realistic goals and evaluate their accomplishments; call attention to their successes and send positive notes home; encourage them to focus on trying to surpass their previous day's or week's performance rather than to compete with classmates; use performance contracting methods; and give marks and report cards grades on the basis of effort and production rather than in relation to the rest of the class. (p. 121)

With this professional environment, students seem less likely to get caught in merely the win-lose mentality of defeating other students. Since they are competing against their own past successes, students build additional intrinsic motivation strengthening their academic skills, a win-win scenario.

Conclusion

Studies examined in this review of literature show a need for promoting middle school student academic motivation. Kytle (2004) uses the popular saying '*time flies when you're having fun*' to introduce the concept that "high points in life come from those few moments when we are psychologically fully involved". Through "support motivation and learning" (p.

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93), students can become better focused on their educational growth. The best way for teachers to help students achieve their full academic potential is to guide students toward an increase in intrinsic motivation toward academics. Motivating students will assist students' academic achievement. Using resources and data-supported concepts, this study asks students what they perceive has motivated them in math during middle school.

Chapter 3: Methodology

Researcher's Perspective

As a teacher, I use both quantitative and qualitative data to guide my instruction. I spend much of my day analyzing and re-evaluating knowledge I accumulate about my students in order to be a more effective instructor. I use quantitative data at the start of each year and at specific points throughout the year to determine instructional baselines for students in each math classroom under my responsibility. In practice, I find quantitative data very useful but impractical (too time intensive) as an everyday tool to record 96 students' progress in math. As a result, for daily checks I use qualitative data more often to adjust my instructional pace and lesson planning. Qualitative data (my continuous collecting of written sticky-notes and memos to myself) about the progress of 96 students is far more immediate and time-advantageous to my practice, overall providing more immediate understanding into the 'right now' instructional needs of my math students.

It comes naturally to me, as an instructor, to use classroom interaction time with students to observe their body language, listen to the types of questions students pose during class, and gauge general levels of classroom discussion among peers to better provide immediate insight into each student's mathematical understanding. Such interactions allow me to assess the extent to which specific topics have been mastered. Qualitative data collection "can go far beyond 'snapshots' of 'what?' or 'how many?' to just how and why things happen as they do" (Miles & Huberman, 1994, p. 10). Collecting snapshot data through personal notes written on sticky notes or on student's papers is quick, time-efficient, and provides a manageable guide for 45-minute class blocks. These clips of information serve as a way to reference how a student is setting up

math problems and why the student may be getting confused in their work or overall understanding.

My desire to have greater depth and insight into students' challenges in math has led to my curiosity about what academically motives students in math and inevitably my current interest in narrative inquiry. "When we listen carefully to the stories people tell, we learn how people as individuals and in groups make sense of experiences and construct meanings and selves" (Chase, 2003, p. 80). The stories of others provide a rich structural framework for collecting information on the human experience as well as a creative way to analyze and interpret data (Coffey & Atkinson, 1996; Webster & Mertova, 2007). While it is common to use observations, questioning, and class discussion to gauge my students' mathematical understanding, there is one element that seems very difficult to observe from an outside perspective: Motivation.

Academic motivation is complex in nature. Outside factors such as peer approval, teacher approval, personal interest, and individual confidence all play roles in whether a student is academically motivated with the activity that day (Patrick et al., 2002, p. 87; Schunk & Meece, 2006). Most of the time these factors are not easily observable; students may hide how much these factors truly affect them. The observations I conduct may only be effective in showing where student's knowledge of the current math topic lies on a continuum. To find out more concretely what motivates middle school students in math, I decided to ask a sample of students directly. Only through students' perceptions and motivational observations may I more accurately know if my observations are accurate. I selected narrative inquiry as my research methodology to gain deeper understanding into students' experiences in math and to learn more about what motivates them to achieve academically in the classroom.

Background of the Study

Students are a population very much impacted by school decisions, yet they are often not heard and excluded from decision making within schools (Michie, 1999; Tierney & Dilley, 2002). Searches for middle school student motivation studies found few personal reflections or narrative inquiries asking for students' perspectives around what they feel to be motivating them academically in math. Currently a change is taking place in research. Student views are now being sought. This change has resulted in an "explosion of student interviews, which aims to garner and represent the words and worlds of students and their peers, [and is] part of a movement to include the voices of those being educated in the learning process" (p. 458).

There is now a greater desire to understand students' motivation and experience from a personal student's perspective. "Interestingly, the group that typically eludes the planning team is the one that is most affected by the work of school districts—children and young…If youth are important stakeholders in the outcome, they need to be involved…" (Schweitz & Martens, 2005, p. 159). When it comes to student motivation, what greater resource could be found than students experiencing this motivation first hand?

As a middle school math teacher, I find the topic of effectively motivating students' toward better academic performance intriguing. Theories discussed in Chapter 2 provide insights into student academic motivation. Through this review of relevant literature and drawing upon my own experience, I conclude that each student is capable of being motivated in some way and for some duration of time. Academic motivation cannot be created and 'given' to a student; every student is already motivated in some way to do something (Deci & Ryan, 1992). Effective motivation then becomes a matter of tapping into what each student personally enjoys and finds motivating in other realms of life. Motivation can be brought out from within each student

(McCarty & Siccone, 2001). Therefore, the challenge for teachers is to use what already motivates students to further encourage each student to achieve in school or in their math learning. The importance of this research for me is twofold: To better understand how each student views his or her math experiences and to use research conclusions to gain additional understanding about motivational adolescent experiences.

In the Literature Review (Chapter 2), I discussed many learning theories about motivation. In this review one voice seldom heard is that of the students. Recently this has started to change to include students' voices (Tierney & Dilley, 2002). These voices are student's self-expressed experiences of academic motivation in math and in middle school. Since the inclusion of student voices in discussions of motivation is relatively new, they are not yet adequately represented in the literature. In this study I look to add to the small and growing body of literature, which includes student voices, and acquire a better understanding of motivation through interviews with students who communicate their experiences with math: What had meaning for them, what motivated them, and how they viewed their math exposure in middle school.

Researchers examining middle school education urge use of narrative inquiry as a valuable tool "to understand dimensions of adolescent students [sic] lives that are not otherwise apparent" (Lachuk & Gomez, 2011, p. 6), and it has been found an effective tool informing data collection within this school age population (Eder & Fingerson, 2002). It is important that students' own voices and perspectives are included in the examination of what motivates students in middle school and in math. Understanding students' experiences at this level can help teachers have a deeper understanding of effective tools to motivate middle school students academically. Motivational experiences expressed by one student may or may not have a

positive effect on others. Thus, my research seeks to answer the question: What are students'

experiences of motivation in math during middle school? I used narrative inquiry to gain insight

into this question.

Narrative inquiry. *Narrative inquiry* can be described by its two component parts: The

first is *narrative*: meaning the story being told (Riessman, 2008); and second, *inquiry*:

representing a systematic examination or analysis. However, in practice a working understanding

of the interactions it describes is more complex. "First, narrative research is concerned with

using individual lives as the primary source of data. Second, it is concerned with using narratives

of the 'self' as a location from which the researcher can generate social critique and advocacy"

(Bloom, 2002, p. 310). It is a methodology through which researchers comprehend others'

representations of the world around them from the stories those interviewed chose to share

(Gomez, 1997). A narrative inquiry is not only an examination of a story told, but how the story

is captured and analyzed. In a narrative "attention shifts to [recalled] detail" (Riessman, 2008,

p.12).

In this study, narrative inquiry was used to capture students' experiences through

interviews (Creswell, 2007) and to develop personal stories of students' academic motivation in

mathematics during their middle school years. Interviewing, recording, and analyzing students'

reflection concerning their motivating experiences in middle school math provides insight into

what each student expresses was personally successfully motivational and memorable.

The experience-centered approach, a focus taken on retelling middle school experiences

that are recalled as highly motivational, is used in this study to support student experiences as

personal "truths" for the student. There is no 'cookie cutter' or singular right way, to conduct a

narrative inquiry study. Narrative inquiry is developed on a spectrum. At one end of this spectrum "is the 'pure' narrative, a story told without explicit references to theories or research findings; the other end becomes the 'pure' academic essay," which references theory but remains without the narrative themselves (Goodall, 2008, p. 61).

Student participants.

Stage 1: administrative permissions. The study's target population required permissions from the school district, school principal, parent/guardian, and each student in order to be involved in the interviews. I acquired permissions (see Appendix B) from the district office and school administrators to enter the school. The research was conducted within the school facility, during the school day and during student's class time. This required continual support for the project from school administrators and teachers.

To ensure safety and confidentiality of the participants, I was the only person privy to the final student interviewee list. No students' academic performance information (grades, progress, and test scores) was obtained in accordance with Family Education Rights and Privacy Acts (FERPA) laws. Interview dates and times were set up with the student prior to the study and informed consent forms were collected. If students forgot to show up (or were more than 10 minutes late) they were called to the office for the interview. This was done by the office staff and what the student was being called for was not announced. If students had to be called for their interview, their name was told directly to the office staff. The office staff was not privy to the list of students in the research study.

Stage 2: acquisition of participants. After receiving district level permissions, the school principal asked the eighth grade math department head to create a list of students. The

department head was provided with a letter and guidelines for recommendations of student participants (see Appendix C). After speaking with the 8th grade math teachers the math department head provided a list of 4 eighth grade students in each general ability level in math (high, medium, low across 8th grade Algebra and Geometry courses offered) to provide me with enough participants for a purposeful sample (Creswell, 2007). The goal was to have a range of math ability levels (Struggling and successful math students in Algebra or Geometry) to provide access to varied mathematical educational experiences. To assist with gaining a mixed ability sample students were contacted in order they were recommended, a few from each ability level.

Stage 3: student and parent permissions. Students from the math department head's list were called to the office individually and offered a place in the study and time to review the study requirements. In the letter all aspects of the interview were explained, and at this time, intended uses for the interviews and persons who might be allowed to access the results of the data were disclosed. Each student was given a permission slip (see Appendix B) to take home, read over, have signed by both the student and a parent with legal guardianship, and then returned to the office within a week. The one week deadline was extended for two students who expressed interest in participating and said they had forgotten the forms at home. These students were given a weekend and two extra school days to gather permission from their parents and return the consent forms.

Fifteen students were approached for participation in the study, 5 students in each math skill group. Initially 10 students were contacted about participation, from this first group 4 students accepted. If they declined participation, other students from the main list were called down to the office and offered places within the study. In the second group 5 more student

participants were contacted and invited to participate. One of the students from the second group agreed to participate. Ultimately, 10 declined participation prior to starting interviews and 5 students accepted, which is consistent with the minimum recommended sample group needed to form a strong narrative inquiry study (Josselson & Lieblich, 2003). No students left the study after the initial interview.

Prior to the first interview with each student, consent forms were double checked for signatures. During student's first interview study requirements were explained in person to each student using the assent form (see Appendix B) prior to starting the audio-recording during their first interview session. An explanation of the interview procedure, what interviewees might expect to be asked and background information about the study were uniformly given verbally to each student. This information was on the consent and assent forms to make sure they fully understood the parameters of the study in which they were to be participating. Any student questions were answered before the first interview initiated. The first interview provided the perfect extra time to read through the assent form with each student participant. Time was then given for questions and each student participating in the study signed the assent form. All five student participants signed the assent form before starting the first interview.

Telling their stories. "Narrative inquiry is human centered in that it captures and analyses life stories. In doing this it has the ability to document critical life events in illuminating detail…" (Webster & Mertova, 2007, p. 13). In this study the interviewed students had the ability to share their academic experiences in math classes through their discussions of personally memorable motivational experiences. Students were prompted by probing questions (See

Appendix D) to recall their experiences in middle school around motivation. They were prompted to provide as much detail as they could in their recollections of each experience.

The eighth grade students were interviewed at the conclusion of middle school to maximize their focus with a middle school context. "Like all stories, it is selective and perspectival, reflecting the power of memory to remember, forget, neglect, and amplify moments in the stream experience" (Riessman, 2008, p. 29). Student recall was captured within an experience-centered approach, which "stresses that [individual, internal representations of phenomena] vary drastically over time, and across the circumstances within which one lives, so that a single phenomenon may produce different stories, even for the same person" (Squire, Andrews, & Tamboukou, 2008, p. 5). According to Clandinin and Connelly (2000), "what we may be able to say now about a person or school or some other is given meaning in terms of the larger context, and this meaning will change as time passes" (p. 19).

Interview structure. Students were interviewed individually in a semi-structured interview format (Creswell, 2007) requiring keeping "research aims and personal interest in mind, while leaving space for conversation to develop into a meaningful narrative" (Josselson & Lieblich, 2003, pp. 269-270). To assist with the semi-structured interviews (Creswell, 2007), each interview session had a theme and prompting questions in reserve to be used as each interview progressed (See Appendix D for interview question prompts). Interview sessions followed the generalized topics:

- 1st Interview Session: Getting to know each student and his/her interests.
- 2nd Interview Session: Stories of student's experiences in math: focusing on their middle school experiences.

- <u>3rd Interview Session</u>: Stories of student's experiences with motivation: both in math and extending into middle school generally.

Three sessions were chosen to allow for in-depth interviewing (Johnson, 2002) created through a natural environment to strengthen trust overtime. Questions posed to the students were developed to get gradually deeper into their stories of motivation and experiences with math in middle school in subsequent interviews. According to Johnson (2002) the first interview should yield great learning about the interviewee with two to three questions serving as icebreakers and the interviewer sharing information about the study.

When working with adolescents, interview questions should avoid making the student feel there is a *right* or *wrong* answer or that they may feel compelled to answer as they feel 'they should'. "The focus of any good narrative is its accurate rhetorical representation and rich evocation of what happened (or what is happening) in a particular time and place" (Goodall, 2008, p. 23). As much as possible, I limited any persuasive questioning. My goal was to achieve a clear picture of the motivational experiences of each student. As Pfohl (2008) points out "all meaningful accounts of the real world are mediated by the social contexts in which such accounts are constructed" (p. 645). Interview questions were designed to unearth detailed student stories and allow each student to express the realities of his or her world. "The individual is understood as a social being whose experiences are mediated by and in turn mediate the social world in which [he or] she lives" (Bloom, 2002, p. 311).

Interview questions were intended to support students' recollections of their motivational experience in math, while allowing the freedom to guide the interview where the students felt it meaningful to go. Each student's stories lead to the discovery about their 'true' human experience (Riessman, 2008, p. 10). I tried to prompt responses that focused on motivation, math

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classrooms, or the two entwined. However, I did not redirect students if they choose to share math experiences in elementary school. The interview questions were less controlled by the interviewer and allowed for student questions, comments, and student lead directional questions (Eder & Fingerson, 2002). Therefore, unstructured questions focusing on learning each student participant's general interests and dislikes were utilized during the first interview session. This helped each student become and better remain comfortable in the interview process. According to Eder and Fingerson (2002) it is more important to create a natural atmosphere, get to know each student, and let the student lead the interview than it is to get to all of the planned questions answered. The knowledge gained about each participant allowed future question prompts to be better focused on individual student interests.

Better findings are reached when students are able to be themselves and express their 'true' stories as their interests and recollection lead them. "One clear reason for interviewing youthful respondents is to allow them to give voice to their own interpretations and thoughts rather than rely solely on our adult interpretations of their lives" (Eder & Fingerson, 2002, p. 181). As the three sessions progressed diversions from the generalized structure were allowed, creating a shared flow to each interview. "It is essential that the interviewer be assertive enough to return the interview to its anticipated course when necessary, but not so rigid as to preclude his or her learning unexpected information" (Johnson, 2002, p. 111). This was done to provide unique personalized experiences to be shared within an experience-centered narrative approach. "The experience-centered approach assumes that sequential temporal orderings of human experience into narrative are not just characteristic of humans, but *make* us human" (Squire, 2008, p. 43). Important elements of experience-centered narratives are:

1. They are meaningful and sequential with a humanistic element;

2. They represent a person's experiences;

3. They show any transformation or revelation a person may have (Squire, 2008).

Data collection. The five student study participants were interviewed in a series of three one-on-one interviews. For ease of access to students, each student was interviewed during the school day at a time deemed appropriate by the administrative staff: lunch, student's free block (i.e., study hall), or during a student assistant time (if they had one and the teacher allowed it). Students were each asked when they would like to meet for the interviews. I was very flexible when it came to scheduling interview times around each student's school schedule. I rescheduled interviews for both sports games and test make-ups, so as not to interfere with each student's school responsibilities.

All interviews were conducted in a quiet environment free from distraction and peer or staff influence. Interviews were conducted on school grounds to provide student comfort and convenience. Each interview was either in the main office multipurpose room or the counseling office multipurpose room, depending on room availability. Both rooms had windows to see into the school building but were out of the main hallway free from students passing by. Most interviews utilized the multipurpose rooms located within the counseling office. Student testing, studying, projects, and staff meetings were some reasons location for interviews required being flexible. This design, interview location and multiple short interviews, was used to assist in achieving a natural context to the interview. A natural context is effective when interviewing adolescents (Eder & Fingerson, 2002).

Each student was interviewed three times. The first helped me get to know *The Student*; the second helped to know their *Math Experiences*; and the third helped to know more about

their *Motivational Experiences*. Each interview was intended to last about 30 minutes, but their length varied according to the amount of information and elaboration each student desired to share about their experiences. The actual time for each interview ranged from 5 to 20 minutes. Generally students' first interviews ran 7 ½ minutes; the second interviews ran 9 minutes; and the third interviews ran just over 10 ½ minutes.

All fifteen interviews (3 interviews each student with 5 student participants) were conducted over the course of one month. One interview was conducted with each student per week, with time in between for reflection. Only one student had interviews conducted on an expedited schedule. Interviews for this student, his second and third interview, were conducted during the same week (week 3) due to a school conflict during the second interview time on the second week. No interviews extended past the three week window of time desired. In the four weeks there were three audio-recorded interviews and one closure meeting (to ensure validity of transcribed data from the 3rd interview) for each student interviewed. Audio-recordings were made and transcribed (Creswell, 2007) for each interview.

To assist with validity students were given a summary page (1-2 pages) of the interview transcriptions at the beginning of the next consecutive interview. Starting at the second interview the summary pages were shown to each participant. The first interview's summary page was shown to the student prior to their second interview, the second interview's summary page shown before the third interview, and the third interview summary page was shown during the closure meeting. The closure meeting was not an interview. Instead this meeting lasted only a few minutes and its purpose was to allow students to verify the third interview summary and for me to thank them for their participation in the study. The interview summary times were to allow students to be able to change, cross out, or add to the summary if they felt it was incorrectly

summarized. Ultimately, all students gave a verbal OK to the transcriptions content after reading. No students chose to change, omit, or add to their transcriptions.

Data Handling and Ethics

Transcription process. After each session, the interview recording was transcribed in a quiet location at my home within 48 hours, following the interview. I transcribed the audio-recordings myself to ensure accuracy of the responses and the confidentiality of each responding student. Each interview was transcribed verbatim. To keep student's voice intact I transcribed the interviews with focus on the *primary speaker* but continuing to include the *listener/questioner* (Riessman, 2008).

In transcriptions of the interview sessions two columns were made for dialogue as text. The left column of the transcription interviews were the questions (etc.) I asked while interviewing each student. The right side was each student's response to each question. Spacing was used to assist with natural flow of reading dialogue. The only items removed from the transcriptions were individual identifiers and expressed pauses (i.e., *um*, *like*, *uh*, or stuttered/repeated words). Breaks in speech for thought and ums were removed and the enter key was used to note a place where the student had paused or broken for thought during their natural flow of speech. Word removals kept the narratives mainly 'pure,' intact and unchanged; while at the same time improving readability.

For confidentiality, I audio-recorded student interviews. Students' names were labeled "Student 1", "Student 2", and so forth for my organizational purposes, and were not included in the recordings. "Often, children or adolescents who engage in narrative inquiry want to have their stories validated by having their names attached to research texts" (Clandinin & Connelly,

2000, p. 175). Identifying the student was not an option within my study, so to assure confidentiality any names mentioned were changed to provide all parties' confidentiality. After transcription the recordings were destroyed and students were referred to by pseudonyms (student 1, 2, 3, etc.).

The transcriptions were reread after a few days to assist with a more individualized interview for each student's second and then again for third interviews. Additional question prompts were personalized for student's second and third interviews where possible with the opportunity to amend, clarify, or add to anything mentioned last session. Each summary then provided a starting point and foundation for the next sequential interview discussions.

Member checking. Written summaries were made of each interview session. Student interview summaries were written as bullet points of responses to help shorten its length, simplify reading any changes in student thought or dialogue direction, and to highlight pertinent information discussed. A summary was chosen as the form that would be the easiest for the age of the participants and to counteract possible unwillingness to read the full transcription for member checking purposes. The summaries were kept to one to two pages, and student participants were referred to as "the student" to protect confidentiality. Each student reviewed the interview summary at the start of the next interview session. The student participants were given a pen to add, clarify, or cross through portions of the summary.

Summaries of the interview sessions may have reflected interviewer perspective and allowed for researcher bias. However, by allowing student interviewees to read summaries of the interview sessions, each was able to make corrections if needed, to assist with trustworthiness in the data representation and analysis. Students each gave a verbal acknowledgement that what

was summarized was what they had said. No students changed their interview summaries. This step may have become partially procedural but it also was useful in reminding students what was stated on the previous interview, which in most cases had been a week earlier. In consecutive interviews, I asked follow up and elaboration questions involving their previous responses to try to add additional depth and further my understanding of their motivational perspective. These questions were asked using students own terms or language used during their pervious interview (i.e., One student used the words "real person" when speaking about getting to know or connecting with a teacher, so those exact words were used when a follow up question was asked to gain further understanding).

Approach to Analysis

"Most obviously, individuals and groups construct identities through storytelling" (Riessman, 2008, p. 8). Because student interviews were allowed to flow naturally into storytelling, based on what each student felt like sharing, each interview had its unique components. Themes were created through multiple readings (Josselson & Lieblich, 2003) of the full transcriptions of each interview session using an experience-centered approach (Squire, 2008). "Experience-centered narrative analysis is distinguished by its attention to the sequencing and progression of themes within interviews, their transformation and resolution" (Squire, 2008, p. 50). I used three guidelines from Squire (2008) for the experience-centered narrative analysis. First, I created themes from within each interview, supported by a thematic approach (Riessman, 2008); then I gave predictive explanations, and finally I used top-down and bottom-up interpretations of data.

"Thematic narrative analysis, [is] not generally interested in the form of narrative, only its thematic meanings, and 'point'" (Riessman, 2008, p. 62). After I analyzed the narrative data using this combination of experience-centered and thematic approach, I conducted a further interpretive review searching for motivational factors. Any motivational experiences mentioned in any settings (not limited to math) were categorized and evaluated through intrinsic and extrinsic 'lenses'. I coded and categorized possible motivational commonalities, differences, themes, and general focus points influencing academic motivations. I made generalized conclusions about motivational factors (Riessman, 2008). This allowed motivational themes and critical incidents to emerge, and types of motivations experienced by students to be addressed within my findings.

Prior to uploading my interview transcriptions, I read and reread through all of them noticing themes or commonly mentioned thoughts across the interviews, irrespective of the person who was sharing. After the interviews were transcribed and reviewed, the full interview transcriptions were placed into the NVivo software to assist in coding and data analysis. I then used NVivo to tag and code transcriptions.

Students' stories are presented as general themes and individual student views. Student values, personalities, and personal interests are seen within the data collected. With thought given to attribution theory (See Chapter 2, *attribution theory),* commonalities spanning the fifteen interviews became the first set of themes or 'nodes' created. To find these commonalities I looked at three sets of factors present in attribution theory: External (Extrinsic) or Internal (Intrinsic), Stable or Unstable, and Controllable or Uncontrollable, as stated by Boruchovitch (2004). As I read the transcriptions, I looked for possible meaning behind what each student was sharing. For example, was he/she actually mentioning an internal or external motivator or did

they have a common uncontrollable situation they experienced? After, the themes were listed as nodes (in NVivo) I was able to find portions of interviews relevant to each student's narrative and tag or attach them to the themes addressed. Additional nodes were created as new themes emerged. Multiple readings of the transcripts were needed to ensure all desired coding was complete.

Coding was utilized for themes, motivational types, and analyzing similarities or differences among students' experiences. After coding initial themes in all fifteen interviews, connections started forming among the initial themes. I started to create theme headings for these theme connections. After working through what would be appropriate heading names for the theme connections, I started to notice that most of these overarching themes were actually levels of need mentioned in Maslow's Hierarchy of Needs (Maslow, 1970). There was a connection between what students valued and the levels of need. After this connection was observed, it seemed logical to make the initial themes into sub-themes and group each under the appropriate overarching theme headings: *Physical*, *Safety, Belongingness, Esteem,* and *Self-actualization* (Maslow, 1970). This grouping mirrored most of the initial themes found. The rest of the themes identified fit into either of the data's overarching themes of *Types of Motivation* or *Environment*. Since the interview questions were designed to obtain information about what types of motivation students experienced, these themes were prevalent. Environment as a theme, on the other hand, was unforeseen prior to interviewing but was discussed frequently in every interview.

Using the NVivo system, all interview dialogue was stored, coded, and cross-referenced in a way that allowed theme connections to be observed. The queries ran to assist with the organization of these findings were: 1) *Coding Summary by Nodes* report, and 2) *Matrix Coding*

Query- Nodes vs. Interviews. Results and specifics of my analyzed finding are listed in Chapter 4, *Results*. These findings are displayed as both charts and graphs to assist analysis.

Study Quality Criteria

    Trustworthiness. Trustworthiness or validity is shown through the steps put in place to allow for the most accurate interview data collection and interpretation. First, to help obtain more reliable interview responses, I did not ask questions that were above students' comprehension or comfort level. Validity concerns within the student interviews questions and extension prompts were reduced by having two high school students, ages 15 and 16, initially review them for language usage, dialect, and possible misunderstandings. I wanted the interview questions to obtain the information I was after, while still have a comfortable friendly flow. Therefore, I wanted to use language in my questions that is common among middle school students (Eder & Fingerson, 2002).

    During interview sessions, relationships and trust were established through the creation of a natural environment and reciprocity or mutual exchange of conversational dialogue. Student's dialect and interactions were reviewed after interviews to help address validity concerns. Eder and Fingerson (2002) suggest that analyzing the discourse styles of students interviewed can help assist with rapport and validity concerns. "If dialect codes and styles of talking that respondents use during the interview are those they use with people they know well and with whom they are comfortable, the researcher can be assured that a high level of validity has been achieved" (p. 194).

    I utilized member checking to help validate stories in the form of interview summaries. In these summaries I used the same terms each student used in their interviews and copied as many

feelings or statements expressed as possible into very concise sentences. I chose a summary method to make it more likely for students to read all that was written and to help with possible interview time restraints. Prior to student reading each summary, as well as after they finished the summary, I reminded them that they could change or add to anything. No student opted to change their interview summaries. The checks made through the use of the interview summaries helped to construct *a truth*, capturing the meanings and experiences shared among their stories; to represent *their* reality as accurately as possible (Goodall, 2008).

To help collect, reflect on my thoughts, and support the creation of my research themes, I used a field note journal to record my process of collecting and analyzing data. I was able to reflect on the interviews already conducted and gave thought to additional probing questions used to seek deeper understanding of student earlier responses. Validity efforts were supported by planning questions for the second and third interviews that helped me gain greater understanding into each individual's experience, hopefully capturing and retelling their story more accurately (Riessman, 2008). I started a pre-analysis of the data by identifying possible themes detected during interviews and recording them as they emerged. I used journaling to help track my thoughts throughout the research, prior to the interviews, during the interview time, and during the data analysis. I analyzed my own inherent qualities and position as a middle school math teacher, a possible position of power within the interview structure itself, and I reflected on what this may mean to the analysis of the interview data.

Transferability. A narrative "gives us an avenue into human consciousness and thus may be a powerful tool in tapping into the complexities of human centeredness in a wide range of environments where learning takes place" (Webster & Mertova, 2007, p. 16). All students did

have their own sense of self and experience, but it is through analysis of their stories that others may start to understand the middle school student's shared experiences and the collective themes of importance they create.

Findings collected provide a basis for insight into middle school students experiences of feeling motivated in math. Since all students interviewed attended the same middle school at the same time and all three years had contact with one another, findings may reflect experiences particular to these students. Due to the possible closeness to each other and their desire to initially share their math stories, students may share commonalities among exposures to math classes, motivational factors, neighborhood factors, and interests.

Chapter 4: Findings

The first section, *Individual Student Data,* within this chapter shows the general interview data for each student's three interviews individually. Interview questions, along with extension or follow up questions, are listed in Appendix D for each student. The five students, over the course of three interviews each, shared their experiences in school with math courses and motivation. To make analysis and comparison easier, the three interviews for each student were combined. Figures in each student's section show overall findings for each of the students combined three interviews stories of middle school motivational experiences in math.

In the second section, *Overall Findings*, both tables and bar graphs are used to show each student's frequencies of themes and sub-themes identified for the three interviews. To support comparisons the sub-themes are grouped alongside one another in alphabetical order within each overarching theme. In this section, individual student results may be compared to other students.

Lastly, *Motivational Findings by Student* shows the breakdown of the types of motivation each student discussed and how often they discussed that type in comparison to the others. The three themes were categorized into *Intrinsic Motivation, Extrinsic Motivation*, and *Academically Unmotivated or Unfocused*. The last section shows student data individually. This graph is displayed with combined interview data for each student with the various overarching themes and sub-themes.

Individual Student Data

Through the creation of the interview summaries, I was able to internalize a deeper understanding of what motivates each student, and some of the motivational factors behind what

each student said. I was able to get a clearer picture of each 'whole student.' It was through these insights that I was able to identify the themes used to organize the data for this section.

Five students' interviews are shown in a graph by themes discussed by each in their three interview sessions (see Appendix G). Each student's individually tailored interview questions, derived from the general template with input from past interviews responses, are shown in Appendix D within each student's section.

Student 1 - Liam. Figure 1 (see Appendix G) shows the frequency of each motivation mentioned, as a combined total for Liam's three interviews. In the frequency of themes mentioned in three interviews, Liam showed an importance of staff and peer connections (*belongingness*), *intrinsic motivation*, and accomplishments (*esteem*) in his experiences. Elements of *intrinsic motivation* (i.e., attempting an assignment without a physical reward given) were mentioned 24 times. Liam mentioned a need for staff connections 27 times and a need for peer connections 15 times, showing a high *belongingness* need. Lastly, Liam mentioned his accomplishments as a motivational factor; this *esteem* need was mentioned 21 times over the course of his three interviews.

Student 2 - Elliot. Figure 2 (see Appendix G) shows the frequency of each motivation mentioned, as a combined total for Elliot's three interviews. Over Elliot's 3 interviews he expressed a great desire to satisfy the accomplishments (e*steem*) need, spoke a lot about peer support or *belongingness,* classroom (*environment*), and indicated being influenced by *Intrinsic motivation*. Elliot stated 23 times an enjoyment or excitement around his accomplishments supporting a desire to satisfy an *esteem* need. A desire for peer collaboration or group support

(*belongingness*) seemed to be valued by Elliot discussing it 11 times. *Intrinsic motivation* outweighed e*xtrinsic motivation*, 13 times compared to 6.

Student 3 - Katelyn. Figure 3 (see Appendix G) shows the frequency of each motivation mentioned, as a combined total for Katelyn's three interviews. To Katelyn group work and peer connections (*belongingness*), accomplishments (*esteem*), and *intrinsic motivation* are discussed frequently. Katelyn's group work and peers connections (b*elongingness*) played a large role in her discussions at 17 and 15 times. Accomplishments (*esteem*) outweighed many other themes mentioned, 20 times Katelyn discussed her accomplishments or a value in accomplishing something set before her. Katelyn mentioned utilizing or having more motivation twice as often through *intrinsic* means than through *extrinsic* (14 to 6).

Student 4 - Paige. Figure 4 (see Appendix G) shows the frequency of each motivation mentioned, as a combined total for Paige's three interviews. Paige mentioned *intrinsic motivation*, accomplishments (*esteem*), and peer and staff connections or support (*belongingness*) as major themes over her three interviews. Her mention of *intrinsic motivation* far outweigh her mentions of *extrinsic motivation* at 22 times compared to 6 times. Accomplishment (*esteem*) was mentioned 20 times, nearly as many times as *intrinsic motivation*. Paige frequently mentioned peer and staff connections (*belongingness*) as well as the support she received from them: peer connections 11 times, staff connection 19 times, and support received 15 times.

Student 5 - Daniel. Figure 5 (see Appendix G) shows the frequency of each motivation mentioned, as a combined total for Daniel's three interviews. In Daniel's three interviews there is

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a high frequency in his mention of *intrinsic motivation*, accomplishments (*esteem*), individual

work (*environment*), and staff connections (*belongingness*). At 34 compared to 10 it should be

noted that the mention of *intrinsic motivation* is more than three times as frequent as the mention

of *extrinsic motivation*. Accomplishments (*esteem*) were also highly mentioned (30 times).

Daniel shows his value, through frequencies, for individual work over collaborative work,

comparing 22 times to 7 times discussed. Staff connections, mentioned 17 times, conveyed value

through frequent mentions.

Overall Findings

Table 1 (see Appendix G) designates the number of times each student discussed each

theme in their combined three interviews. For simplicity of reading, this table has been split into

themes under the particular needs they pertain to. Hue has been added to help visually recognize

those areas discussed frequently by each student for ease of comparison across students. Shading

is set to a gradient where the darker shading represents more discussion around the theme and the

lighter shading represents less discussion.

When looking at the table, a few commonalities can be noted. For instance, all students

mentioned intrinsic motivators twice as often as extrinsic motivators, and very seldom mentioned

being unmotivated or unfocused, with very similar frequencies of students' mentions of

accomplishment or feeling accomplished. Mentioning feelings of accomplishment many times

went hand in hand with students' mention of intrinsic motivation. The classroom or classroom

environment was mentioned frequently by all, which is not a surprise due to the academic nature

and school focused questions students being asked. Connections with peers, teachers, and staff

were discussed as well as support. These themes seemed valued by the frequency students chose

to discuss them. One difference to note among students is their preference of group work or individual work. Four students valued group work with peer support and one valued individual work with teacher support.

Figure 6 (see Appendix G), shows motivations of all students combined into single bars by theme for clarity of review. In this figure, differences of frequencies among themes can be observed.

Motivational Findings by Student

Figure 7 (see Appendix G) shows student frequencies in each type of motivation responses (Intrinsic, Extrinsic, and Academically Unmotivated or Unfocused) compared to the other students. Intrinsic motivation was mentioned within students' dialogue and included such motivators as peer acceptance (*belongingness*) and positive self-worth through their accomplishments (*esteem*) or triumphs over challenges. When coding and analyzing data I did incorporate achievement of grades as an extrinsic reward, which raised the extrinsic frequencies on the graphs. I incorporated grades in the extrinsic theme because that is how it is described in much of the literature on extrinsic motivation. However, coding grades as extrinsic did not affect the overall outcome. Every student made mention of intrinsic motivation far more frequently than they mentioned extrinsic motivators or motivations, and being unmotivated or unfocused was mentioned very infrequently.

Chapter 5: Discussion and Implications

This study was designed to gain insights into middle school academic motivation from the students themselves. Student motivation was discussed as one of the problems with education in 1990 by Ames and is still being mentioned as an educational problem. According to Chapman and Vagle (2011) "teachers already used innovative strategies to promote engagement… Still, educators struggle daily with unmotivated students" (p. 1). As mentioned in the review of literature, there are many theories behind motivation and the behaviors influencing student motivation. These theories' prompted the questions used in student interviews. This was done to understand what experiences have been meaningful and impactful for each student individually. As I looked further into the research around motivation, I could not help but wonder whether students themselves would agree with some of the motivation research findings.

This chapter serves to present summaries and analysis drawn from the data presented in Chapter 4. The purpose of the conclusions discussed will be to provide a platform for further discussion about adolescent motivational factors in education and recommendations for research into middle school students' motivation. The data shown in Chapter 4 and topics students spoke frequently about are discussed and interpreted within this chapter.

Summary of the Study

Overview of the problem. Every person is motivated to do something. People are motivated to eat when they are hungry or move out of the street if a car veers too close. And while everyone has their own interests, there may still be things each student can be motivated to accomplish outside their usual interests.

As a teacher I have observed firsthand how motivating students academically, possibly each with different ambitions and interests, in one classroom setting can prove to be challenging, however important. Increasing student motivation toward accomplishing math tasks can affect learning and their overall view of math, even into college experiences or careers. It is discussed by Sullivan and McDonough (2007) that students who are unmotivated or under-motivated to achieve academically in math have a lack of confidence in their abilities. A student's beliefs around whether they will be successful in math are instilled by the time they reach college (Middleton & Spanias, 1999).

Classroom environment, student self-efficacy, and negative or positive experiences with motivation all affect a student's overall attitude toward math (Gunn et al., 2007). "The school environment also impacts on adolescent development. The physical setting of the school, limitations in resources, philosophies of education, teacher expectations, curriculum charatceristics, and interactions between teachers and students have been found to be related to a host of adolescent outcomes…" (Holmbeck, 1994, pp. 21-22). This research seeks to assist in understanding adolescent academic motivation, specifically regarding mathematics, and which factors are mentioned playing a part in each student's increased or decreased academic motivation in math.

Purpose of the study. In this study 8th grade middle school students were interviewed about recalling their experiences in middle school. Interview questions focused on student experiences with motivation and within their math classes. This research study was conducted to gain a better understanding of how middle school students can be motivated academically in their math classes and throughout their middle school academic experience. Many studies have

been conducted on motivation of students throughout many difference age groups. However, after much research, it seemed that firsthand accounts from middle school students were in short supply. Interviews with exiting 8th grade students provided a unique perspective into adolescent motivational experiences.

The research question, underlying questions, and additional considerations are listed for convenience below, as they are in Chapter 1 *Guiding Questions*, and are addressed within this chapter.

Research question.

- What are students' experiences of motivation in math during middle school?
  - o How are they motivated to achieve academically in math?

Underlying questions and considerations.

- If intrinsic or extrinsic motivations are present in students' stories where and how are they recalled?
- Do students imply sustainable academic motivation within their stories?
  - o If so, is it intrinsic or extrinsic?

Additional considerations.

- How do middle school students think about math influencing their future endeavors?
- What role do middle school students see math having for their future after middle school/high school?

- What thought do middle school math students give to their post high school endeavors?

- How do students view academic experiences they have now assisting them in their future?

Interview Overviews

Five students were willing to be interviewed three times over the course of three weeks. Each interview was meant to delve deeper into the understanding of each student and their individual academic motivations. And while I would not claim to completely understand the inner workings of each student after three interview sessions, these students shared many details with me that were personal and assisted me in gaining a greater understanding of middle school academic motivation. I found the interviews to have more of a friend feel and less of a student-teacher feel, which as a middle school teacher I had experienced. I found it surprising that students were willing to mention their feelings, concerns, and successes so openly. Therefore because of this comfort component, which seemed to be present for each student within all of the interviews, I was able to derive an understanding of motivation for each student in their current stage of development. So before losing each student's individuality in the collective group by discussing the collaborative findings, I share a recap of each student's stories and an analysis of their motivational drives.

Student 1 - Liam. For Liam, connections with peers and staff were mentioned right away. He enjoyed joking with his teachers and was actively engaged in classes when he felt welcomed. If Liam did not feel welcomed, he admitted using headphones and music to become

disengaged from the class. "It changes how I act towards people, like I won't talk if I'm you know, if I feel like I'm not welcomed. I just either use my headphones or something, usually don't talk to anybody. Try to get through the class" (3rd interview). He believes the teacher makes the class and with the right teacher it would not matter what subject was being taught, he would gain a lot from the class. "I rather like her a lot; she's a really good teacher. It doesn't matter what we're learning, we were learning poetry and stuff like that and my writing is not that good, but I still tried" (3rd interview). Liam described how a bond built with a teacher can greatly affect his comfort and feeling of self-efficacy. "Well, being able to talk to um, joke with um; made me feel more comfortable, made me feel like I wasn't shy. Or I didn't feel like dumb or something like that. Or like I couldn't understand what they were teaching. It's more like since we had a friendship I can learn more" (2nd interview). Showing care and support toward Liam, I believe, would make a big difference in whether Liam was academically motivated in the classroom or not.

Liam wanted to feel that he was a valued part of the classroom. He had a view of working for the good of all, instead of the individual, in many aspects of his life. He seemed to like collaborative team video games where a team worked together against other teams. He mentioned possible military interests in the future and named the group dynamic as one of the factors. Sports played a big part in Liam's middle school experience. Liam mentioned being able to participate in sports as an incentive or motivator for keeping his grades up. Sports were one of the big motivators for good or 'qualifying grades.' However, the last semester he decided to challenge himself to see if he could be successful in completing all homework and classwork, even without the sports component keeping tabs on his grades. "This quarter I started turning in my work and stuff during football and wrestling. My off season it seems like I start slacking a lot

and I just, I guess I decided not. To turn in everything, to see if I could do it and I have done that so far and have been participating, raising my hand more, asking questions more, turning in my work" (3rd interview).

Liam occasionally shared conflicting feelings. For instance, he shared his belief that he learned best one-on-one and made the most academically growth individually, but when asked if he experienced too much group time he implied that he would much rather work in groups. Liam self-proclaimed that the social element of groups was detrimental to his academics, but it was still appealing due to its belongingness and safety factors. Peers were a large part of what influenced his motivation to do or not do academic work. "Just coming to class, my friend … he's like encouraging. Either it's a good encouragement or a bad encouragement" (3rd interview).

All in all he has had some thought around future possibilities for careers but is unsure if anything he does now in math will assist him to achieve any of these future paths. At the most he views graduation from high school as the connection between what he is doing in school now and what he will do later. Therefore, this may make his motivation around any day-to-day mundane tasks in math susceptible to peer or immediate influential factors. This being said, he mentioned extrinsic motivations only a few times and implied them as not being of much value to him. When asked if he can describe a time he had received a reward for accomplishing his math work, Liam replied "It was probably this year" (3rd interview). Then he recall he had received one today "I got a, award, or like a [school mascot] pass for, you know. I think I have it in my pocket" (3rd interview).

Intrinsic motivation, when mentioned, seemed to be more valued within his descriptions. "Well I've learned that if you pay attention, you know. It's pretty much if you do, you do the work you would have to do at home in class. So if you pay attention and you're ahead of the

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game then you know you'll pass in the classroom" (1st interview). Attending classes themselves and being able to attend school seems to be of value. Liam mentions an intrinsic and a motivating speech that helps him persist through difficult days. "I think to me it's just like a privilege" and "I just tell myself it's not that hard" (3rd interview).

Student 2 - Elliot. Elliot mentioned enjoying the feeling of being special or accomplishing things above others abilities. "I don't know it's really nice when you do something that nobody else does" (1st interview). And, "I liked it when I understood factoring. Not many other people did, that's always nice" (2nd interview). I believe accomplishing things that he felt all others could not do created a sense of pride and intrinsic motivation to persist through challenging or difficult tasks. Elliot mentioned feeling accomplished in math. He enjoyed both math and science and sees possible enjoyment with a career in engineering. And, while the enjoyment of these subjects may have led him to thoughts around this career path, he mentions how he would feel pride in being able to say to a friend he had a hand in the creation of something special. "Well I like the idea of something that you made being useful to people. I think that'd be really cool, to tell someone like yeah I did that. Just that simple comment" (1st interview). Intrinsic motivation provided through the possibility of accomplishing something special, either with a team or on his own, seemed to play a role in motivating his academic accomplishments. His career aspirations are currently based around his interest in science and math. He has thought of general engineering careers loosely based on these two areas of enjoyment.

Elliot enjoys playing sports in his free time and is involved in Science Olympiad collaborative team competitions involving STEM (Science, Technology, Engineering, and

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Mathematics). He has spent a few months every year with this STEM focus and interest in the Science Olympiad competitions providing him with an ulterior motive and emphasis toward his general math understanding. He believes there is not a direct connection between the competitions he is involved in and what he learns everyday in math. However, he does believe that a connection may exist on more of a problem solving skill and strategic level.

Group work and collaboration are very valuable to Elliot. He mentions really liking the peer support and the various strategies he gains from working with peers. "Well if I get stuck normally what I do is just come at it from a different angle and I just keep on doing that so I can have that satisfaction of completing something that was difficult" (2nd interview). Peer support helps him to persist through math challenges that might seem difficult solving on his own. New ideas and collaborative efforts help Elliot to not feel overwhelmed when attempting challenging problems because he knows he has others to support him. "Me and my friends get in a group and work and its kinda cool cuz we are pretty smart and we can just uh, like if one person doesn't like uh get it someone else will always get it" (2nd interview).

Elliot values support from his teachers as well as his peers. A teacher's mood and willingness to assist makes a difference in whether or not Elliot asks for help from that teacher. Elliot has had frustrations when teachers will not assist him or are not friendly when they do so. "It's always frustrating when you need help on something and he's like in his bad mood and, and you caught him at the wrong time or something. Yeah and then you like don't, like he can't help you, or you, like he tries to help you kinda but you don't understand it, and then you like ask him again and he gets more mad. And so that's kinda annoying and frustrating. Basically I just ask my friends and see if anybody figured it out and then usually somebody has" (2nd interview). Elliot feels that he can count on peer support when teachers are unavailable. He mentions not

feeling stress over accomplishing any of his assignments due to the peer and family support. "I could just take it home and ask my dad and he would, he would always, he learned it a different way. Everything I've ever done. So then I try it his way, and his way normally makes more sense to me, so that helps too" (3rd interview). I then remind Elliot that he had mentioned before how he likes to approach problems from different angles. His response was "yeah, that's one of the different angles" (3rd interview).

Student 3 - Katelyn. Katelyn seems very motivated to complete her math assignments but was unable to pinpoint exactly her motivation. On occasion she laughed when I asked her about liking math. When she was asked to describe a time when she felt excited to do her math work, her response was made with much hesitation. "Um…A time when I felt excited? My math work? I don't think I've ever been excited to do it" (3rd interview).   Afterward she laughed a bit. Her truth is that she liked the challenge of math but her ultimate goal was always founded in completing the work. For Katelyn, academic motivation seemed relatively intrinsic in nature, knowing the work was finally complete and over was what spurred her on. "I only feel excited like afterwards when I get it" (3rd interview). For Katelyn her math was just math work, completion was the ultimate goal. She seemed to learn things along the way and enjoyed working with friends to accomplish the math work; however, whenever asked directly she did not mention valuing the learning just the completion. It is possible the aspect of learning the math topics was part of the levels viewed within *the completion* and was simply not viewed as its own entity.

As part of a school honor society, Katelyn has enjoyed many collaborative efforts in community service projects. Since she must have grades in good standing to participate, grades

become motivational for Katelyn. This grade driven motivation is demonstrated when asked what keeps her motivated when she finds herself struggling with an assignment. "Well like the first part is probably my grade, cuz I know my grade depends on every assignment. Definitely just like the working with the groups-thing, kinda prevents that getting me stuck. So I mean, it doesn't really happen to me often" (3rd interview). She enjoys being able to work alongside friends toward a common goal and then seeing that goal achieved. At this point it would be difficult to pinpoint whether grades act as an intrinsic or extrinsic motivator for Katelyn. I have a notion for Katelyn it may depend on other factors, the overall situation, and what role grades take on as a motivator for her. It is possible that grade attainment as a set personal goal motivates Katelyn's level of performance. "Students who are motivated to learn tend to be the highest achievers…the more motivated students are to achieve in certain areas (e.g., academics, athletics, and social interactions), the more they value the rewards that come from their success in these areas" (Wiseman & Hunt, 2008, p. 46).

Group work was mentioned as Katelyn's preferred learning method. Even when her previous math classroom did not assign official groups, she joined a large group or multi-group of 8 or so students. "Last year there were a lot more kids, so kinda just worked on their own, and I personally worked in like a bigger group like almost like eight kids working together. So I mean it'd be like little groups, like with the eight people we would have little groups and we would all share our answers at the end I mean" (3rd interview). This year she described really enjoying the benefits of working in chosen small groups on a regular basis. When Katelyn was asked what keeps her from giving up on challenging problems she described her peer collaborative groups boosting her motivation and providing multiple ways to solve challenging problems. "Well like I said, we always work in groups so whenever I get stuck or something, I'll

ask one of my friends and they'll help me kinda overcome it, or I'll talk to the teacher, so that will help me" (2nd interview). These peers and her teacher created a support system she valued and leaned on for assistance.

"In sixth grade it was Mrs. …, I had her for a couple classes. She was very caring. I liked her a lot. And probably Mrs. … too, she was my sixth grade math teacher. Yeah, she helped me a lot" (1st interview). Valuing this supportive and caring nature, she noticed in many of her teachers, Katelyn mentions a possible future path as a teacher. She has not planned much, but mentions thinking that she would like to be a teacher. She falls within the range coded *less thorough plans* for the future. She gives the impression that she has not yet thought much about careers or her future after high school. Her main concerns are those things affecting her in the present. She enjoys the caring and supportive aspect of being a teacher, but does not have a favorite subject. "I have always wanted to be a teacher and help people, but they don't get paid well right now… definitely interacting with everyone and just being able to help people" (1st interview). Whatever her path for the future becomes it seems likely that she may bring practical factors, such as money, into her equation.

Student 4 - Paige. Caring and bonding with peers and teachers seemed to be highly valued by Paige. Referring to middle school she states "It's been really fun. It's been easy to make a lot of friends and the staff has been really supportive and it's just been a great experience" (1st interview). She spoke a lot about connections at school and caring teachers. She mentioned enjoying getting to know a teacher while being honored at a school function. "Well I won the 8th grade student of the year award and I got to choose a teacher to take to the ceremony and we just talked started talking. It was probably just talking about normal person things with

the teacher which you don't normally get to do… I choose the teacher that had been really supportive and she's just an awesome person in general so" (1st interview).

Paige spoke about many different accomplishments she had been able to achieve while in middle school. However, most stories lead me to believe that it was not about the tangible achievement she earned, it was more about how much pride she had in her accomplishment. Paige was able to see what she was able to accomplish through her hard work. "We did this huge project in seventh grade. It was called the inquiry investigation and it was a huge chunk of our grade and I was working a long time on it. And when the day came everyone else's was like ehhh. And mine was like really professional looking and really nice. And I was like, I'm so proud of this. I worked hard on this" (3rd interview). Paige valued hard work in challenging problems. When asked about a time she felt accomplished in math, she stated that she preferred working hard on a challenging problem over getting the answer immediately. "That finally feeling, I get it and I can do this in the future now, and I won't fail. It's more when I've been working something. Cuz when I get it right away, I'm just like oh everybody got that, it's not a big deal and it's not that hard" (3rd interview).

Paige mentioned struggling with feeling judged over her accomplishments and taking steps to avoid feeling "stupid" or inadequate in front of her peers. This feeling of inadequacy and fear of looking dumb in front of peers may have caused her to use an avoidance of self-helping (Urdan et al., 2002), discussed in Chapter 2. She sought refuge from judgment by working in small supportive collaborative groups. "I'm in a class with like really really really smart people so if, I 'm afraid to ask a question because everyone else seems to get it and I just feel like they're going to view me as stupid from that point on so… I normally try and get in with a group if possible so they can like help me understand it better. Or I just try an make it as good as it can

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possibly be so I don't feel less up to the standards" (2nd interview). Paige mentioned enjoying small group work and collaborative efforts. In these group environments, there seemed to be less emphasis on getting the answers immediately and more on the process around finding a path toward a solution. Paige understands that if she has struggles she has both the support of peers and the teacher. "I know that I can always ask a teacher for help if I don't understand it and I just, I know that I have to get it done in order to continue to learn and further my knowledge" (3rd interview).

During Paige's interviews she said many self-empowering and self-motivating phrases, such as, "wow I'm not just learning pointless information I'm learning how it happened! (2nd interview). This made me believe she tended to use more intrinsic motivators to keep her academically advancing. When asked what her favorite middle school moment has been. She replied, "kinda having that ah-ha moment. When you just totally get something that you've been struggling with" (1st interview). She mentioned pep talks that she gives herself when she needs to do something she is not excited about: "I kinda just tell myself like, you know this is going to help you in the long run, get through it and stay focused" or "like, I can understand this now and I can get through the rest of the day whatever it brings" (3rd interview). These phrases not only tell me that she thinks about what she does today affecting her accomplishments or goals in the future, but they also imply that she has a good grasp on how to keep herself motivated to persist through challenges.

One challenge she recently faced had to do with a poor test grade. Knowing her frustration over the poor grade, I asked her if it was more important for her to change the grade or understand the material. She responded "like I care a lot about the grade, but if I knew I understood it and I just made mathematical errors that I can easily fix and I understand why I

made them, then I'm ok with it" (3rd interview). Paige seemed to strive for personal growth and wanted to know "why I got the grade or how to do it better" (3rd interview). Paige gave the impression that she did not accomplish her work for a reward or grade. She spoke of being more frustrated over her lack of understanding of the math material than the unfavorable grade itself. For her, understanding and future growth were highly valued. If she could learn something from the situation it was not a wasted experience. She seemed to try to connect to others' points of view. Even after the poor grade she had an open debate with herself around not blaming the teacher, even though she felt that he had not taught them the material efficiently. "Quite recently we were working on finding the volume of tetrahedrons and we had a sub on the one day that he was going to explain it. So I totally didn't understand it and I botched it on the test. And he doesn't understand why I botched it. And I'm like it's your fault you weren't there to help me, but I don't want to right out say that to him so I'm kinda feeling upset with him. Yet I can't really blame, yet I could really blame him so. I'm just gonna hope he gets the retake done soon so I can retake it and actually understand it this time" (2nd interview). Along with the obvious teenage angst over a poor test grade there is also a bit of her taking responsibility, understanding the teacher's perspective, and growing in her understanding of tetrahedrons. She demonstrated ownership around how she chose to view her circumstance and confront challenges in her day.

Student 5 - Daniel. While interviewing Daniel I noticed key differences in what he valued compared to the other interviewees. He preferred to work on his own, only desiring to check with the class or a group at the end to make sure he was on the right track and to take note of any faster methods to solutions. Daniel prefers to work through challenging problems or puzzles without others' input first. He felt he gains more academically from accomplishing

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things on his own. Daniel mentions feeling slowed down by others and would prefer work at his own pace, with help given when needed. "Yeah, it just goes really fast for me. So when I'm given these questions, like the kids they are asking questions and I mean it's just like, it slows me down a lot, a lot of the time" (3rd interview). When asked to describe his ideal class, he said it would allow for him to work independently and then to help others who are struggling after he was finished to help solidify his understanding. "I think the teacher would just kinda of let us chose if we could work on our own or in a group. But I mean I would choose to go alone for most of the thing and then once you, once you got the problem done you can help, help other people. And then I think that would be, that would be beneficial for a lot of the people. Yeah I think, I think also teaching. If someone gets it done its good for them to help teach other people, it helps reinforce it I think and uh, in our minds so" (3rd interview).

The second clear difference about Daniel is that he was obviously very driven or motivated to accomplish goals he has clearly defined for himself. Every time I interviewed Daniel his answers were very concrete and well thought out. The only instance, where he seemed perplexed with indecision was around whether grades or understanding were more important to him.

> umhmm, they both matter to me quite a bit. Probably my understanding just a little bit. Um, so like the first time I did I didn't understand how to do it? I think both. In that case I would probably be more concerned about my grade a little bit cuz it's a test. And, I don't know. I really, it is really close. Yeah and like depending on how bad of a grade I got. I mean if I got a B or something or C if it's a high C then I might just be doing it just to understand better, and then also bring my grade up. But if its, yeah. Yeah I think

usually, I think most of the time it is to get my grade up mostly, but I do enjoy

understanding the concepts (3rd interview).

This question went on puzzling him even after the interview was over. He told me as he left the

interview room that it was a really good question but too close to call. I speculate that for Daniel

the grade and the understanding may have always gone hand in hand, not one without the other,

however, it is possible that Daniel values both equally. For Daniel it would depend on the

situation and repercussions that either a poor grade or lack of understanding might have.

After interviewing Daniel, grades seemed to be one of his motivational factors, but not

the main factor. Grades just seemed to be a wonderful byproduct of his accomplishment, gained

through his confidence and persistence. According to Latham (2012) this is common. "Most

people have a need or desire for a firmly based high evaluation of themselves based on

achievement that leads to respect from others and inculcates confidence to face the world" (p.

34). He spoke about accomplishments upon accomplishments earned while in middle school.

Achievement itself, whether tangible or not, seemed to be the main academic motivational

driving force for Daniel. He may be like other "individuals [who] routinely appraise their

qualities, performance, behavior, and feedback they receive from others" (Alicke, 2012, p. 303).

To Daniel it is probable that achievement of a grade acted as an affirmation of his self-evaluation

and supported his confidence.

When asked what kept him interested in challenging or complex logical reasoning

problems, he responded that he liked thinking through the entire problem. "When it is simple it

uh, I'm not sure but uh it is more just how fast you can make quick easy calculations in your

head. But the complicated ones keep you thinking throughout the entire thing. It is like each time

it is a new, it is a new problem it is a new way of thinking about" (2nd interview). Learning this

new way of thinking is what he gains through his accomplishments. "Having to change, change the way I do things, or I sometimes learn new short cuts to learning problems. To doing problems I've learned new uh things that I can do, just ta help me be better in math. So the problem might sometimes start out long but next time you can do it faster and faster. Yeah, I learn to do it better each time" (2nd interview). Daniel is intrinsically motivated. He wants to learn more and more for the sake of curiosity and gaining additional knowledge. "When individuals are intrinsically motivated, they do activities for their own sake and out of interest in the activity" (Wigfield et al., 2012, pp. 464-465).

He was involved all three years in Science Olympiad team competitions. It is my understanding that all competitions are team efforts; however, when speaking about the competitions he did not mention teammates often. The only time teammates were mentioned was when he discussed practicing for the competitions. He devoted much of his free time every week to thinking about Science Olympiad, math, and engineering. "So Science Olympiad out of school…yeah uh, a long time, let's see probably its usually like 4, 4ish hours, 5 hours per week, 6 hours something like that. Well just having it on my mind is probably more than that too" (3rd interview). Daniel admitted winning many awards and cash prizes over the three years. However, consistent with the previous discussion, the excitement in his voice did not seem to revolve around the awards themselves. He seemed more excited about the pride that came with being able to say he achieved 'it,' whatever 'it' was became somewhat inconsequential. It did not matter whether the reward he received was tangible, he wanted the pride of saying he was able to accomplish what he set out to do.

Due to his intrinsic desire to achieve as an engineer, he had an interest in spending much of his time both inside and outside of school thinking of math and engineering. This current

motivation toward math and engineering has already exposed possible careers paths in engineering. It helped him to give thought to specific engineering paths that would be best suited for his current interests. When asked about career possibilities, he made connections between what he was currently accomplishing in class and what he enjoys doing in Science Olympiad.

> Really any kind of, a lot of different kinds of engineering are interesting to me right now. Like specifically mechanical engineering, and uh aeronautical engineering… I think my best, my favorite subject in science is physics. I think that's probably cuz its more math related, so uh I'm not sure. I, from what I know about electricity err, ah electrical engineering and chemical engineering its less math. So whichever one involves more math. You know mechanical engineering, I think has a lot of physics involved and also the uh aeronautical engineering. And I'm in events in eh Science Olympiad that have to do with, I'm in bottle rockets which is like aeronautical engineering. (1st interview)

Daniel goes on further to say that if he was able to have a job similar to what he accomplishes with the bottle rockets, he would really enjoy it (1st interview).

Findings Related to the Literature

Intrinsic motivation. Intrinsic motivation may be related to human needs, such as those within Maslow's Hierarchy of Needs (Ferguson, 2000). Portions of this research show intrinsic motivation act as a 'driving force' or factor to obtain each level of need, as mentioned in Chapter 2. However, motivation is shown as a byproduct of a fulfilled level of need. This somewhat contradicts Maslow's (1970) view that "…a satisfied need is not a motivator" (p. 57). While I tend to agree that the satisfaction of a need is not a motivator in and of itself, the students' interviews seemed to say that when a desired need was met, it opened the way for intrinsic

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motivation to occur. This intrinsic motivation seemed to occur without a specific level of need as the end result or 'driving force'. Students mentioned many instances where they were accomplishing their academics because of intrinsic motivation, but this motivation did not seem present if some of the more basic needs were not met first. For instance, students described needing to eat and shower before they could even start moving in the morning (*Physical* needs). They mentioned not being motivated to attend classes if they did not feel safe (*Safety* needs) or welcomed (*Belongingness* needs). After these three needs were met, students mentioned feeling achievement and persistence through difficulties toward math accomplishments (*Esteem* needs).

Four of the five students mentioned enjoying the problem solving (*Self-actualization* needs) and challenge within math itself. All five students felt more success if they first struggled through a challenging assignment before finding a solution. Intrinsic motivation, not giving up, persisting through, and feeling accomplishment at the end, by either having the work completed or working through problems on their own (minimal assistance) created this feeling of accomplishment. Whether intrinsic motivation falls within Maslow's Hierarchy or is a motivational factor and driving force, it definitely shows that students gain intrinsic motivation woven throughout achieving various needs. Daniel showed intrinsic motivation when speaking about his excitement to learn more for the sole purpose of advancing. "I am motivated to get, you know at some point I am going to get somewhere I think, so I'm motivated to get to that, that point where I learn something and I advance" (Daniel, 3rd interview).

Motivation through future purpose. "The study of motivation must be in part the study of the ultimate human goals or desires or needs" (Maslow, 1970, p. 22). Bandura (2006) mentions that having an anticipated future in mind helps students have motivation to persist

through mundane day to day work. "The human being to some extent yearns for his goals, purposes, and ends, *rather* than being driven by blind impulses and drives. (Maslow, 1970, p. 284). I found this to be the case. Students had clear views of possible futures they may have after high school. While these views may change overtime, the students who mentioned paths that were more clearly defined also saw current connections and future value in what they were learning now. An example of this is shared when Elliot discusses how he enjoys chemistry and believes that he may be able to incorporate this enjoyment into a future career track. "I think it'd be really cool to be an engineer but I don't know what kind I wanna be yet but … we're doing Chemistry now so I think I might like to be a biochemical engineer" (1st interview).

Paige seemed to have many different possible future paths in mind. She alluded to the fact that she has thought about her future a lot, even to the point of stressing over hardships that could be faced due to her decision. "I'm struggling with that because I've always wanted to be an art teacher and have an art career but I'm thinking that's not practical at all and I should go into something like engineering because I easily could do that at this point. So either engineering with science somehow and or being an artist" (Paige, 1st interview). When questioned about her motivation for a career in engineering over teaching, she discussed the possible financial burden of being a teacher. "Just how unstable it is at the moment, I don't know how teaching is gonna help pay my bills and everything and if I wanna raise a family, can I support them? So" (Paige, 1st interview).

Achievement. Students' mentioned different ways they felt achievement. "I think I basically feel accomplished every time there's something hard that you have to work for and so not quite every day but almost every day" (Elliot, 3rd interview). Elliot shared the common

opinion that hard work makes him feel accomplished. Liam mentioned enjoying the fact that he accomplished a self-set goal of completing his homework and classwork, even though the motivation given through sports was no longer there after the season ended (3rd interview). The intrinsic motivation shown here seemed to help improve his confidence in his abilities and gave him pride over his accomplishment.

As part of thinking about achievement, students also discussed what factors did not help them achieve. Three mentioned working best in groups to accomplish math work. Two mentioned that individual work kept them on task, while working with a group either provided a way for them to elude doing work or they felt other students slowed their pace. For each of these students the social aspect of groups provided barriers to accomplishing their work. Whereas for the first three, group work provided much needed support.

The three students who academically excelled in groups also shared the same comfort in asking their groups questions to gain support along the way. Elliot mentioned feeling accomplished in math because he did not feel pressure (3rd interview). He had many people to turn to for support, which in turn kept him intrinsically motivated to persist through to the end of even the most difficult assignments. "So I'll just like ask people around and then…there's no reason to freak out about it" (Elliot, 3rd interview). If any pressure was present it may have only shown up as peer pressure to accomplish the math task. Since groups worked collaboratively, students were assumed to stay together and progress with the whole group. According to students' *social goals* (Urdan et al., 2002), students may feel an intrinsically motivated responsibility to other group members, in this case self-selected peers, to complete the assignment. This support was discussed by all interviewees as something they desired or found valuable throughout their time in middle school. Many of the avoidance strategies mentioned in

Chapter 2 seemed to be limited through this classroom setup, based around student support for one another. Paige even spoke openly about not feeling comfortable asking the teacher questions in class. She did not want to appear dumb in front of her peers. She felt more comfortable asking her peers within the small group if she was on the correct path to a solution (2nd interview).

Safety. According to Ames and Ames (1984) a student's motivation can be based upon that student's thoughts, instead of pure instinct. Therefore, to assist student motivation, their values, interests, anxieties and needs must be addressed (McCarty & Siccone, 2001). These concepts, discussed within Chapter 2, were mentioned by all interviewees. "When students believe in the safety of the school setting (academic or physical), they flourish" (Korb, 2012, p. 100). In the classroom students need to feel welcomed, supported, comfortable (Tileston, 2010), interested, or curious about the knowledge being learned to feel motivated to continue and on occasion to attend class. "I mean it seems like, you know, if the school doesn't want me here I don't have to be here. I choose to go to classes that I like and if I don't wanna be in that class, and there's nothing to do, then I probably won't go" (Liam, 2nd interview). And whether Liam was physically present or not if he did not feel comfortable, supported, or welcomed, it was "just a class" (3rd interview). "I still participate. It's just I'm just not as social, not as. I guess I'm still engaged, it's just yeah, it's just a class I guess" (3rd interview). "Students who do not feel safe and accepted in the learning environments will not be able to reach their fullest potentials in their learning until they do feel safe and accepted" (Wiseman & Hunt, 2008, p. 62). Liam experienced this unsafe or unwelcomed feeling, both in the classroom and within the school environment itself. "I think this year I got pulled to the, pulled to the side in the lunch room because, well first she asked me to empty out all my pockets … and I kinda told her what are you looking for?

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You, are you trying to find something? And she says no, I just looked suspicious. Yeah, I was like ok well. Yeah, I just look suspicious you know" (Liam, 2nd interview).

Liam could not focus on the academic learning when his safety need was unfulfilled. If he had felt comfortable and welcomed this need would not have been his main focus. Academics may have been able to flourish. As an avoidance behavior (Urdan et al., 2002) and possible protective measure "to prevent further hurt of threat or frustration" (Maslow, 1970, p. 30), on occasion Liam would choose to miss class or classes that made him feel this way. "Environments where students feel safe, both physically and emotionally, where they are desired and cared for, and where they 'fit in' or belong, contribute significantly to higher motivational levels" (Wiseman & Hunt, 2008, p. 79).

Care and support. "Research from all three kinds of socialization agents [Teachers, Peers, and Parents] shows that teacher support is particularly important for academic motivation and adjustment" (Wigfield et al., 2012, p. 468). Students expressed valuing the support and care they received from their teachers over their middle school years. "There is compelling evidence that people are motivated to form and maintain stable interpersonal bonds" (Gable & Prok, 2012, p. 350), without this bond made there may be something lacking from the classroom environment for students. When asked about the support he had mentioned in a previous interview, Elliot elaborated "she [a teacher] definitely helped because if I had any troubles she would just help me fix them, so that helped" (2nd interview). Similarly Paige mentioned support and care given from two teachers, one 6th and 7th grade. "I will remember how awesome my sixth grade math teacher was and I got my first B in her class like during on a project and she was totally understanding about it and she helped me get through it. So I'll remember her being

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supportive and awesome. I'll remember my seventh grade math teacher being funny and loving to joke around and just easily getting me out of the glummest mood" (2nd interview). Liam went as far as to say that the teacher made the class. It was more important to his motivation and learning if he liked the teacher and felt that teacher's support, than the subject matter being taught (3rd interview).

When Paige was asked how important it was that her teacher was caring and supportive she responded: "Yes very important, just to be able to understand what the student is going through and how to help them get out of that or how to help them through it" (3rd interview). Then when she was asked what would happen if a teacher did not have these qualities she stated: "It wouldn't be very fun or helpful at all for me. I think they help just to like, if I'm in a bad mood or something I normally can't focus on something and if they can help me get out of that then I can focus more on the work and get a better grade and if they're not there I'm just gonna stay unfocused and think about other things that are unrelated" (3rd interview).

During Elliot's second interview he was asked what he will remember about his middle school math teachers. He replied, "I'll remember like they have all been really nice and helpful, and they've always challenged me too. It hasn't been easy stuff I can just fly by, it's been stuff that you have to work for to get and when you get it, it's really cool" (2nd interview). "When teachers provide challenging opportunities and hold positive expectations for their students, motivation increases" (Chapman & Vagle, 2011, p. 8). Seeing value in their efforts helped students persist through challenging math tasks. "I think I had to work towards it cuz like when your first doing it your like what is this but then once you get it down its pretty simple. So I think it took me a while but once I could get it was like <click>. Yeah, it's just easy." (Elliot, 3rd interview). Along with Elliot, Paige spoke about a few difficult challenges she encountered in

math and how through effort and persistence she was able to accomplish the tasks (3rd interview).
Feeling this accomplishment seemed to build up confidence in her academic competencies.

Confidence. According to Wigfield et al. (2012) teacher support improves student confidence in their abilities. "When teachers support students emotionally, they have higher school-related perceptions of competence, clearer positive social and academic goals, and willingness to engage in school activities" (p. 468). Many students mention a concern about their own abilities when not supported by others. Paige mentioned this concern openly by stating that she felt stupid if she asked for help in class when others seemed to understand the material (2nd interview). Group work helped her to create a comfortable atmosphere where she could ask questions and feel more confident in her abilities. Her confidence was increased through support and discussions about her MAP (Measures of Academic Progress) test scores. "When we were going over MAPs testing grades I went down four points this year and he's like at this high level it is not uncommon, and you're still incredibly high up there. Which was like, oh I feel smart now. You're still smart!" (Paige, 3rd interview). Although she did not score higher than on previous MAP tests, the teacher, through discussion with her, was able to help her still feel confidence in her abilities.

All five students discussed having a high level of confidence in their abilities when they knew they had support when they struggle or got stuck. However, the types of support each student preferred were different. Three students mentioned preferring one-on-one assistance, two of these three mentioned they found value in the one-on-one help, while Paige mentioned not wanting to call attention to her struggles in front of the large class group. The other two students mentioned feeling so much support around them that it created a non-stressful academic

atmosphere. Both students mentioned having great collaborative peer support systems. Elliot, felt comfort in the knowledge that his father, who was an engineer, could assist with any math struggles he was having. "Then if the teacher's way didn't make sense, my dad's an engineer too" (3rd interview). Elliot described support his father could provide and that his father had always been able to show him other methods to solve the math problems that were more aligned with how he comprehended math.

Peer motivation. It was not a surprise that many of the interview sessions led to discussion about peers. Students mentioned both peer support and judgment from peers influencing their academic motivation. "By working together students can create communities of learners and learn to co-regulate each others' motivation and achievement" (Wigfield et al., 2012, p. 469). As previously discussed, Paige shared feeling stupid in front of peers if she asked questions in class (3rd interview). She was not motivated to ask questions needed for her academic understanding if she felt others in class already comprehended what she found difficult. The peer support within her math group helped her feel motivation toward her academic understanding. According to Wigfield et al. (2012) "when children are socially supported and accepted by their peers, they have stronger motivation, better achievement outcomes, and are more engaged in school" (p. 468). For Paige, intrinsic motivation toward academic understanding was increased when she felt peer support and decreased when she felt judged by peers.

Increased motivation due to peer interaction was mentioned throughout many of the interviews. Wigfield et al. (2012) mention that current research on cooperative learning supports this and "children's achievement often improves, social relations are more positive, and students'

motivation is enhanced" (p. 469). Three students specifically mentioned peers at some point in the day helping them feel motivated for the day or continue being motivated until the end of the day. "Social support can help ease school transition from home to school" (Wigfield et al., 2012, p. 468). When asked what Liam does to get excited for school he mentioned talking to friends at the bus stop. Katelyn mentions the same type of motivational support from friends before school via texting. "Sometimes texting my friends in the morning kinda gets me excited or like if I know that there's going to be something cool going on at school. So I mean it just depends on what happens" (3rd interview).

Much of the direct peer motivations mentioned in the interviews were positive, group collaborative efforts. "I had like a little group of friends. We'd always do work together and it was a lot of fun. Well it was an algebra class and we got a lot of homework. So we'd just do that together and we'd have a lot of fun doing that" (Katelyn, 1st interview). However, the peer effect on motivation can either be positive or negative (Wigfield et al., 2012). Liam opened up that he has been privy to both positive and negative academic motivation from his peers. He admits that he received both good and bad encouragement from a particular friend, then goes on to give a few examples of his friend's encouraging words. "You know sometime he's is like, I have to stick through this too so we will stick through it together, other times he's like this is not so bad we only got an hour or 90 minutes of this" (3rd interview).

Unanticipated Results

I came into the interviews anticipating my ultimate goal of dialoguing about motivation and math. I found many surprises through the interviews of the five students. First, I was pleasantly surprised that each student was so willing to share their struggles and fears alongside

their successes. They openly shared experiences involving classes, teachers, and peers. Their willingness to share provided valuable insights into students' academic motivations, which will hopefully provide a foundation to build on for adolescent motivation.

As a middle school math teacher, I enjoyed students' perspectives on what they did and didn't enjoy about classroom learning. Many concepts shared, such as a desire for support and care from a teacher, were not new information to me. However, Daniel mentioned an unexpected view I had not previously considered. While I might think that a teacher being nice or joking with students was a way to show the teacher cared (Liam, 1st interview). Daniel mentioned not liking when a teacher was too nice or happy.

> I think a lot of times the bad, the mood that you don't want them to be in is a really kinda a just happy-ish kinda fun mood. That's actually worse cuz then the entire class just starts getting in that mood and think that the teachers not gonna get mad at them for that or the teacher is not gonna get mad at them for laughing a lot or having fun or anything like that and then they get off task… so I mean you don't want them to be really mean and stuff but being really silly is kinda not good (3rd interview).

A teacher's mood can change the climate of a classroom. I believed that a teacher's mood could affect the classroom students, but I had never realized that there was a negative side to having an overly happy mood. Apparently Daniel had seen this negative effect on enough occasions to bring it up. According to our dialogue he was academically motivated and was unable to actually work in the environment created by the teacher's good mood. The teacher's mood had actually hindered his academics for the day, and quite possibility helped others in the class become motivated toward something other than academics. This view showed me his perspective around his value of education.

Lastly, I was surprised by my findings on students' needs. I came into this study with the understanding that motivation may help students proceed through varying levels of Maslow's Hierarchy of Needs (1970). However, I did not realize how obvious the levels of need (Physical, Safety, Belongingness, Esteem, and Self-actualization) would be. I am not surprised by middle school students mentioning belongingness with their peers, but there was very strong agreement among the students that feel they belong in their classrooms, with their teachers, and within the school itself.

It is clear that middle school students experience many levels of academic motivation influencing them within their math classrooms. Students' value having their needs met. They are motivated to achieve these levels of need and simultaneously their needs being met further academic motivation. It is my finding, that motivation has a unique role in Maslow's Hierarchy of Need (1970). As previously thought, students were motivated to achieve these needs, but student motivation is actually more complex than this. I found that students valued these needs being met and through met needs found an increased level of motivation. It was almost like a debt they owed to themselves to fulfill.

Conclusion

Analysis of all five students' interviews showed many common themes as well as a few individual interests or learning preferences. To discover these themes, the interviews were reviewed multiple times. Common themes between students' stories were coded using NVivo. These themes were: Intrinsic Motivation, Accomplishment/Achievement, Teachers/Staff, Classes, Support/Care, and Peers. I chose to leave these themes separate at first, however, the mention of teacher or school staff usually overlapped with each student's experience of the

support or care received within the classroom. These particular themes were more prevalent and most meaningful within each student's current school experience. Through further analysis even more connections were made. Themes with common meaning or purpose were combined. New overarching theme names were created, many of which fell in step with levels of need mentioned in Maslow's Hierarchy of Needs (Maslow, 1970). The new overarching theme groupings then became: *Physical*, *Safety*, *Belongingness*, *Esteem*, *Self-actualization* (Maslow, 1970), *Types of Motivation,* and *Environment*.

Research question: a new direction.

- What are students' experiences of motivation in math during middle school?

- How are they motivated to achieve academically in math?

Students mentioned *Safety, Belongingness,* and *Esteem* as some of the key factors making up their middle school experience around motivation. These five students did not only show motivation to achieve these levels of need, but rather I noticed the opposite being discussed. Maslow's needs, which people ultimately desire to obtain (in varying levels), but these five students were inferring that met needs were what helped their academic motivation thrive. For instance, Liam (2nd & 3rd interview) mentioned needing to feel welcomed in the classroom to become actively engaged and academically motivated. He alluded to feeling motivated to miss a class when he felt unsafe or unwelcomed (2nd interview). Tileston (2010) mentions this is common, for students to be successful they must first "have a positive feeling about the class itself" (p. 19), otherwise they may exhibit similar avoidance behaviors as Liam.

Paige mentioned not asking questions in class to 'save face' in front of her peers but describes actively being engaged in group efforts to solve math problems when she is in a

comfortable atmosphere (2nd interview). The first motivation mentioned might serve to gain safety or belongingness, depending on the repercussions she might be worried about receiving if she appears 'dumb.' The second example in this instance is academic motivation derived from the need of belongingness being achieved. Through my discussions with Paige and analysis of the interviews, I do not believe she, in this instance, was being motivated in any way to achieve esteem or self-actualization levels. She simply had intrinsic motivation to achieve her work after she felt safe and that she belonged without judgment.

Below are examples of each need and how it relates to this study. At some point all students mentioned each level of Maslow's Hierarchy of Needs present to some extent or another.

Physical needs. Starting first with physical needs, students expressed needing food, a shower, and water to help them start their day. When asked specifically what helps them get excited or motivated to start the day these were some of the responses:

- "I'm dead tired and grouchy …I don't know I brush my teeth I wake up some but" (Elliot, 3rd interview).

- "Well definitely like eating breakfast and drinking water just helps me, you know start the day" (Katelyn, 3rd interview).

- "Normally on those days I take a shower to like jolt me awake" (Paige, 3rd interview).

- "I usually just let my water run really cold and put my face under it" (Liam, 3rd interview).

- "I mean usually I just kinda drink water and eat some. You could eat a good breakfast, drink a lot of water and try to get myself moving I guess" (Daniel, 3rd interview).

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Safety needs. Students need to feel comfortable and safe in their school environment. For specific examples please see *Safety* section within this Chapter.

Belongingness needs. Students valued caring and supportive teachers, staff, and peers. Feeling welcomed was a need that four of the five students interviewed mentioned desiring. For specific examples please see *Care and Support* section within this Chapter.

Esteem needs. This need was shown many times as either student achievement or a sense of pride in accomplishments. For specific examples please see *Achievement* or *Confidence* sections within this Chapter.

Self-actualization needs. Examples of self-actualization were shown mostly in each student's planning for the future. Some students were able to discuss great plans for their future interests or endeavors, while others see value in what they were learning in school now affecting future plans. Since self-actualization can be, for most, an ever changing and evolving need (Maslow, 1970), students reaching the exact plan they see for their future is irrelevant. At this point achieving these plans are unforeseen, but students being intrinsically motivated toward a self-actualization goal for themselves is a step toward attaining this need.

Research considerations explicitly stated.

1. If intrinsic or extrinsic motivations are present in students' stories where and how are they recalled?

Both intrinsic and extrinsic motivations were mentioned by students. Generally students spoke more on intrinsic motivation than extrinsic. When specifically asked to recall rewards (of extrinsic nature) given to them in math, many remembered at least one instance. One student had a difficult time remembering any extrinsic rewards they had received, but eventually he remembered: "uh we've gotten suckers before…I think its cuz we, I think it was like if you got an A on a test or something" (Elliot, 3rd interview). Extrinsic rewards for achievement did not seem to hold much value or make much of an impact on him.

For Elliot grades seemed to hold intrinsic value and filled an Esteem need when received. Therefore, even though grades are normally categorized as extrinsic, I coded grades under intrinsic motivation if students inferred that receiving the grade was not behind their motivation. The grade itself seemed to count as a way for the students to know that they had achieved either a self-proposed goal or challenge. The grade itself, therefore, was no more valued then knowing the assignment was completed to an acceptable standard. Their intrinsic motivation seemed to drive their academic accomplishment, the grade was a bonus acquired at the end of a task but the motivation behind accomplishing the task.

2. Do students imply sustainable academic motivation within their stories?

    a. If so, is it intrinsic or extrinsic?

The students interviewed implied a consistent motivation within their stories. Only one student, Liam, mentioned an increase or decrease of motivation from year to year as well as an rise in academic motivation due to participation in sports. From the overall stories I felt extrinsic motivation was not highly effective, remembered, or regarded, as previously described under

question #1. Therefore, I would tend to agree with the research around intrinsic motivation being a longer lasting more effective form of motivation (Schreck, 2011).

3. How do middle school students think about math influencing their future endeavors?

Thinking about math and each student's future endeavors solely depended on the student, how much they had thought about their interests for the future and finally whether they were interested in a math based career. Three of the five students interviewed actively mentioned thinking about careers in engineering, among these three there were varied levels of commitment and forethought that had been given. However, students interested in possible careers in engineering could make definite connection around what they are learning now and how it will help them in the future. Conversely one student who provided me with many possible views for his future did not make any connection to what he was learning now benefiting him in his future after high school. He seemed to view the math he was learning now as more of a four year time commitment toward a goal of graduation, rather than specifically benefiting his future career life through any specific knowledge gained. Knowing this I would tend to speculate that different motivations, than those that motivate the engineering interested students, would help him succeed academically.

4. What role do middle school students see math having for their future after middle school/high school?

Aside from what was previously written in #3, some students mentioned a few real life examples of learning that they received in their middle school. Liam shared, "like when I'm excited is learning about stuff I'll be using every day like, more like when you're buying a car,

buying a house. How much money you will lose if you don't pay upfront or something like that, you know" (3rd interview). He mentioned learning about interest rates and loans and how paying money back early can help him save money over the course of the loan. This math he could see definite application for in his future.

Elliot spoke about a learning opportunity in his math course being very valuable and interesting to him due to its use in baseball. "So I remembered what it was we were working on yesterday, it was the quadratic equation and we were using it for baseball. If it told us the direction that it hit we could tell if they got out or if it was a home run or anything. Yeah, so basically what he gave us was like .5x squared plus 2y or 2x equals like 16, or err plus 16 equals y and then we'd have to find out how far it went and how high it went and then we could tell if it was, if it was going to be an out or a home run or anything" (2nd interview). Elliot not only valued the experience but enjoyed the fact that he knew this information. His interest and excitement over future applicability assisted in his motivation and knowledge retention. He enjoyed the experience so much he retained the formula and recited it to me, even after only one experience with it.

5.   What thought do middle school math students give to their post high school endeavors?

This was a question I gave much thought to while analyzing the interview data. Every student was able to provide a thought about their path for the future after high school. So to allow for a way to better address this question, each student's responses were divided into thoroughness about the future. This was done to provide a gauge for how much they had thought about future goals and what, if any, influence these thoughts might have on their academic

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motivations. I observed a notable difference in academic motivation and focus between a student who had planned what route he/she saw his/her life going and a student who saw many possible paths for his/her future. The latter is shown in Liam's discussion of possible future paths for his life. He has thought about future paths for his life, but they are all still very distant thoughts and therefore do not seem any effect on his current academic motivations. When asked additional questions about the paths he had mentioned in a previous interview, he answers:

> Well I mean staying in a sport, putting effort into like a team and stuff like that. Kinda like football team stuff, like that. If I can get a scholarship and go to college that'd be awesome but being on a team kinda, like the military and stuff, like that serving my country. Yeah, yeah we work as one or as one group instead of like one person. Yeah, well if I got to college, I don't know. I wasn't too much thinking about degrees yet. I mean if I was going to do anything I'd probably just, my main goal right now is just to get my masters (2nd interview).

6. How do students view academic experiences they have now assisting them in their future?

For those students who have clear and seemingly well thought through future plans, they also seem to have a general understanding of how things they learn now may affect their goals (Paige, 3rd interview) and have a general understanding of how academics now will affect them in the future. Daniel explained how he enjoys challenging problems that have real world application. "When we have kind of a story problem that is applicable to the real world, like pulleys systems and wheels and figuring out how many rotations of a wheel moves or how it moves things. And yeah cuz I enjoy, I enjoy learning how I can apply that to like engineering, or

cuz I am in a lot of engineering events and Science Olympiad and uh. So I like applying math into that so I like, I like real world situations" (2nd interview).

Limitations. The school's location in Colorado with a suburban and rural student population may have limited my findings. Different findings might have been found among students with varied backgrounds to those interviewed. Interview days were chosen around teacher lessons, schedules, students' sports schedules, and student illness, as per ethical considerations. On different days, with different factors, students may recall different motivational experiences.

Interviewing middle school students provided unique challenges in obtaining the thick, rich descriptive narratives traditionally found in narrative inquiries. By the nature of their youth, their dialogue responses lacked descriptive detail and the interview sessions (although 3 total) tended to be one-third of my projected length. Other limitations to my study may include the use of a small sample (5 participants) of students at the end of their 8th grade year and unknown math ability levels.

In order to adhere to Family Education Rights and Privacy Acts (FERPA) laws, students' performance (grades, progress, and test scores) were not obtained. FERPA states that schools must acquire written permission from a student's parent or guardian prior to releasing any identifying information from a student's record. As per Institutional Review Board (IRB) guidance, teachers were not to indicate which students had High, Medium, or Low math ability levels. Rather, teachers could provide a list of students with mixed abilities, without reference to individual ability levels. With the small sample size and not knowing the abilities of the students,

identification of the range of commonalities of interests and learning style preferences may have been limited.

Implications for action. According to Nelson and DeBacker (2008) academic achievement, present and future, can be affected by enhancing students' academic motivation. On the knowledge that students need to be active learners through the encouragement of teachers and the understanding of what motivated them academically (Carroll & Leander, 2001), this study was constructed. Insights were found on how students may be better motivated and what might enhance their classroom experiences. Gathered from five students, the list below was created to incorporate the possible classroom ideals of all. Not all students mentioned needing all listed items, and there were a few conflicting views. However, the majority of this list were agreed on by all five students and may provide teachers a place to start when trying to create a classroom environment that caters to student support and academic motivation.

Learning from the student perspective. Students mentioned liking the new math class set up this year. The new setup included the elements listed below.

- Watching a video or taking notes for homework

- Working in small groups in class to solve a few challenging problems

- Relating problems to the previous day's homework notes/video

- Students had time to try the problems on their own before given help

    o Guiding questions provided help to solving the problems, rather than the answer itself

- Providing hints around faster/easier ways to solve the problems after students had been given time to try their own methods

Students found the amount of group time beneficial, some students found more personal growth by working alone.

- There was either more accountability for understanding and accomplishing all the work themselves

Students also found working alone rewarding.

- They felt better accomplishing the work on their own, comparing their answers or methods, only after coming up with their own solutions

Some students may have not attended or given full attention in classrooms in which they did not feel welcome. Characteristics that helped students connect with their teacher and feel welcomed in class included:

- Showing students that they care

- Making jokes with students

- Being supportive

- Being very knowledgeable about their subject

- Having an easily approachable teacher

- Letting students get to know them as 'real people'

Students enjoyed having teachers who had control of the classroom but also made class fun.

- Wanting not to 'just talk'

- Socializing while accomplishing work or as a way to support arriving at the solution (such as was accomplished in small groups).

- Joking around or happiness of a teacher leading to off task behavior was not always valued since it sometimes caused students/class to lose focus.

Memorable assignments/projects:

- The M&M® day: figuring out the number of chocolate Mars M&M® candies using volume and packing percentages.

- The Math Carnival

- Science Olympiad: National science competition for K-6 and 6-12. Competitions vary by grade level.

Students mentioned doing well in school in connection with being a part of something at the school.

- Sports teams

- Competitions

- After school or lunch clubs

- Extracurricular activities

Students mentioned enjoying knowing where they stood with their standardized and school testing scores, their overall understanding of the material, and what growth they had made over the year(s) in math.

Recommendations for research. A few questions came to mind while analyzing the findings.

1. Is motivation purely a means to attain each set of needs?

(Or)

2. Is feeling motivation or being motivated, in and of itself, a level of being that is able to be easier achieved when various needs are met?

Due to the nature of this narrative inquiry study a small sample of students from one school participated. To help validate, add to, or further understand these questions and the current findings, a larger sample should be studied. I would suggest more school involvement, larger samples from each level of math within a school, or an entire whole school's eighth grade population be sampled. Students in other grades could be sampled, however, the value in sampling exiting eighth grade students, is that they have had exposure to all middle school grade levels. Insights discovered over those years give meaning and context to the middle school academic motivational experience in its entirety and may provide ideas for early interventions.

Other research options may include a look into student self-efficacy and what part it plays in student's academic motivation. There were many references to environment, both of the classroom and the school itself. I would be curious to see how much of a factor the environment of the school has on students' academic motivation. Students interviewed mentioned something about engineering and at even a first glance into the school I felt a strong math, science and engineering atmosphere. The school studied promoted themselves as a STEM (Science, Technology, Engineering, Mathematics) school and it showed throughout their hallways. I believe research into how much a school's environment influences students' academic motivation or the student interests would be a valuable study.

Suggestions for teachers. Student interview findings confirm three fundamentals for supporting student academic motivation (Levesque, 2008) by teachers and the school. These are listed below under *Elements* and from these elements and adaptions from Long (2005), teacher guiding questions were created and are included after the discussion of the elements.

Elements.

1. Provide a challenge component to each math task or problem

2. Use evaluations that provide immediate feedback

3. Encourage students to feel satisfaction in their accomplishments

Levesque (2008) provides a great metaphor for explaining #3. "Serious bowlers, too, know beforehand that they won't succeed in knocking down every pin every time. But their efforts to do so remain undiminished. And any time they manage to get close to the unattainable ideal, the air is full of shouts and cries and whoops and cheers" (p. 13). This is the kind of student satisfaction that needs to be strived for, great celebrations of little achievements and improvements students attain along the way to an ideal end result. "On the whole we yearn consciously for that which might conceivably be attained" (Maslow, 1970, p. 31). When students set realistic academic objectives for achievement it can increase belief in oneself and ultimately increase the ability for success. "Nothing breeds success like success" (Long, 2005, p. 35).

Teacher guiding questions.

1. How are students' needs and values being addressed?

2. How do the academic results provide challenge for students?

   a. Are they relevant to students? Why or why not?

3. How are regular support, encouragement, and feedback provided to the students?

4. How often is there occasion for students to feel success??

According to Long (2005) there is a motivational dip that students go through before they reach the *effectiveness stage*, where results are high and effort is low. The motivational dip is likely to occur in the *learning stage* directly prior to the *effective stage*. In the *learning stage* students have a high amount of effort they must give to attain a lower level of results. This stage of high effort is where many students can 'lose steam' or struggle with continuing their academic motivation. Long (2005) suggests "for learners who are at risk of giving up quickly [teachers should] break tasks down into small achievable steps and to make sure that they receive feedback on their progress" (p. 8). These views of supporting motivation through small, challenging but achievable ends, is shown in the interviews (Elliot, 3rd interview; Paige, 3rd interview; Daniel, 2nd interview). Katelyn shares: "Well I like how it's really challenging to me and how when I don't get it I can look at it closer and then I start learning more, everything just comes together" (1st interview). The general consensus was that students do not want easy problems, they want to feel challenged. Now it is the teachers' task to find challenges that are within grasp, while moving students forward with an aim to develop their academic competence. Daniel mentions that he will remember his middle school math teachers for how they tried to challenge him. "They tried to challenge us, really it is a big thing. They give us high level questions… so they tried to have us excel even more cuz they know that we are able to understand things a little quicker than other students. So they try their best to give us challenging problems so we can use our ability" (Daniel, 2nd interview). Teachers should strive to make the work load "always challenging but

within the reach of the student. Tasks are made interesting and linked to real life, with the aim of making them as relevant to the individual student as is possible" (Long, 2005, p. 33).

Concluding remarks. This research study set out to gain insights into student academic motivation and found as many new questions as it did answers. From the data obtained, many statements can be made about the findings; however, this research now requires larger populations to validate current findings within a more diversified scale. What can be said with certainty is that the students agreed on the need for connections with teachers and peers. All students mentioned the desire to have a supportive and caring school environment. However, they did differ in what that environment was. For some students this caring was a desire and not a necessity, while others were more personally and ultimately academically affected by the absence of support. What can be concluded with certainty is that there is a definite relationship between Maslow's Hierarchy of Needs (Maslow, 1970) levels being satisfied and increased student motivation. Through further study, I hope to address the question: Which was created first 'the motivation' or 'the need'?

<div align="center">**References**</div>

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APPENDIX A: Permissions

Email to District

To whom it may concern,

My name is Melanie Ramey and I am a doctoral candidate at Colorado State University. I would like to request permission to conduct a Narrative Inquiry research study within the District. Under the guidance of my advisor, Donna Cooner, Ph.D., Associate Professor in the School of Education, I am conducting this interview to better understand the academic motivational experiences of middle school students, specifically in their mathematics courses.

As part of the Narrative Inquiry design I will need access to 5-7 exiting 8th grade students, for a total of three-30 to 40 minute interviews. The length of each interview will depend on the length and elaboration each student provides. I plan to conduct these interviews during April and May of this year (2012) before the school district lets out for the summer.

For transcribing purposes I will audio-record student interviews. Student's names will not be in connection with the recordings. All names mentioned within any recording will be changed to protect student, teacher, or peer confidentiality when transcribed. For my purpose, audio-recording tapes will be labeled "Student 1", "Student 2", and so forth. This will be done to assist with keeping follow up interviews joined with previous interviews of each student. After transcribing audio tapes, student recordings will be destroyed and students referred to within my study under a pseudonym thereafter.

From the district I may need guidance as to which middle schools would be open to having interviews conducted and who would allow me to access to students during the school day. I am willing to work with the school to find an appropriate time to pull students during the school day. School, student parents/legal guardian, and student permissions will be obtained prior to conducting any interviews.   The research was approved by the Colorado State University Institutional Review Board (IRB) on March xx, 2012 with the condition that recruitment cannot begin until approved by your ethics review board.

On the conclusion of my dissertation I am willing to provide a copy of the entirety of my dissertation if you

are interested in my findings.

Please consider my research for approval within your district.

Let me know if there is anything further you would like to know or need me to provide.

Thank you for your consideration,
Melanie Ramey, Doctoral Candidate
CSU, School of Education
████████ ████████

Donna Cooner, Ph.D
Associate Professor
School of Education
(970) 491-5292
Donna.Cooner_Gines@colostate.edu

Permission Letter from District.

4/24/12

Melanie Ramey,

Please consider this document as formal approval for you to conduct research within ██████ School District based on your application materials originally received 3/27/12. Research project name: "Motivation of Middle School Students in Math."

* Date of project: Between April 2012 and June 2013 (If additional time is needed to complete the study, please notify me via email).

* I would like to add two conditions: 1) It is requested that the researcher provide ███ an electronic copy of the project summary at the end of the project, and 2) if you decide to submit an article for publication, please provide an electronic version of the article to ███ when completed.

* Priority consideration for future research partnerships with ███ will be given to individual researchers that have a demonstrated track record of submitting final reports for ███ consideration.

* Please feel free to use this email in your correspondent with ███ schools and personnel regarding this research project.

This approval letter signifies that you have successfully met all ███ criteria for conducting research within ███. Approval from building principals where research activities may occur is also needed prior to beginning research activities at any particular ███ school. Providing principal(s) with a copy of this letter is an important step in your communication with principals, but please keep in mind that principals have

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the right to refuse to participate in any proposed research activities that involve the students, teachers, or facilities that they are responsible for. Furthermore, a principal may exercise their right of refusal at any point during the implementation of an authorized research proposal. Thank you for considering ███ School District as a research partner. Please feel free to contact me if you have any questions, and I look forward to reading your findings.

███ ███ Ph.D.
Director of Research and Evaluation
███ School District
██████████

████████████████████████████

District Permissions Given

April 24, 2012

School Permissions Given

April 30, 2012

IRB Approval Granted

May 2, 2012

IRB Approval Memo

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Research Integrity & Compliance Review Office

Office of the Vice President for Research

321 General Services Building - Campus Delivery 2011 Fort Collins,

CO

TEL: (970) 491-1553

FAX: (970) 491-2293

</div>

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE: April 08, 2012

TO: Cooner, Donna

                         Oltjenbruns, Kevin, Ramey, Melanie

FROM: Barker, Janell, , CSU IRB 2

PROTOCOL TITLE: MOTIVATION OF MIDDLE SCHOOL STUDENTS IN MATH

FUNDING SOURCE: NONE

PROTOCOL NUMBER: 12-3372H

APPROVAL PERIOD: Approval Date: April 05, 2012 Expiration Date: March 21, 2013

The CSU Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled: MOTIVATION OF MIDDLE SCHOOL STUDENTS IN MATH. The project has been approved for the procedures and subjects described in the protocol. This protocol must be reviewed for renewal on a yearly basis for as long as the research remains active. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.

This approval is issued under Colorado State University's Federal Wide Assurance 00000647 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under CSU's Assurance, please do not hesitate to contact us.

Please direct any questions about the IRB's actions on this project to:

Janell Barker, Senior IRB Coordinator - (970) 491-1655 Janell.Barker@Colostate.edu
Evelyn Swiss, IRB Coordinator - (970) 491-1381 Evelyn.Swiss@Colostate.edu

Barker, Janell

Barker, Janell

Includes:
Approval is to recruit up to 7 8th-grade mixed-math ability students with the approved parent consent and child assent forms. The above-referenced project was approved by the Institutional Review Board with the condition that the attached consent form is signed by the subjects and each subject is given a copy of the form. NO changes may be made to this document without first obtaining the approval of the Committee. Subjects under the age of 18 years old

must obtain parental permission. NOTE: Please submit the school district approval document and finalized consent when available as an amendment via eProtocol.

_____

Research Integrity & Compliance Review Office
Office of the Vice President for Research
321 General Services Building - Campus Delivery 2011 Fort Collins,
CO
TEL: (970) 491-1553
FAX: (970) 491-2293

Approval Period:	April 05, 2012 through March 21, 2013
Review Type:	EXPEDITED
IRB Number:	00000202

Consent Forms Sent Out to Parents/Guardians

May 4 - 8, 2012

Participants Selected

May 4 – 8, 2012

Informed Consent Letters Collected

May 7- 9, 2012

Interview Times

May 8 -25, 2012

APPENDIX B: Participant Information

Informed Consent to Participate

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: Motivation of Middle School Students in Math: A Narrative Inquiry into Student Experiences

PRINCIPAL INVESTIGATOR: *Donna Cooner, Ph.D., Associate Professor, School of Education,* *Donna.Cooer_Gines@colostate.edu ; 970-491-5292*

CO-PRINCIPAL INVESTIGATOR: *Melanie Ramey, Doctoral Candidate, School of Education,* *Melanie.Ramey@gmail.com;* █████████

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH? *Researchers are recruiting students who are 8th grade students at* █████ *Middle School. Your child has been nominated to participate by* █████ *Faculty.*

WHO IS DOING THE STUDY? *The study is being conducted by Melanie Ramey, doctoral student, under the guidance of her advisor, Donna Cooner, Ph.D.*

WHAT IS THE PURPOSE OF THIS STUDY? The purpose of this research study is to investigate how middle school students experience motivation in math during their middle school years. In particular, we are interested in experiences occurring during student's years in middle school*.*

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST? *The study will take place at your child's school, either during the regular school day, before school or after school, based on school preference and your child's availability.* The time required for your child's participation will be three 30- to 40-minute sessions, and one follow up meeting, 10-minutes, for a maximum total time of 130 minutes

WHAT WILL I BE ASKED TO DO? What your child will do in the study is to participate in three scheduled interviews, on three separate occasions at your child's school, either during the student's school day, before or after school. In each interview student will be asked to recall memories they have around their experiences in middle school. They will interact with the researcher in an interview setting, as a question and answer. Interview sessions will be audio-recorded for later transcription purposes, and then recordings will be destroyed. Only students within this study will be involved in the interviews. Parents, student's family, and friends will not be allowed to participate within the interview sessions**.**

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY? *Only 8th grade students at* █████ *Middle School are being recruited to take part in this research.*

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?
There are no risks to your child from participating in this study, other than students becoming more self-aware after speaking about motivational experiences
It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

ARE THERE ANY BENEFITS FROM TAKING PART IN THIS STUDY? There are no direct benefits to you or your child for participating, other than other than students gaining knowledge around what academically motivated them.
DO I HAVE TO TAKE PART IN THE STUDY? Your child's participation in this study is completely voluntary. You and/or your child have the right to stop the study and/or withdraw from it at any time without penalty. If you or your child chooses to withdraw from the study, all audio-recordings and data from your child's sessions will be destroyed. If at any point you or your child wants to stop participating or

to withdraw from the study, simply tell the researcher and the session will be ended immediately. There is no penalty for withdrawing.

WHO WILL SEE THE INFORMATION THAT I GIVE? The information that your child provides in the study and his/her audio-tape will be kept completely confidential (unless student mentions something that falls under Mandatory Reporting Statutes for the State of Colorado). Audio-tapes will be labeled with a number for the purpose of the researcher keeping the three interviews together. However, student names will not be recorded or connected with the recordings in any way. Names of any person mentioned in the audio-recordings will be changed to keep confidentiality. When the study is completed and the data has been analyzed the audio-tapes will be destroyed. Your child's name will never be used in any report of this research.

CAN MY TAKING PART IN THE STUDY END EARLY? If your child is unable to make all interview sessions or is unwilling to interview with the researcher(s) during their interview session your child may be removed from the study early.

WHAT IF I HAVE QUESTIONS?
Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Melanie Ramey at ▮▮▮▮▮▮▮▮. *If you have any questions about your rights as a volunteer in this research, contact Janell Barker, Human Research Administrator at 970-491-1655. We will give you a copy of this consent form to take with you.*
This consent form was approved by the CSU Institutional Review Board for the protection of human subjects in research on (April 8, 2012).
Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages (front to back).

Agreement:

I give permission _____ I do not give permission _____

for my child _____ (Name) to participate in the study described

above.

Child's birthdate:_____

Teacher's name (if applicable): _____

Parent's signature: _____

Parent's printed name: _____ Date: _____

Email address: _____

_____   _____

Name of person providing information to participant   Date

_____

Signature of Research Staff

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Informed Assent to Participate

MOTIVATION OF MIDDLE SCHOOL STUDENTS IN MATH

Assent Form

My name is Melanie Ramey. I am a graduate student at Colorado State University, and I am trying to learn about middle school student motivation in math because I am interested in learning what helps middle school students get excited to learn math. If you would like, you can be in my study.

If you decide you want to be in my study, you will get to have three interview talks with me. I will audio-tape each talk to help me remember what we spoke about. Each time we may spend up to 30 or 40 minutes talking about your experiences. This time depends on what we decide to talk about. You will get a chance to share your likes and dislikes around your experiences in middle school and in math.

There are no known risks to you if you decide to be in this study. Possible risks may be that you become more aware of your likes and dislikes or miss portions of class that you will have to catch up on. Benefits to you may involve getting a chance to share your personal stories with someone that wants to hear them and knowing that your stories may eventually be published in a library when my dissertation is complete.

Other people will not know if you are in my study since all names, including friend's names, and teacher's names, will be changed. I will put things I learn about you together with things I learn about other teens, so no one can tell what things came from you. When I tell other people about my research, I will not use your name, so no one can tell who I am talking about.

Your parents or guardian have to say it's OK for you to be in the study. After they decide, you get to choose if you want to do it too. If you don't want to be in the study, no one will be mad at you. If you want to be in the study now and change your mind later, that's OK. You can stop at any time.

My telephone number is ▮▮▮▮▮▮▮. You can call me if you have questions about the study or if you decide you don't want to be in the study any more. My graduate advisor is Donna Cooner. She is an Associate Professor in the School of Education at Colorado State University.

I will give you a copy of this form in case you want to ask questions later.

Agreement

I have decided to be in the study even though I know that I don't have to do it. Melanie Ramey has answered all my questions.

_____   _____
Signature of Study Participant   Date

_____   _____
Signature of Researcher   Date

APPENDIX C: Teacher Selection Directions

Dear Math Teacher,

My name is Melanie Ramey. I have been a math teacher for 7 years, in middle school math for 6 of those years. Currently I am a doctoral candidate in the School of Education at Colorado State University, and as part of the requirements for my dissertation, I am conducting research to study student motivation in math during their middle school years. I plan to interview 8th grade students on their personal stories of motivation in middle school and in math. To be able to conduct my research I look to you for guidance. I would like to create a group of willing mixed-ability students, exemplifying the currently student body population of the 8th grade. The Principal Investigator for this study is my advisor, Donna Cooner, Ph.D., Colorado State University, School of Education; I am the Co-Principal Investigator.

To help in my selection process for possible student interview candidates please list a few students names on the lines provided on the following page. I am not looking to interview only students who seem motivated in math, rather I would like to gather a student interviewees based on a mixed math-ability sample. I would like to have students that may be able to provide variety stories around what they find motivational for them in middle school and in math. Here are some general guidelines to help with your recommendations:

1. Provide a few students with high ability, a few with medium ability, and a few struggling math students.

2. Try to provide a mix of males/females and ethnicities as it pertains to the current school population.

3. Try to name students that would be willing to share their stories while being audio-recorded.

Please feel free to contact me if you have any questions: ███████. Thank you for your

guidance in my student interviewee selection.

Melanie Ramey, Doctoral Candidate
CSU, School of Education
███████████████████

Donna Cooner, Ph.D
Associate Professor
School of Education
(970) 491-5292
Donna.Cooner_Gines@colostate.edu

Print Name

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

APPENDIX D: Interview Question Templates

Student 1 - Liam's Interviews

<u>Interview 1- The Student</u>   (The lettered questions are potential follow up questions)

1. Tell me about middle school.
   a. What has school been like for you?
   b. What do you like about school?
   c. What do you not like about school?

2. Tell me about your favorite moment in middle school?
   a. What made this moment better than others?
   (If student says they don't have one)
   b. What was your favorite memory from elementary school?

3. What has been your favorite memory with a teacher?
   (If student says none)
   a. Who has been your favorite teacher in school?
   b. What made did this teacher do that made them your favorite?

4. What has been your favorite memory with your friends at school?
   a. What about this makes you remember it so well?

5. Describe your favorite subject to learn about?
   a. What is it about this topic that makes it your favorite?

6. What kind of activities do you like to do on your free time?
   a. What is it about this activity that you enjoy the most?

7. What kinds of jobs do you think you might like to do after high school?
   a. Do you think you might see math in these jobs?
   b. What kind of math do you think you might find?

<u>Interview 2- Math experiences</u>

<u>**Question Add-ins:**</u>

1. <u>You mentioned bonding with a teacher that you would talk to and tell jokes with.</u>
   a. <u>Describe the impact this friendship has had on you throughout middle school?</u>

2. <u>You mentioned a few different career paths after high school: Truck driving, college, and the millitary.</u>
   a. <u>What has helped you choose these paths?</u>
   b. <u>Is there a subject you have in mind when attending college?</u>
   c. <u>Do you see what you are doing now in school having an impact on the paths you</u>

1. Can you tell me about a math experience that you liked?
    (If student says none)
    a. Describe what you think others might like about math?

2. Can you tell me about a math experience that you didn't like?

3. Tell me about a time in middle school when you were excited or interested in math.
    a. Did you share your experience with anyone afterward?
    b. Why do you think this memory stands out for you?

4. What memories do you have about your middle school math teachers?

5. What memories do you have of friends and you in math?

6. Are there any other experiences you would like to share that are memorable for you?

Interview 3- Motivational Experiences

Question Add-ins:

1. You mentioned working with a group in math:
    a. Is this how you learn best?
    b. How much of your class time do you feel you are working in a group?
    c. Have you ever felt that there has been too much group work time?

2. Think about a class you have felt welcomed in and think about a class you have not:
    a. Do these differences change how you work on your classroom and homework? Describe how?
    b. Are you think you able to learn more form the classroom you feel welcome in or is it about the same?

3. What helps you learn and complete your work more liking your teacher or liking the topic you are learning?
    a. Why?
    b. Can you describe a time?

4. <u>Have you felt welcome in all of your math classes in during middle school?</u>
    a. <u>During which grades?</u>
       <u>(or)</u>
    b. <u>When was the last time you felt welcome or comfortable in your math class?</u>

---

1. Are you energetic when you wake up in the morning?
    a. Why do you think you are (are not) so energetic at the start of the day?

2. Is there anything you do to help you get ready or excited for school?

3. Can you describe a time when you were excited that you understand something in math?
    a. Was this something you were struggling on or something you understood right away
    b. What helped you to be able to understand?

4. When you find yourself struggling with an assignment what do you find keeps you from giving up?

5. Describe a time when a math teacher said something nice to you.
    a. What did they say?
    b. How did you respond?

6. Can you describe a time you were given a reward for accomplishing your math work?
    a. Why did you receive this award?

7. How often do you feel accomplished in math?
    a. What makes you feel accomplished?

8. Describe a time when you felt excited to do your math work.
    a. What does being excited or motivated to learn in math looks like to you?
    b. Is there a time when others have helped you to feel excited to understand and accomplish your math work?

Student 2 - Elliot's Interviews

<u>Interview 1- The Student</u>   (The lettered questions are potential follow up questions)

1. Tell me about middle school.
    a. What has school been like for you?
    b. What do you like about school?
    c. What do you not like about school?

2. Tell me about your favorite moment in middle school?
    a. What made this moment better than others?
    (If student says they don't have one)

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      b.   What was your favorite memory from elementary school?

3. What has been your favorite memory with a teacher?
    (If student says none)
      a.   Who has been your favorite teacher in school?
      b.   What made did this teacher do that made them your favorite?

4. What has been your favorite memory with your friends at school?
      a.   What about this makes you remember it so well?

5. Describe your favorite subject to learn about?
      a.   What is it about this topic that makes it your favorite?

6. What kind of activities do you like to do on your free time?
      a.   What is it about this activity that you enjoy the most?

7. What kinds of jobs do you think you might like to do after high school?
      a.   Do you think you might see math in these jobs?
      b.   What kind of math do you think you might find?

Interview 2- Math experiences

Question Add-ins:

1. You mentioned bonding with a teacher who you felt you could talk to when you were having trouble with something.
      a.   Describe the impact this has had on you? Or what having this has meant to you?

2. You mentioned liking Math and Science because you like to solve puzzles.
      a.   What do you think makes you keep attempting these challenging problem when you first get stuck?

3. You mentioned a lot of what you do like about middle school, are there any things that you have not liked about your time in middle school?

---

1. Can you tell me about a math experience that you liked?
    (If student says none)
      a.   Describe what you think others might like about math?

2. Can you tell me about a math experience that you didn't like?

3. Tell me about a time in middle school when you were excited or interested in math.
      a.   Did you share your experience with anyone afterward?
      b.   Why do you think this memory stands out for you?

4. What memories do you have about your middle school math teachers?

5. What memories do you have of friends and you in math?

6. Are there any other experiences you would like to share that are memorable for you?

Interview 3- Motivational Experiences

> **Question Add-ins:**
>
> 1. Has joining Science Olympiad improved how you do in math or science?
>   a. Have you been able to use what you learn in math or science in your practice for the Science Olympiad competitions?
>   b. Or vice versa, has anything you have learned working on Science Olympiad competitions helped you understand more of what you so in math or science?
>
> 2. Do you always feel welcome in math class?
>   a. Why or why not?
>   b. Does how much you are able to learn in class depend on the teachers mood that day?
>   c. Give an example.
>
> 3. You mentioned working in small groups of 2 to 3 people:
>   a. Is this how you learn best?
>   b. How much of your class time do you feel you are working in a group?
>   c. Have you ever felt that there has been too much group work time?

1. Are you energetic when you wake up in the morning?
   a. Why do you think you are (are not) so energetic at the start of the day?

2. Is there anything you do to help you get ready or excited for school?

3. Can you describe a time when you were excited that you understand something in math?
   a. Was this something you were struggling on or something you understood right away
   b. What helped you to be able to understand?

4. When you find yourself struggling with an assignment what do you find keeps you from giving up?

5. Describe a time when a math teacher said something nice to you.
   a. What did they say?
   b. How did you respond?

6. Can you describe a time you were given a reward for accomplishing your math work?
   a. Why did you receive this award?

7. How often do you feel accomplished in math?
   a. What makes you feel accomplished?

8. Describe a time when you felt excited to do your math work.
   a. What does being excited or motivated to learn in math looks like to you?
   b. Is there a time when others have helped you to feel excited to understand and accomplish your math work?

Student 3 - Katelyn's Interviews

<u>Interview 1- The Student</u>   (The lettered questions are potential follow up questions)

1. Tell me about middle school.
   a. What has school been like for you?
   b. What do you like about school?
   c. What do you not like about school?

2. Tell me about your favorite moment in middle school?
   a. What made this moment better than others?
   (If student says they don't have one)
   b. What was your favorite memory from elementary school?

3. What has been your favorite memory with a teacher?
   (If student says none)
   a. Who has been your favorite teacher in school?
   b. What made did this teacher do that made them your favorite?

4. What has been your favorite memory with your friends at school?
   a. What about this makes you remember it so well?

5. Describe your favorite subject to learn about?
   a. What is it about this topic that makes it your favorite?

6. What kind of activities do you like to do on your free time?
   a. What is it about this activity that you enjoy the most?

7. What kinds of jobs do you think you might like to do after high school?
   a. Do you think you might see math in these jobs?
   b. What kind of math do you think you might find?

<u>Interview 2- Math experiences</u>

1. Can you tell me about a math experience that you liked?
   (If student says none)
   a. Describe what you think others might like about math?

2. Can you tell me about a math experience that you didn't like?

3. Tell me about a time in middle school when you were excited or interested in math.
   a. Did you share your experience with anyone afterward?
   b. Why do you think this memory stands out for you?

4. What memories do you have about your middle school math teachers?

5. What memories do you have of friends and you in math?

6. Are there any other experiences you would like to share that are memorable for you?

Interview 3- Motivational Experiences

> b. In what ways might these qualities help or hurt you learning in their classroom?
>
> **c.** What is the best ways teachers have helped you learn when you have been frustrated or confused with your work?

1. Are you energetic when you wake up in the morning?
   a. Why do you think you are (are not) so energetic at the start of the day?

2. Is there anything you do to help you get ready or excited for school?

3. Can you describe a time when you were excited that you understand something in math?
   a. Was this something you were struggling on or something you understood right away
   b. What helped you to be able to understand?

4. When you find yourself struggling with an assignment what do you find keeps you from giving up?

5. Describe a time when a math teacher said something nice to you.
   a. What did they say?
   b. How did you respond?

6. Can you describe a time you were given a reward for accomplishing your math work?
   a. Why did you receive this award?

7. How often do you feel accomplished in math?
   a. What makes you feel accomplished?

8. Describe a time when you felt excited to do your math work.
   a. What does being excited or motivated to learn in math looks like to you?
   b. Is there a time when others have helped you to feel excited to understand and accomplish your math work?

Student 4 – Paige's Interviews

Interview 1- The Student   (The lettered questions are potential follow up questions)

1. Tell me about middle school.
   a. What has school been like for you?
   b. What do you like about school?
   c. What do you not like about school?

2. Tell me about your favorite moment in middle school?
   a. What made this moment better than others?
   (If student says they don't have one)
   b. What was your favorite memory from elementary school?

3. What has been your favorite memory with a teacher?
    (If student says none)
    a. Who has been your favorite teacher in school?
    b. What made did this teacher do that made them your favorite?

4. What has been your favorite memory with your friends at school?
    a. What about this makes you remember it so well?

5. Describe your favorite subject to learn about?
    a. What is it about this topic that makes it your favorite?

6. What kind of activities do you like to do on your free time?
    a. What is it about this activity that you enjoy the most?

7. What kinds of jobs do you think you might like to do after high school?
    a. Do you think you might see math in these jobs?
    b. What kind of math do you think you might find?

Interview 2- Math experiences

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Question Add-ins:

1. You mentioned the staff being very supportive.
    a. Can you describe a time when you felt this support from a staff member?

2. You mentioned liking art because you don't feel judged on your work.
    a. What classes make you feel judged on the outcome of your work?
    b. Does feeling judged on your work change how you work on your work?
    c. If so, describe how?

3. You mentioned a lot of what you do like about middle school, are there any things that you have not liked about your time in middle school?

</div>

1. Can you tell me about a math experience that you liked?
   (If student says none)
    a. Describe what you think others might like about math?

2. Can you tell me about a math experience that you didn't like?

3. Tell me about a time in middle school when you were excited or interested in math.
    a. Did you share your experience with anyone afterward?
    b. Why do you think this memory stands out for you?

4. What memories do you have about your middle school math teachers?

5. What memories do you have of friends and you in math?

6. Are there any other experiences you would like to share that are memorable for you?

Interview 3- Motivational Experiences

Question Add-ins:

1. You mentioned liking qualities in teachers like being supportive, funny, caring, knowing their stuff.
   a. Are these qualities very important to you in the teachers you have?
   b. In what ways might these qualities help or hurt you learning in their classroom?
   c. What is the best ways teachers have been able to help you learn if you get frustrated or confused with your work?

2. You mentioned recently being frustrated with a test grade and your understanding of the math topic.
   a. Which matters more to you the grade or the understanding?
   b. So if you could meet with someone to help you understand tetrahedrons now, even if your grade couldn't be changed on the test this year, would you bother with it?

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1. Are you energetic when you wake up in the morning?
   a. Why do you think you are (are not) so energetic at the start of the day?

2. Is there anything you do to help you get ready or excited for school?

3. Can you describe a time when you were excited that you understand something in math?
   a. Was this something you were struggling on or something you understood right away
   b. What helped you to be able to understand?

4. When you find yourself struggling with an assignment what do you find keeps you from giving up?

5. Describe a time when a math teacher said something nice to you.
   a. What did they say?
   b. How did you respond?

6. Can you describe a time you were given a reward for accomplishing your math work?
   a. Why did you receive this award?

7. How often do you feel accomplished in math?
   a. What makes you feel accomplished?

8. Describe a time when you felt excited to do your math work.
   a. What does being excited or motivated to learn in math looks like to you?
   b. Is there a time when others have helped you to feel excited to understand and accomplish your math work?

Student 5 – Daniel's Interviews

<u>Interview 1- The Student</u>   (The lettered questions are potential follow up questions)

1. Tell me about middle school.
   a. What has school been like for you?
   b. What do you like about school?
   c. What do you not like about school?

2. Tell me about your favorite moment in middle school?
   a. What made this moment better than others?
   (If student says they don't have one)
   b. What was your favorite memory from elementary school?

3. What has been your favorite memory with a teacher?
   (If student says none)
   a. Who has been your favorite teacher in school?
   b. What made did this teacher do that made them your favorite?

4. What has been your favorite memory with your friends at school?
   a. What about this makes you remember it so well?

5. Describe your favorite subject to learn about?
   a. What is it about this topic that makes it your favorite?

6. What kind of activities do you like to do on your free time?
   a. What is it about this activity that you enjoy the most?

7. What kinds of jobs do you think you might like to do after high school?
   a. Do you think you might see math in these jobs?
   b. What kind of math do you think you might find?

<u>Interview 2- Math experiences</u>

1. Can you tell me about a math experience that you liked?
   (If student says none)
   a. Describe what you think others might like about math?

2. Can you tell me about a math experience that you didn't like?

3. Tell me about a time in middle school when you were excited or interested in math.
   a. Did you share your experience with anyone afterward?
   b. Why do you think this memory stands out for you?

4. What memories do you have about your middle school math teachers?

5. What memories do you have of friends and you in math?

6. Are there any other experiences you would like to share that are memorable for you?

Interview 3- Motivational Experiences

b. Does how much you are able to learn in class depend on the teachers mood that day?
c. Give an example.

4. You mentioned working in small groups of 2 to 3 people:
   a. Is this how you learn best?
   b. How much of your class time do you feel you are working in a group?
       Have you ever felt that there has been too much group work time?

1. Are you energetic when you wake up in the morning?
   a. Why do you think you are (are not) so energetic at the start of the day?

2. Is there anything you do to help you get ready or excited for school?

3. Can you describe a time when you were excited that you understand something in math?
   a. Was this something you were struggling on or something you understood right away
   b. What helped you to be able to understand?

4. When you find yourself struggling with an assignment what do you find keeps you from giving up?

5. Describe a time when a math teacher said something nice to you.
   a. What did they say?
   b. How did you respond?

6. Can you describe a time you were given a reward for accomplishing your math work?
   a. Why did you receive this award?

7. How often do you feel accomplished in math?
   a. What makes you feel accomplished?

8. Describe a time when you felt excited to do your math work.
   a. What does being excited or motivated to learn in math looks like to you?
   b. Is there a time when others have helped you to feel excited to understand and accomplish your math work?

APPENDIX E: Interviewing Schedule

Dates	Days of the Week	Before School 7:10-7:40	3rd Period 9:20-9:50	Lunch 10:30-11:00	5th period 11:00-11:30	9th Period 1:55-2:25	After School 2:35-3:05
7th	Monday	■	■	■	■	■	■
8th	Tuesday			1L		2E	
9th	Wednesday	■	3K	4P		5D	
10th	Thursday						
11th	Friday	■	■	■	■	■	■
14th	Monday	■	3K	■			
15th	Tuesday					4P	
16th	Wednesday	■	■	■		2E	
17th	Thursday					1L	
18th	Friday					4P	
21st	Monday					1L	
22nd	Tuesday		3K			2E	
23rd	Wednesday					5D	
24th	Thursday						
25th	Friday					5D	

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APPENDIX F: Interview Reminder Sheets

<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺
<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺
<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺
<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺	<u>Next Interview</u> <u>Reminder</u> Date: Day of the week: Time: See you then! ☺

APPENDIX G: Result Tables and Graphs

Table 1

Student Combined Interview Data

Types of Motivation	Student 1: Liam	Student 2: Elliot	Student 3: Katelyn	Student 4: Paige	Student 5: Daniel
Extrinsic Motivation	6	6	6	6	10
Intrinsic Motivation	24	13	14	22	34
Acaedmically Unmotivated/Unfocused	4	2	1	3	2
Environment					
Classes	31	13	25	17	22
Engineering	0	8	0	1	8
Group Work/ Collaboration	10	11	17	2	7
Individual Work	6	1	10	9	22
Mentions Enjoying Math	6	6	10	5	15
Physical					
Basic Needs	1	2	1	1	1
Safety					
Ditch a Class	3	0	0	0	0
Money	4	0	2	1	0
Prejudiced	10	0	0	0	0
Belongingness					
Comfort/Freedom from Judgement	5	6	1	3	4
Feeling Unwelcomed	11	2	0	1	0
Feeling Welcomed	11	3	2	1	6
Judgement or Pressure	11	2	0	7	2
Peer Connections at School	15	10	15	11	11
Support or Caring	9	12	13	15	11
Sports Outside of School	6	2	2	1	1
Teacher & Staff Connections at School	27	15	11	19	18
Team or Club Connections at School	9	6	4	0	11
Esteem					
Accomplishments	21	23	20	20	30
Feeling Special	4	4	2	1	12
Grades	12	1	3	7	1
Reputation	9	2	0	1	0
Self-actualization					
Less Thorough Plans	4	0	0	0	0
More Thorough Plans	7	4	1	1	5
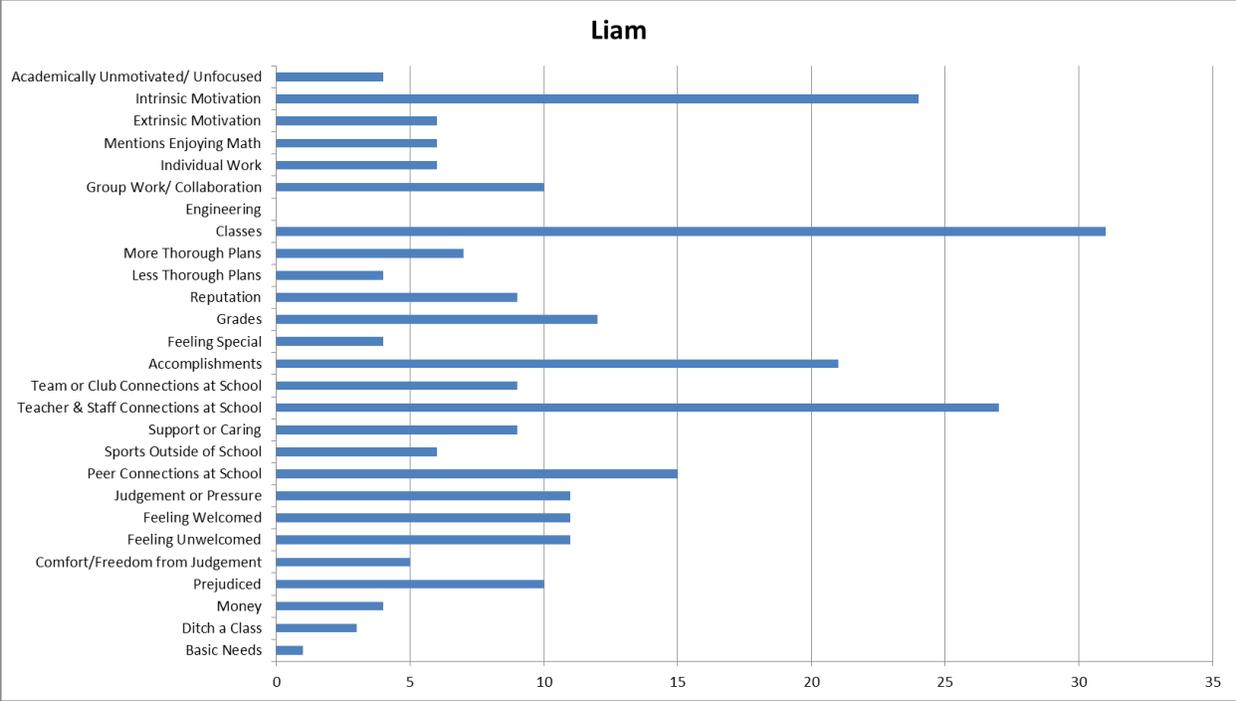
Figure 1: Frequency of Motivations Mentioned by Liam
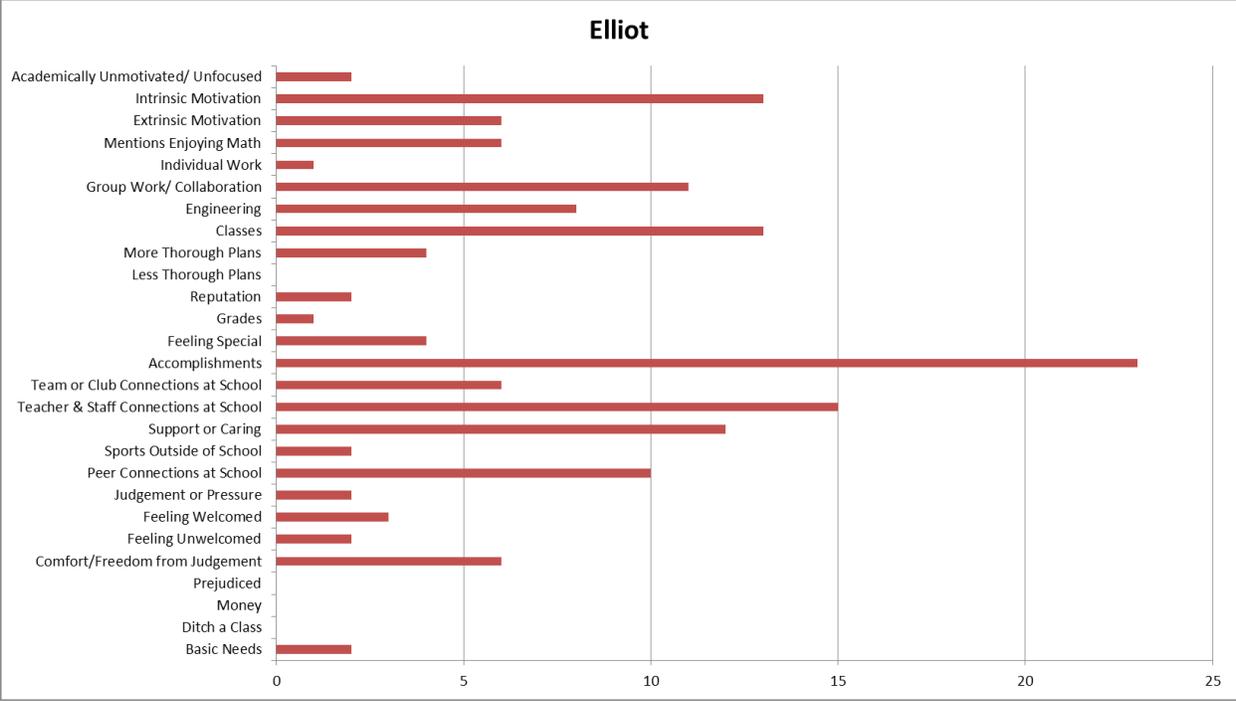
Figure 2: Frequency of Motivations Mentioned by Elliot
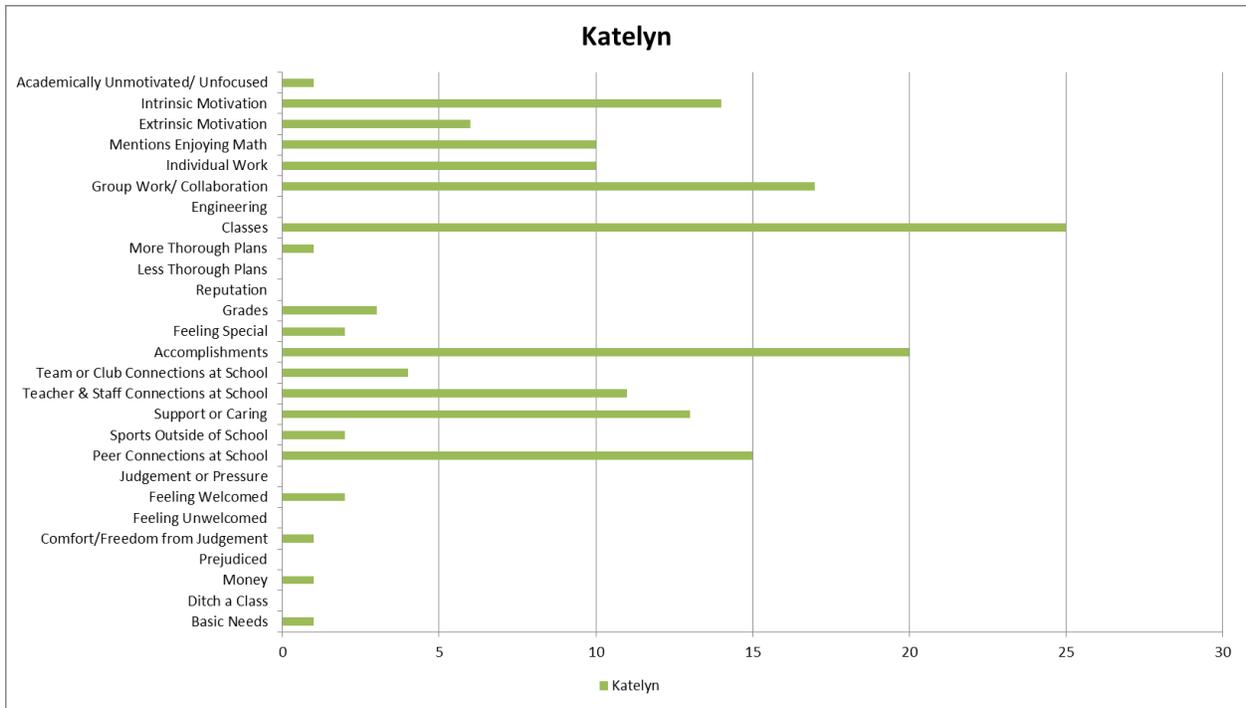
Figure 3: Frequency of Motivations Mentioned by Katelyn
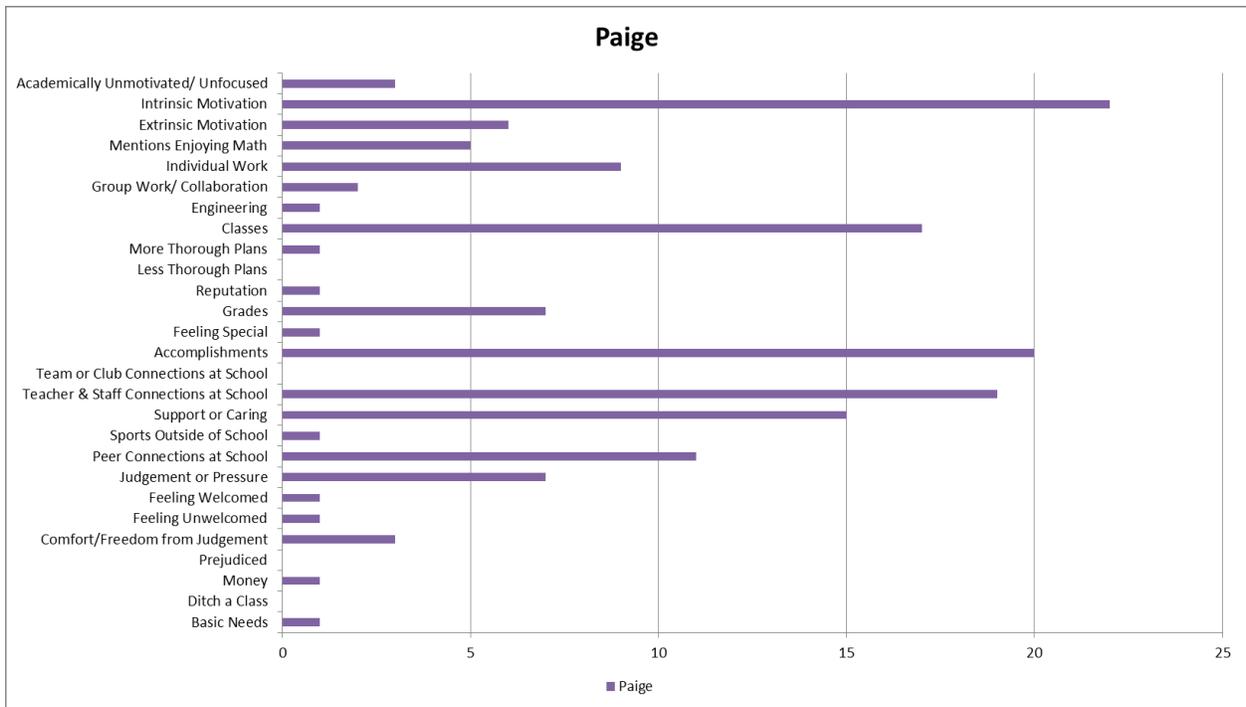
Figure 4: Frequency of Motivations Mentioned by Paige
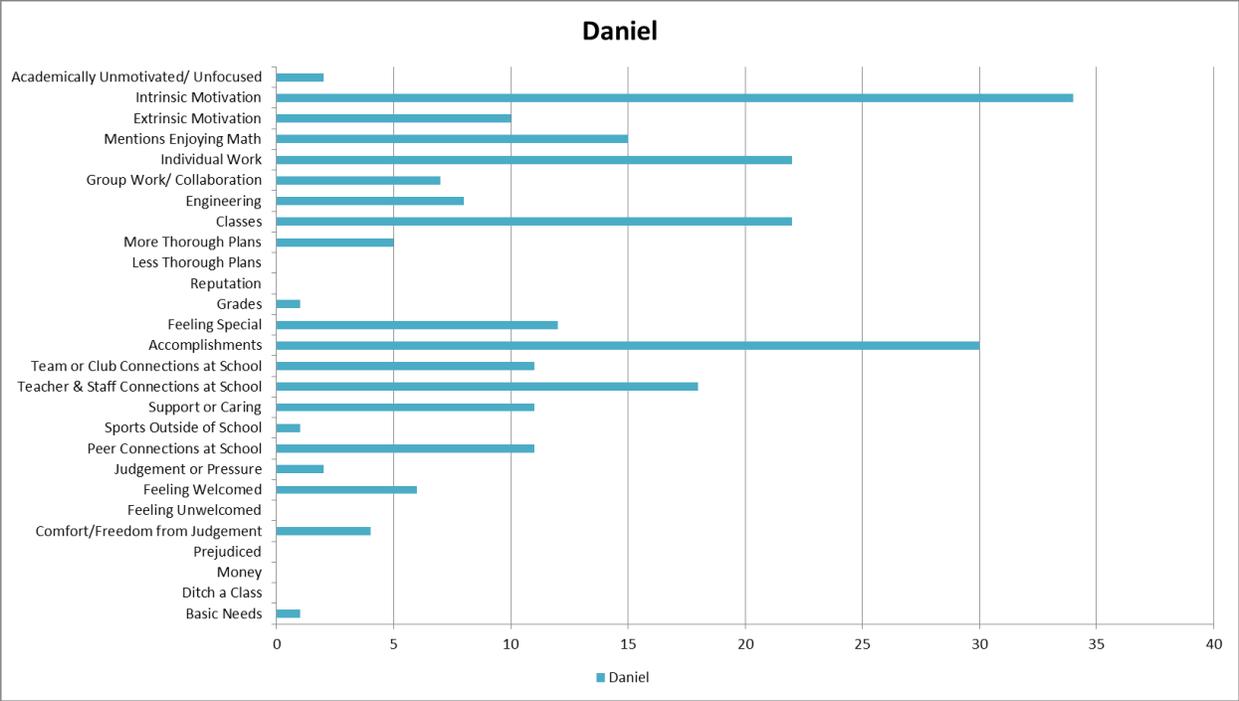
Figure 5: Frequency of Motivations Mentioned by Daniel
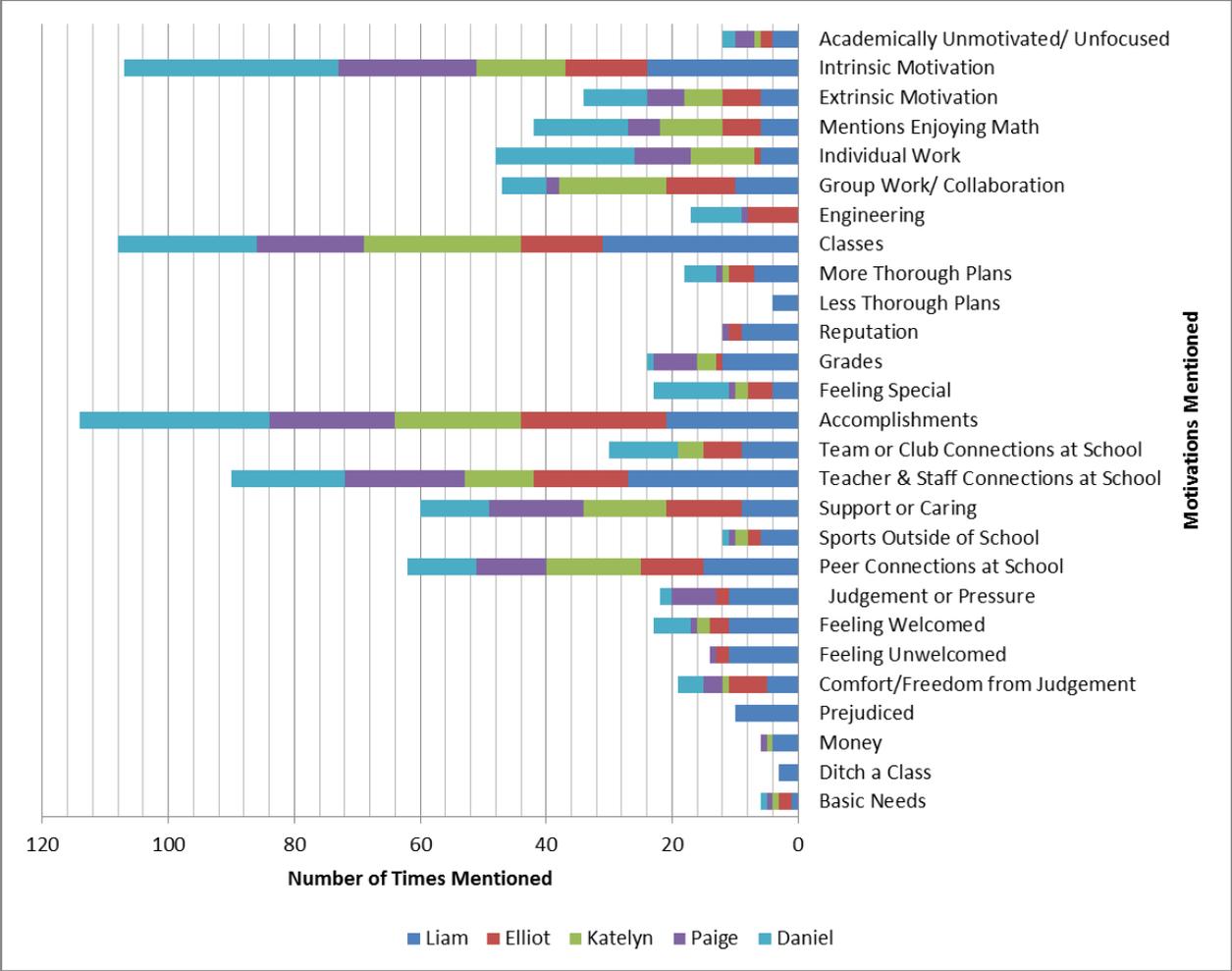
Figure 6: Combined Interview Data for Motivations Mentioned by Students
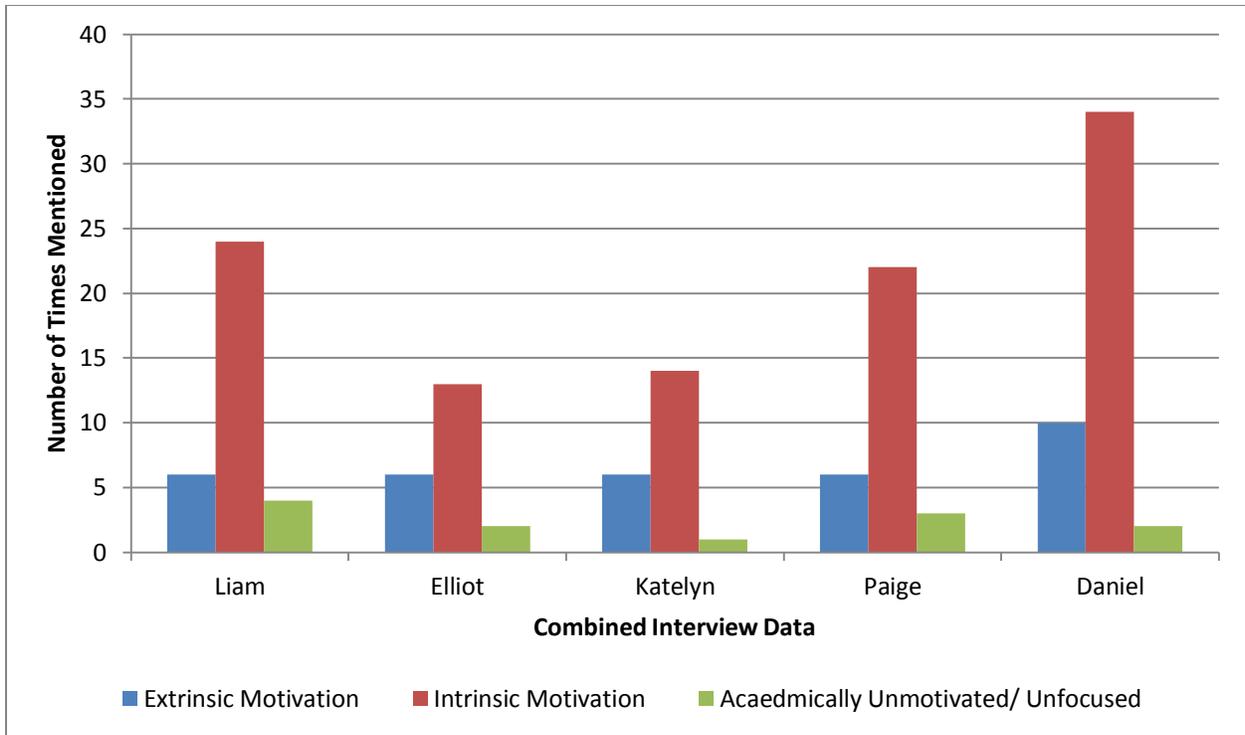
Figure 7: Types and Frequency of Motivation Mentioned by Each Student