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MUSIC PERFORMANCE ENSEMBLE PARTICIPATION AND THE CULTIVATION OF STUDENT GRIT

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Dedication

For my wife, Kendra, and our children, Grayson and Madeline.

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Abstract

Myriad empirical studies show that music participation has numerous cognitive and non-cognitive benefits, but there is limited research studying the influence of music participation on the development of grit. Through a cross-sectional analysis involving music ensemble and non-music ensemble students, this study investigated if students with active participation in a school music performance ensemble had higher levels of self-reported grit than comparable students who did not have active participation in a school music performance ensemble. The research study also explored if active participation in a school music performance ensemble satisfied basic psychological needs of autonomy, competence, and relatedness. The study found that students who actively participated in a school music performance ensemble had higher levels of self-reported grit, displaying a mean grit score of 3.15, 95% CI [3.07, 3.23] compared with non-music ensemble students who participated in a different school extracurricular activity, 2.90, 95% CI [2.79, 3.00] and non-music ensemble students who did not participate in any school extracurricular activity, 2.78, 95% CI [2.64, 2.92]. A statistically significant difference in grit was attributed to type of extracurricular activity ($F = 13.03$, $p < .01$) with 9% of overall grit variance attributed to extracurricular activity. Additionally, for music ensemble students, there was a relationship between self-reported grit and the satisfaction of basic psychological needs, with grit showing statistically significant relationships with autonomy satisfaction ($r = .33$, $p < .01$), competence satisfaction ($r = .28$, $p < .01$), and relatedness satisfaction ($r = .18$, $p < .05$).

Chapter 1: Introduction

The United States has a long history of free public education reaping myriad benefits on both micro and macro levels (March, 1975; Pellegrino & Hilton, 2012). Not only has education made it possible for individuals to climb the socio-economic ladder, the country has also grown in both power and wealth through public education (March, 1975; Pellegrino & Hilton, 2012). In the current era of high-stakes testing and international benchmarking, school systems are under tremendous pressure to make sure that students achieve at high proficiency rates (Perkins-Gough, 2013; Ryan & Weinstein, 2009). This high-stakes environment of educational accountability and competitiveness, if not balanced, can create a destructive educational environment full of unintended negative consequences (Ryan & Weinstein, 2009). Testing and accountability measures for schools and districts are not innately harmful, but high-stakes testing can cause schools and districts to narrow curriculum and lessen the depth of student learning (Pellegrino & Hilton, 2012; Ryan & Weinstein, 2009).

A general response to high-stakes testing has been for educators to abstain from employing creativity and enrichment and to narrowly focus on prescribed state mandated standards at the expense of more ambitious aims of dedication to creativity and enrichment (Ryan & Weinstein, 2009). At the same time that a narrowing of curriculum has occurred around basic content knowledge, a changing economy and evolving requirements of a modern workforce have resulted in an increased emphasis upon the importance of 21st century skills and competencies (Pellegrino & Hilton, 2012; Shechtman, DeBarger, Dornsife, Rosier, & Yarnall, 2013). Expectations for school

systems to promote the deeper set of competencies, however, clash with the constraints imposed by test-based accountability, creating a curious paradox for education.

Diminished autonomous motivation for school and learning has been another unintended consequence of rigid test-based accountability policies (Ryan & Weinstein, 2009). Ryan and Weinstein (2009) argue that the modern test-driven educational environment often forces teachers to educate all students on the same material and in similar manners, which can result in a lack of motivation for students. This inadvertent outcome creates a challenge for school systems, not only in keeping students motivated while meeting system level accountability (Ryan & Weinstein, 2009); but while also enhancing 21st century skills and competencies required by the modern workforce (Pellegrino & Hilton, 2012; Shechtman et al., 2013). This challenge occurs, however, in an educational environment of restrictive budgets and accountability measures which leave little room for students' development of 21st century skills and competencies (Perkins-Gough, 2013). These same restrictive budgets and accountability measures have also placed undue pressure on schools to narrow curriculum and reduce learning opportunities to tested subjects in which their performance carry significant consequences (Robinson & Aronica, 2015).

Students have unique learning styles, attitudes, and individual motivations (Grolnick, 2009). Thus, students are not widgets in an assembly line that are standardized and equal in all ways. Public schools should provide more learning opportunities than merely the teaching of tested standards, but restrictive policies and limited resources have led many systems to either eliminate or erode non-tested skills and subjects (Perkins-Gough, 2013; Shorner-Johnson, 2013). Easton (2012) makes this

point when he argues, “The test score accountability movement has pushed aside many of these so-called ‘non-cognitive’ or ‘soft’ skills, and they belong back on the front burner” (p. 19).

Despite its well-documented benefits, music is an often-deemphasized academic discipline (Cole, 2011; Hallam, 2005; Perret & Fox, 2006; Phillips, 2010; Robinson & Aronica, 2015; Shorner-Johnson, 2013). This deemphasis occurs despite mounting research that shows music education aids in the development of cognitive and non-cognitive skills that have myriad positive effects on child development and student achievement. The benefits of students participating in the unique social environment of a school music performance ensemble may not always be evident in the surface level cognition that is practiced in high-stakes standardized testing, but the empirical evidence on the varied cognitive and non-cognitive benefits of music makes a strong case for renewed attention to music education (Adderley, Kennedy, & Berz, 2003; Azizinezhad, Hashemi, & Darvishi, 2013; Broh, 2002; Campbell, Connell, & Beegle, 2007; Cole, 2011; Fellows et al., 2019; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Johnson & Memmott, 2007; Miksza & Tan, 2015; Phillips, 2010; Schellenberg, 2004; Schlaug, 2001; Schlaug, Jäncke, Huang, Staiger, & Steinmetz, 1995; Zimmerman & LaHav, 2012).

Statement of the Problem

This research study derived from a perceived lack of empirical evidence on how a student’s social environment supports the development of grit. Several studies have found grit to be a differential factor in academic achievement and other personal outcomes (Anderson, Turner, Heath, & Payne, 2016; Duckworth, 2016b; Duckworth &

Gross, 2014; Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011; Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Quinn, 2009; Duckworth, Quinn, & Seligman, 2009; Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014; Miksza & Tan, 2015; Perkins-Gough, 2013; Pink, 2009; Robertson-Kraft & Duckworth, 2014; Rose, 2015; Shechtman et al., 2013). However, specific evidence on the function of curricular or extracurricular experiences in supporting grit within students is limited (Duckworth, 2016b). Furthermore, although largely theoretical in nature, distinct psychological and contextual factors have been articulated to be effective in grit formulation (Duckworth, 2016b; Shechtman et al., 2013).

An education that includes learning and performing music has many cognitive and non-cognitive benefits for students (Adderley et al., 2003; Azizinezhad et al., 2013; Broh, 2002; Campbell et al., 2007; Cole, 2011; Fellows et al., 2019; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Johnson & Memmott, 2007; Miksza & Tan, 2015; Phillips, 2010; Schellenberg, 2004; Schlaug, 2001; Schlaug et al., 1995; Zimmerman & LaHav, 2012). However, research has been lacking in identifying if experiences in a music ensemble can activate positive personality traits like grit. Environments common in many music ensembles have face value for grit formation as students engage in deliberate practice, are showered with performance feedback, and toil through setbacks and frustrations while working towards performance goals (Evans, 2015; Miksza & Tan, 2015). Experiences such as these are hypothesized to underlie grit (Duckworth, 2016b). Moreover, music ensemble environments have been argued to trigger positive psychological traits by fostering autonomy, competence, and relatedness within their students (Evans, McPherson, & Davidson, 2012).

Statement of the Purpose

The purpose of this research study was to determine if students with active participation in a school music performance ensemble had higher levels of self-reported grit than comparable students who did not have active participation in a school music performance ensemble. Additionally, this research study sought to determine if active participation in a school music performance ensemble satisfied basic psychological needs of autonomy, competence, and relatedness. The research study sought to utilize a cross-sectional analysis involving students who actively participated in a school music performance ensemble, students who did not participate in a school music performance ensemble but did participate in a school extracurricular activity, and students who did not actively participate in either a school music performance ensemble or another school extracurricular activity. The research study, therefore, sought answers to the following research questions:

1. Do students who actively participate in a school music performance ensemble have higher self-reported grit than comparable students who do not actively participate in a school music performance ensemble?
2. Is perceived needs satisfaction related to music ensemble students' self-reported grit?

Definition of Terms

Grit- “perseverance and passion for long-term goals” (Duckworth et al., 2007, p. 1087).

Ensemble- “A group of singers and players, *e.g.* an instrumental ensemble, a vocal ensemble” (Westrup & Harrison, 1960, p. 224).

Self-determination theory- a meta theory that assumes that all human beings have inherent tendencies towards a “coherent sense of self” (Deci & Ryan, 2002, p. 3).

Basic psychological needs theory- a mini theory within the larger self-determination theory that explains autonomous motivation as originating from a social context supportive of autonomy, competence, and relatedness (Deci & Ryan, 2002).

Autonomy- the feeling of being one’s own source of interests, behaviors, and values (Deci & Ryan, 2002).

Competence- the feeling of being effective or confident in interactions and, in turn, directs individuals to activities in which further competence can be attained (Deci & Ryan, 2002).

Relatedness- the feeling of connectedness and belonging to other persons and communities (Deci & Ryan, 2002).

Organization of Dissertation

The research study began with Chapter 1, an introduction, that included a statement of the problem and statement of the purpose of the study including the research questions, a definition of terms, and discussion of organization. Chapter 2, a review of literature, examined the nature of grit, criticism of grit, effects of grit on individual performance, speculation on grit formation, music and child development, and music education and grit. Chapter 3 explored the study's theoretical framework including a theory overview and a section on the fusion of music education, needs satisfaction, and grit. Chapter 4 investigated the study's research methods and its research design, data source, data collection, measures, and analytical technique. Chapter 5 inspected the study's results. Specific attention was given to tests of normality, group differences regarding grit, and the relationship of needs satisfaction and grit within the music ensemble. Chapter 6, a discussion, focused upon music ensemble participation and grit formation, music ensemble participation and needs satisfaction, the relevance of findings for 21st century education, and limitations and implications for future research. The study culminated with references and appendices.

Chapter 2: Review of Literature

Introduction to Review of Literature

What non-cognitive trait makes individuals persevere towards achievement goals despite repeated failures and adversity? What makes these same individuals not change course, but work tirelessly because of deep passion for something that they love? What trait is unique from other similar characteristics, because of a distinct combination of talent and focused effort towards long-term goals? The answer, as Duckworth (2016b) argues, is grit.

The Nature of Grit

Grit is defined as "perseverance and passion for long-term goals" (Duckworth et al., 2007, p. 1087). Grit has been referred to as an intrapersonal characteristic, a psychological trait, a 21st century skill or competency, and a non-cognitive factor (Duckworth, 2016b; Eskreis-Winkler et al., 2014; Pellegrino & Hilton, 2012; Shechtman et al., 2013). The research on grit is primarily associated with Angela Duckworth at the University of Pennsylvania (Anderson et al., 2016). She and her team have studied grit and its influence on achievement and retention in many diverse areas of life. The ever-increasing scope of Duckworth and her team's grit studies is beyond the time constraints of this study's literature review, but some of their best known studies focus on success in many domains including educational attainment, spelling bee participants, educators, public school students, university students, sales representatives, marriages, West Point cadets, and the Army Special Operations Forces (Anderson et al., 2016; Duckworth, 2016b; Duckworth et al., 2007; Duckworth et al., 2009; Duckworth et al., 2011; Duckworth & Gross, 2014; Duckworth & Quinn, 2009;

Eskreis-Winkler et al., 2014; Miksza & Tan, 2015; Perkins-Gough, 2013; Pink, 2009; Robertson-Kraft & Duckworth, 2014; Rose, 2015; Shechtman et al., 2013).

Individuals have varying levels of innate talent and one's natural abilities have the potential to help individuals gain proficiency at quicker intervals when the same level of effort is exerted. Talent is important in skill acquisition, but effort is also important (Duckworth, 2016b; Duckworth et al., 2007). The tireless striving towards goals is what sets grittier individuals apart from similarly talented individuals (Duckworth et al., 2007). Individuals can have talent, but not possess grit; and thus, skill and achievement develop at different rates (Duckworth, 2016b). It is a combination of talent and effort that produces skill. It is skill combined with effort that produces achievement (Duckworth, 2016b).

Despite the increasing amount of empirical studies focusing on grit, critics argue that grit is not a new idea, but rather new terminology for theoretical ideas that have a long history in social science disciplines (Anderson et al., 2016). In the field of psychology, researchers are quick to note that Galton talked about the nature of the phenomenon in 1869 when he argued that ability was not in itself singularly responsible for high achievement (Duckworth, 2016b; Duckworth et al., 2007; Duckworth & Gross, 2014; Eskreis-Winkler et al., 2014; Von Culin, Tsukayama, & Duckworth, 2014). Galton (1869/1978) explained "ability combined with zeal and with capacity for hard labour" brought about high achievement among individuals across diverse disciplines (p. 38).

Differing theoretical opinions appear in the literature when researching how grit is related to other psychological traits and states. Kelley (1927) describes the problem of referring to similar phenomenon by different terms as jangle fallacy. Coleman and Cureton (1954) refer to Kelley's jangle fallacy, emphasizing the fact that this was a practice which continued to negatively affect education and psychology in the 1950s. Pellegrino and Hilton (2012) stress that empirical research involving 21st century skills is still plagued by jangle fallacy debates. When previous empirical research is ignored, or segregated by discipline specific terminology, previous educational and psychological understandings can be detached from the construct at hand (Anderson et al., 2016). To better understand the relevance of grit and other 21st century skills and competencies, one must think of the constructs not as unrelated, but rather, related pieces of the achievement puzzle (Anderson et al., 2016; Duckworth, 2016b; Pellegrino & Hilton, 2012; Shechtman et al., 2013).

With the wide-range of potentially related constructs, this study relies on Duckworth's theoretical ideology in describing grit's relationship with similar or related constructs. Individuals who display high self-control or high conscientiousness are also likely to display high grit. Grit is associated with aspects of self-control but goes deeper than just controlling one's actions. Self-control is associated with short-term accomplishments while grit is associated with exceptional achievements that take extended time to accomplish (Duckworth & Gross, 2014). Similarly, conscientiousness is associated with short-term goal attainment while grit is associated with long-term stamina toward goal attainment (Duckworth et al., 2007; Duckworth et al., 2009). Furthermore, grit differs from both self-control and conscientiousness in keeping

consistent interests and goals (Duckworth et al., 2007; Duckworth et al., 2009; Eskreis-Winkler et al., 2014).

Growth mindset is a third psychological concept associated with grit (Duckworth, 2016b; Shechtman et al., 2013). Individuals with a growth mindset believe that their abilities are not fixed and can be increased through effort, experience, and guidance. Students with a growth mindset, not only believe they can improve, they also do improve. In a fixed mindset, one believes that an individual's abilities are fixed and not malleable (Dweck, 2016; Shechtman et al., 2013). In a study of high school seniors, Duckworth and Dweck found that students associated with having a growth mindset have more grit than students with a fixed mindset. The grittier students are also shown to have higher grades. Furthermore, grittier students show higher levels of college enrollment and college persistence (Duckworth, 2016b).

In summary, grit is a personality trait related to success. It is defined as a non-cognitive, intrapersonal trait in which passion and perseverance toward long-term goals among gritty individuals results in higher achievement and retention (Anderson et al., 2016; Duckworth, 2016b; Duckworth et al., 2007; Duckworth et al., 2009; Duckworth et al., 2011; Duckworth & Gross, 2014; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014; Miksza & Tan, 2015; Perkins-Gough, 2013; Pink, 2009; Robertson-Kraft & Duckworth, 2014; Rose, 2015; Shechtman et al., 2013). Grit is similar to other psychological concepts, yet distinct. Although grit has similarities to other related constructs such as self-control and conscientiousness, grit is unique because of its consistent tenacity towards long-term goals (Duckworth & Gross, 2014; Duckworth et al., 2007; Duckworth et al., 2009). Grit and growth mindset are related psychological

concepts that are based on persistent effort and involve the ability to overcome obstacles to achievement (Duckworth, 2016b).

Criticism of Grit

As previously mentioned, grit is not without controversy. In addition to the jangle fallacy argument (Coleman & Cureton, 1954; Kelley, 1927; Pellegrino & Hilton, 2012), which is a primary cause of criticism towards grit, other grit criticisms are found in the research. Some experts wonder if the idea of grit sets unfairly high expectations for students and creates fundamental attribution errors in which grit is overvalued (Duckworth, 2016b; Shechtman et al., 2013).

An additional criticism of grit involves negative applications of misplaced grit wherein students exhibit passion and perseverance towards an inappropriate goal (Anderson et al., 2016; Rose, 2015). Misplaced grit might suggest tunnel vision and repeated missteps without the ability to adjust (Rose, 2015). Anderson et al. (2016) counter that criticisms of potential detriments of grit are overblown because any characteristic can have either positive or negative outcomes under specific circumstances.

Further criticisms of grit center upon the appropriateness of its use in evaluating students as a measurable report card domain (Anderson et al., 2016; Thomas, 2014), and using character data such as grit to measure teacher and school effectiveness (Duckworth, 2016a). Anderson et al. (2016) contend that the former could potentially add to the marginalization of poor and minority students. Duckworth (2016a) is opposed to the high-stakes character assessment discussed in the latter fearing

inappropriate accountability for schools and teachers. Her concerns stem from the potential of reference bias and the fact that any associated external rewards and punishments could generate motivation for cheating (Duckworth, 2016a).

In a related criticism, Rose (2015) critiques the fascination with grit from a structuralism perspective, arguing that attributing life success to character traits overlooks the vast social, educational, and economic inequities that challenge many marginalized youth. He does offer that proponents of grit desire to help students better deal with hardships in their lives but fears emphasizing grit may have the opposite of the desired effect of inspiring students. He fears poor and minority students may be given unrealistic beliefs and aspirations. Lastly, Thomas (2014) goes as far as to claim that the growing narrative on grit and other non-cognitive traits is racist and contributes to a deficit–based depiction of poor and minority communities. He does, however, acknowledge that it is possible that grit research may have valuable and non-biased applications for all students (Thomas, 2014).

To summarize, academic criticism of grit exists beyond jangle fallacy argumentation (Coleman & Cureton, 1954; Kelley, 1927; Pellegrino & Hilton, 2012). Some additional criticisms of grit center on fundamental attribution errors in which grit is overvalued (Duckworth, 2016b; Shechtman et al., 2013), negative applications of misplaced grit (Anderson et al., 2016; Rose, 2015), its use in evaluating students as a measurable report card domain (Anderson et al., 2016; Thomas, 2014), and its use in high-stakes assessment regarding teacher and school effectiveness (Duckworth, 2016a). Further criticism is from a structuralism perspective arguing that focusing on character traits overlooks other social, educational, and economic inequities (Rose, 2015) and can

be viewed as a racist contributor to deficit–based depictions of poor and minority communities (Thomas, 2014). Despite the criticism towards grit, the body of empirical evidence leads to distinct claims about the positive effects of grit.

Effects of Grit on Individual Performance

In their initial paper on grit, Duckworth et al. (2007) explored six varied cases, both inside and outside the field of education, to assess the amount that grit explained success outcomes. The first and second studies investigated levels of educational attainment among two samplings of adults. The third study explored Ivy League undergraduates and grade point average. The fourth and fifth studies investigated retention of individuals at the United States Military Academy, West Point. The sixth and final study in their initial grit research centered on students in the National Spelling Bee (Anderson et al., 2016; Duckworth, 2016b; Duckworth et al., 2007; Duckworth et al., 2011; Duckworth & Gross, 2014; Duckworth & Quinn, 2009; Miksza & Tan, 2015; Perkins-Gough, 2013; Pink, 2009; Rose, 2015; Shechtman et al., 2013).

In investigating each section of the Duckworth et al. (2007) study, the first section focused upon educational attainment and found that more educated individuals were found to be higher in grit than less educated individuals of equal age. When age was controlled for, post college graduates displayed higher grit than most groups in the study. Also, individuals with an associate's degree had significantly higher grit than individuals with less education. Another interesting finding was that individuals who were at the associate's degree level displayed higher grit than those who had attained a bachelor's degree, but that finding did not reach statistical significance. The study's

data also found that older individuals were higher in grit than younger individuals (Duckworth et al., 2007).

The second section of the study also focused on educational attainment but investigated grit while controlling for other non-cognitive traits. The study found that when accounting for conscientiousness and other non-cognitive traits, grit showed higher predictive validity for education and age. Grit and conscientiousness were highly related. The study also found that individuals with higher grit had fewer career changes. The lowest grit amongst groups belonged to individuals who had some college hours but had not ever completed a college degree. Interestingly, in the first section of educational attainment analysis, individuals with associate's degrees and post college graduates displayed higher grit than those with bachelor's degrees. Also, the study's data displayed that older individuals were higher in grit than younger individuals (Duckworth et al., 2007).

The third section of the study focused upon Ivy League undergraduates and how grit was associated with cumulative GPA. The sample contained 139 psychology majors at the University of Pennsylvania. The average SAT score for individuals in the sample was 1,415. The study found that higher grit scores were associated with higher GPAs. An interesting finding of the study was that higher grit was also associated with individuals with lower SAT scores leading the researchers to infer that among intelligent students, those who relatively are not as bright as other students have more determination and work harder to compensate for the differences in intelligence (Duckworth et al., 2007).

Section four of the study explored retention of cadets at the United States Military Academy, West Point. The study placed cadets in an atmosphere specifically designed to test their mental, emotional, and physical capabilities. Grit was found to be the strongest predictor of completion of the summer training program. Grit was also found to be related to self-control in the data analysis (Duckworth et al., 2007).

Section five of the study also explored retention of cadets at the United States Military Academy, West Point. The replication and extension of section four of the study investigated if grit was a stronger predictor of completion of the summer training program than other non-cognitive traits. Like section two, grit and conscientiousness were highly related. Grit, however, was again found to be the strongest predictor of completion of the summer training program (Duckworth et al., 2007).

The sixth section of the study centered on finalists of the 2005 Scripps National Spelling Bee. The research team wanted to investigate grit regarding extracurricular achievement. The data analysis showed that individuals with higher grit performed better in the competition than individuals of the same age that displayed less grit. The study also showed a substantial correlation between grit and self-control, but self-control failed to forecast performance when controlling for age of participants. The results also showed that individuals with more grit spent more time studying for the competition. The findings showed that students with grit perform better than students with less grit because with grit, the students work with more diligence and duration (Duckworth et al., 2007).

After the publication of their initial study on grit, a research team composed of Duckworth and colleagues again studied varied cases, both inside and outside the field of education, to assess the amount that grit explained retention as well as the relationship between grit and other variables (Anderson et al., 2016; Duckworth, 2016b; Duckworth & Gross, 2014; Eskreis-Winkler et al., 2014).

The first section of the study centered upon grit's predicative ability regarding completion of an Army Special Operations Forces selection course. Approximately 58% of the sample were successful in completing the taxing 24-day selection course. Grit was the strongest predictor of successful completion over other variables: general intelligence, physical fitness, age, and years of schooling (Eskreis-Winkler et al., 2014).

The second section of the study focused upon a vacation ownership corporation and grit's predictive ability regarding job retention amongst the corporation's sales representatives. The study showed 45% of sales representatives were retained as of the one-year follow-up by Eskreis-Winkler et al. (2014). Data analysis expressed that grit was strongly associated with conscientiousness and weakly associated with other non-cognitive traits. Grit, however, was the only personality trait that predicted retention. Individuals with higher grit were found to be more likely to stay long-term at their jobs. This finding remained true when controlling for conscientiousness and other non-cognitive traits (Eskreis-Winkler et al., 2014).

The third section of the study centered upon public high schools in Chicago and graduation rates. Eskreis-Winkler et al. (2014) explored whether students' grit scores, as measured in their junior year, would accurately predict if the same students would

graduate on time at the end of their senior year. The study controlled for demographic, situational, and individual variables. The data analysis showed that students with high grit were more likely to graduate on time at the end of their senior year. Grit was also found to be strongly correlated with academic conscientiousness and school motivation (Eskreis-Winkler et al., 2014). Eskreis-Winkler et al. (2014) state that "Notably, the effect of grit on retention held when controlling for academic conscientiousness, school motivation, situational factors, standardized achievement test scores, and demographic variables" (p. 8).

The fourth section of the study involved a sample of adults and their marital status and divorce rates. Married individuals comprised 80% of the sample, and 20% of the sample were separated or divorced. Individuals who did not meet either category were removed from consideration for the sample. Grit was strongly linked with conscientiousness and moderately related to other non-cognitive traits. Males and females did not have significantly different grit scores. Grit was not a significant predictor in the full model of the study. However, when researchers looked for interactions between grit and gender, the study found that although grit was not a significant indicator of women remaining married, it showed that grit contributed to an increase in the likelihood of men remaining married (Eskreis-Winkler et al., 2014).

In summation, all four individual sections that made up the overarching study showed many positive grit effects. Duckworth and her team found that grittier soldiers, sales representatives, students, and married men all showed increased retention in their respective studies (Anderson et al., 2016; Duckworth, 2016b; Duckworth & Gross,

2014; Eskreis-Winkler et al., 2014). These findings, however, were not the conclusion of Duckworth and colleagues' examination of grit in the field of education.

Additional empirical evidence focusing upon the power of grit in the educational realm found that grittier teachers displayed greater effectiveness as measured by students' academic gains (Duckworth et al., 2009; Duckworth & Gross, 2014; Robertson-Kraft & Duckworth, 2014). Similarly, grit showed to be positively correlated with effectiveness and retention among novice educators (Anderson et al., 2016; Duckworth & Gross, 2014; Robertson-Kraft & Duckworth, 2014).

Grit has been shown through numerous empirical studies to have myriad positive effects in both academic and nonacademic realms of human existence. Grittier individuals have been shown to have higher achievement, greater retention, and other positive outcomes (Anderson et al., 2016; Duckworth, 2016b; Duckworth et al., 2007; Duckworth et al., 2009; Duckworth et al., 2011; Duckworth & Gross, 2014; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014; Miksza & Tan, 2015; Perkins-Gough, 2013; Pink, 2009; Robertson-Kraft & Duckworth, 2014; Rose, 2015; Shechtman et al., 2013). It is conjectured that grit can be developed in individuals (Duckworth, 2016b). Certain psychological and contextual factors have been said to be significant in the development of grit (Shechtman et al., 2013). Speculation on grit formation, however, is of a profoundly theoretical nature.

Speculation on Grit Formation

Although the scope of this study focuses upon Duckworth's theoretical ideology in describing grit's relationship with similar or related constructs, it is imperative to turn

attention towards an additional team of researchers to more extensively explore the speculative nature of grit formation. Shechtman et al. (2013) state that they have found through their research with the U.S. Department of Education that there are psychological resources that have the potential to promote grit within students. They argue that through the use of mutually influencing psychological resources of academic mindsets, effortful control, and strategies and tactics, students will show perseverance to overcome adversity and realize goals. In doing so, students grow grit (Shechtman et al., 2013). In addition, Shechtman et al. (2013) have found that contextual factors in a student's learning environment have the potential to promote grit development in students. Their research has led them to propose that long-term or higher order goals, when combined with optimally rigorous needs-supportive environments promote grit (Shechtman et al., 2013).

Duckworth (2016b) similarly argues that there are two distinct ways to grow grit in an individual. She describes these formational avenues of growing grit as simply from the inside-out and from the outside-in. In describing how to grow grit from inside-out, Duckworth (2016b) lists four distinct psychological assets that gritty individuals possess. The first is interest. The passion element of grit is brought forth from an individual's intrinsic enjoyment of what they are doing.

The second psychological asset is practice. This asset speaks to the perseverance part of grit in which an individual seeks to overcome weaknesses and continuously improve. Upon developing interest in a specific area, a person must practice with tenacity to gain mastery (Duckworth, 2016b).

The third asset is purpose. Grit is foundationally structured to seek purpose towards long-term goal realization in an area of interest. Lifelong passions and interests sustain individuals and serve as roadmaps to attaining personal and professional goals. Grit is of foundational importance to reach goals that are purposeful and necessary to fulfill aspirations (Duckworth, 2016b).

Lastly, hope is an additional distinct psychological asset required to grow grit from the inside-out. Hope is present in all stages of passion and perseverance towards the realization of long-term goals (Duckworth, 2016b). Duckworth (2016b) speaks to hope as follows:

> Hope is a rising-to-the-occasion kind of perseverance…From the very beginning to the very end, it is inestimably important to learn to keep going even when things are difficult, even when we have doubts. At various points, in big ways and small, we get knocked down. If we stay down, grit loses. If we get up, grit prevails (pp. 91-92).

In describing how to grow grit from outside-in, Duckworth discusses three distinct areas in which individuals can have influence in growing grit in others. The first of the three areas is parenting. There is no known research to date on parenting and grit, but Duckworth argues the importance of parenting in the building of grit by stating that individuals serve in a parenting role in guiding, affirming, engaging, and providing hope, purpose, and support for the people with whom they interact and show interest. Thus, in investing in the above-stated way, individuals are helping others grow grit from the outside-in (Duckworth, 2016b).

The second area of growing grit from outside-in is through individuals' participation in extracurricular activities. Duckworth states that extracurricular activities have two distinct foundational elements that are usually absent from other life settings. First, Duckworth states that there is an adult in charge that usually is not a parent in the traditional definition of the term. The adult is often demanding yet supportive. Extracurricular activities include the four previously discussed distinct psychological assets: interest, practice, purpose, and hope. She adds that many empirical studies show evidence that students involved in extracurricular activities show greater achievement in diverse academic, discipline, and personal worth measurement areas. She also states that extracurricular activities provide a means for students to practice. This practice facilitates a developing passion and perseverance toward the satisfaction of long-term goals (Duckworth, 2016b).

In describing the third and final area of growing grit from outside-in, Duckworth states that individuals can grow grit by establishing and/or being part of a culture that is conducive to developing grit. She states that by associating with gritty individuals and becoming actively involved in organizations that encourage and nurture grit, grit qualities are enhanced from outside-in (Duckworth, 2016b).

In a brief summation of theoretical literature on the nature of grit formation, specific psychological and contextual factors have been argued to be essential in the development of grit. Shechtman et al. (2013) speculate that through the use of mutually influencing psychological resources of academic mindsets, effortful control, and strategies and tactics, students will display perseverance to overcome adversity and realize goals, thus growing grit. They further conjecture that long-term or higher order

goals can aid in the development of grit when they are combined with optimally rigorous, needs-supportive environments (Shechtman et al., 2013). Duckworth (2016b) states that grit can be developed in an individual from the inside-out through properly utilizing psychological assets of interest, practice, purpose, and hope. She similarly states that grit can be developed in an individual from the outside-in through parenting, extracurricular activities, and culture development (Duckworth, 2016b).

Although precise psychological and contextual factors have been conjectured to stimulate grit within individuals (Duckworth, 2016b; Shechtman et al., 2013), an empirical gap in how school systems can go about forming grit within students is still evident. If school systems could discover learning environments that are generally supportive of the social and psychological inner and outer determinants of grit, then it is plausible that an empirical link as to how a school system could trigger grit might be discovered.

Music and Child Development

Howell (1948) defines music as "a science of combining tones in an artful manner to attract the ear and stimulate emotions" (p. 1). Perret and Fox (2006) explain the scientific process that allows individuals to enjoy music. First, the ear receives sound waves that transform into neural impulses. Next, specific areas of the brain process different components of the music such as rhythm, pitch, and emotion. Finally, these separate elements are reassembled by the brain, providing the unified outcome of a musical experience (Perret & Fox, 2006).

Music is an important part of human development and experience throughout all stages of life. Music helps individuals' intellectual, emotional, artistic, and social development. Music is particularly vital to adolescents. Adolescents relate with music to the point where it becomes part of their identity (Campbell et al., 2007; Kratus, 2007). Therefore, music education is of paramount importance in general and to adolescents in particular.

School systems have an extensive history of offering varied academic, athletic, and artistic extracurricular activities to their students (Broh, 2002). At the secondary level, schools often offer music performance ensembles in their curricula (Miksza, 2013). Westrup and Harrison (1960) define an ensemble as "A group of singers and players, *e.g.* an instrumental ensemble, a vocal ensemble" (p. 224). The most common school music performance ensembles are choirs for vocal music education and bands and orchestras for instrumental music education (Adderley et al., 2003). Student participation in school music performance ensembles increases musical aptitude (Adderley et al., 2003; Phillips, 2010; Schellenberg, 2004). Through participation in school music performance ensembles, students improve their musical abilities including, but not limited to, singing, playing instruments, reading music, and creating and improvising music (Phillips, 2010).

Music participation has been shown to elicit many cognitive and non-cognitive benefits that have positive effects on child development and student achievement that are in addition to predicted musical gains (Adderley et al., 2003; Azizinezhad et al., 2013; Broh, 2002; Campbell et al., 2007; Cole, 2011; Fellows et al., 2019; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Johnson & Memmott, 2007; Miksza

& Tan, 2015; Phillips, 2010; Schellenberg, 2004; Schlaug, 2001; Schlaug et al., 1995; Zimmerman & LaHav, 2012). Music education has been shown to increase math and numeracy (Azizinezhad et al., 2013; Broh, 2002; Cole, 2011; Hallam, 2010; Johnson & Memmott, 2007; Phillips, 2010), reading and literacy (Azizinezhad et al., 2013; Cole, 2011; Hallam, 2010; Phillips, 2010), and English achievement (Broh, 2002; Johnson & Memmott, 2007). These empirical findings make sense to individuals involved in music education because "Music educators teach math and reading; they just do it differently" (Phillips, 2010, p. 92). The 1988 edition of the National Educational Longitudinal Study found a very strong relationship between students who partook in school music programs and achievement in math and English (Broh, 2002). Also, regardless of the socio-economics of the school settings being studied, students scored at more advanced levels if they participated in a higher quality school music department than a lower quality school music department (Johnson & Memmott, 2007).

Empirical evidence states that musical training correlates with positive brain plasticity (Cole, 2011; Hallam, 2010; Hallam & MacDonald, 2013; Schellenberg, 2004; Schlaug, 2001; Schlaug et al., 1995; Zimmerman & LaHav, 2012). These cortical changes are conjectured because "musical training can result in plasticity-induced cortical changes to further optimize the multisensory demands required for music performance" (Zimmerman & LaHav, 2012, p. 180). Other cognitive changes supported by research include the brain's ability to transfer learned skills to other activities (Azizinezhad et al., 2013; Hallam, 2010; Hallam & MacDonald, 2013; Schellenberg, 2004), increased speech and language skill development (Azizinezhad et al., 2013; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013), higher IQ (Schellenberg,

2004), amplified concentration (Cole, 2011; Hallam, 2005), and improved memory (Azizinezhad et al., 2013; Cole, 2011; Hallam, 2010). Further benefits of music participation include improved gross and fine motor skills (Hallam, 2005; Hallam, 2010) and enriched spatial sensitivity and reasoning (Cole, 2011; Hallam, 2010).

In addition to various physical health rewards (Hallam, 2005; Hallam, 2010), and greater self-discipline (Adderley et al., 2003; Hallam & MacDonald, 2013), empirical evidence also conveys that musical training positively correlates with many other diverse social and emotional health benefits (Adderley et al., 2003; Azizinezhad et al., 2013; Campbell et al., 2007; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Schellenberg, 2004). Music participation develops perseverance throughout an extended period of time leading to the development of grit (Fellows et al., 2019).

In summation of music and child development, secondary schools often offer music performance ensembles in their curricula (Miksza, 2013). The most common school music performance ensembles are choirs, bands, and orchestras (Adderley et al., 2003). Students increase their respective musical aptitudes through active participation in school music performance ensembles (Adderley et al., 2003; Phillips, 2010; Schellenberg, 2004). Students who actively participate in music also display varied cognitive and non-cognitive benefits that have advantageous effects upon child development and student achievement (Adderley et al., 2003; Azizinezhad et al., 2013; Broh, 2002; Campbell et al., 2007; Cole, 2011; Fellows et al., 2019; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Johnson & Memmott, 2007; Miksza & Tan, 2015; Phillips, 2010; Schellenberg, 2004; Schlaug, 2001; Schlaug et al., 1995;

Zimmerman & LaHav, 2012). In addition to these findings, music participation has been suggested to foster the development of grit (Fellows et al., 2019).

Music Education and Grit

Students are nurtured by performing in music ensembles, not only musically, but emotionally, intellectually, socially, and psychologically as well (Adderley et al., 2003). Can students' participation in school music performance ensembles influence grit? Direct empirical evidence on this question is scant, but indirect evidence draws a potential relationship between such experiences and formation of grit.

Duckworth et al. (2007) use a musical example when first introducing the idea of grit to the academic world in illustrating the difference of ability outcomes between two children who are equally talented in music and practice at the same level of intensity. Since the children are equally talented in music, the researchers state that the children would theoretically grow in proficiency at the same rate per unit of effort exerted (Duckworth et al., 2007). In school music performance ensembles, however, students of differing innate abilities work to grow their musical abilities. Talents are genetically influenced but are not dependent on genetics alone. Working hard and gaining experience also enhance talents (Duckworth, 2016b). Students who participate in music engage in experiences that have the potential to grow grit. They experience success but also face repeated failures and disappointments in their music education journeys which may contribute to the development of grit (Fellows et al., 2019). It takes numerous hours of practice to acquire skill (Pellegrino & Hilton, 2012), but it is skill combined with many hours of gritty musical practice that produces great musical achievement (Miksza & Tan, 2015). Students in school music performance ensembles

are expected to practice on their own and within the ensemble. Before great strides can be made by a music performance ensemble, individual members must execute individual, deliberate practice. Duckworth states that deliberate practice requires practice on yet unattainable tasks, is not simple, and can be boring and frustrating for individuals (Perkins-Gough, 2013). Duckworth (2016b) proposes four essential elements of deliberate practice that can easily be related to student participation in school music performance ensembles. The four elements are a stretch goal that is clearly defined, full effort and concentration, informative and immediate feedback, and repetition with refinement and reflection. These essential elements are readily present in the quest to heighten one's musical proficiency.

Students in school music performance ensembles experience flow, a concept first introduced by Mihaly Csikszentmihalyi in the 1970s (Pink, 2009). Flow as defined by Sinnamon, Moran, and O'Connell (2012) "is a highly coveted yet elusive state of mind that is characterized by complete absorption in a given task as well as by enhanced skilled performance" (p. 6). There are numerous empirical studies focusing upon the nine dimensions of flow: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience (Sinnamon et al., 2012). There is myriad research on flow within athletics and sports performance, but there is a limited amount of research discussing how flow is experienced in music performance (Sinnamon et al., 2012). However, flow can be utilized as an important tool to benefit music education when it is understood with regard to deliberate practice.

Flow is linked with deliberate practice. Deliberate practice is intentional gritty preparation that leads to flow in performance (Duckworth, 2016b; Miksza & Tan, 2015; Pink, 2009; Von Culin et al., 2014). Both deliberate practice for preparation and flow in performance are necessary characteristics of student participation in school music performance ensembles. In a recent study of collegiate music students, Miksza and Tan (2015) found grit to be the strongest indicator of practice efficiency and long-term goal perseverance. The study also showed that grit and flow were significantly related.

In summation, music participation presents opportunities for overcoming failure with persistence and hard work, leading to success. It is through relentlessly striving towards long-term goals that individuals may be able to grow grit (Fellows et al., 2019). Although musical ability is partially dependent upon genetics (Duckworth, 2016b), musical proficiency can be enhanced through many hours of gritty music rehearsal (Miksza & Tan, 2015). This deliberate practice contains stretch goals, concentration, effort, feedback, repetition, reflection, and refinement (Duckworth, 2016b). The deliberate practice is linked to flow states of intense concentration and expert performance (Duckworth, 2016b; Miksza & Tan, 2015; Pink, 2009; Von Culin et al., 2014).

Chapter 3: Theoretical Framework

Introduction to Theoretical Framework

Students work with passion and perseverance on things they find personally interesting (Duckworth, 2016b). Further, students are more creative and learn more when they are intrinsically motivated (Niemiec & Ryan, 2009). These claims introduce an element of motivation involved in grit formation, suggesting that experiences conducive to autonomous motivation may establish a link between active participation in a school music performance ensemble and grit. To explore this connection further, basic psychological needs theory was utilized as the theoretical framework for this study.

Theory Overview

Self-determination theory assumes that all human beings have inherent tendencies towards a "coherent sense of self" (Deci & Ryan, 2002, p. 3). Active pursuit of an integrated self plays out on a psychological and social level as explained by the six mini theories that combine to form self-determination theory. The mini theories include: cognitive evaluation theory, organismic integration theory, causality orientations theory, basic psychological needs theory, goal contents theory, and relationship motivation theory (Deci & Ryan, 2002; Ryan & Deci, 2017).

Although cognitive evaluation theory, organismic integration theory, causality orientations theory, goal contents theory, and relationship motivation theory cover specific important facets of the larger self-determination theory (see Appendix B), basic psychological needs theory was selected as the theoretical lens for the study's research

problem and purpose because it explores autonomous motivation as originating from a social context supportive of autonomy, competence, and relatedness (Deci & Ryan, 2002; Ryan & Deci, 2017). According to basic psychological needs theory, social conditions can activate or constrain autonomous motivation through interactions depending on the experiences of the individual. Experiences that activate autonomy, competence, and relatedness nurture internal regulation, whereas activities experienced as controlling tend to frustrate inner motivation (Ryan & Weinstein, 2009).

Autonomy is the feeling of being one's own source of interests, behaviors, and values. Competence is the feeling of being effective or confident in interactions and, in turn, directs individuals to activities in which further competence can be attained. Relatedness is the feeling of connectedness and belonging to other persons and communities. Autonomy, competence, and relatedness are universal needs and generalizable across culture (Deci & Ryan, 2002). Individuals have continuous motivation in the pursuit of activities that provide basic psychological needs satisfaction but resist activities that do not satisfy basic psychological needs (Evans et al., 2012).

Ryan and Deci (2017) state that throughout history sundry theories have explored the subject of human needs. They write that extant research focuses on human needs that stem from both physiological and psychological processes. They clarify specific human needs delineations as follows:

> Within SDT, needs are specifically defined as *nutrients that are essential for growth, integrity, and well-being*. Accordingly, *basic physiological needs* pertain to nutrients required for bodily health and safety, and include such

> requirements as oxygen, clean water, adequate nutrition, and freedom from physical harms. Alongside such physical needs, SDT posits that there are also *basic psychological needs* that must be satisfied for psychological interest, development, and wellness to be sustained…SDT's three basic psychological needs are those for *autonomy*, *competence*, and *relatedness*. Like physical needs, these needs are said to be *objective* phenomena in that their deprivation or satisfaction has clear and measurable functional effects… (p. 10).

The needs of autonomy, competence, and relatedness that are outlined within basic psychological needs theory are satisfied when a social environment provides support for the fulfillment of needs and healthy psychological wellbeing ensues within individuals. If a social environment is, however, not supportive of needs fulfillment within individuals, needs are thwarted and the social environment proves antagonistic towards individuals' psychological wellbeing (Deci & Ryan, 2002). The conjectured plausible connection between active participation in a school music performance ensemble, satisfaction of basic psychological needs, and the formulation of grit is examined through the lens of Deci and Ryan's basic psychological needs theory.

Music Education, Needs Satisfaction, and Grit

It is argued in this study that basic psychological needs theory may explain the link between music ensemble participation and grit. Recall from the discussion on the formation of grit that Duckworth advances inner and outer determinants of this characteristic. Duckworth (2016b) speculates that grit grows from the inside-out through four distinct psychological assets: interest, practice, purpose, and hope. All four

distinct psychological assets could be emergent in music performance ensemble students.

Students who participate in music ensembles often do so for the joy they experience in making music. Students show interest through their intrinsic enjoyment of music. Students are interested in the beauty and excitement of the music and the overall joy that comes with performing music with others within an ensemble. Students participate in deliberate practice as they explore a means to overcome weaknesses and seek improvements in musical proficiency. Students not only want to improve as individuals, but also as a music ensemble. Students display purpose as they work towards the excitement of long-term goal realization in their musical interests. Students are pursuing both individual and group performance goals. Students exhibit hope as they keep progressing in their musical studies despite challenging obstacles and difficulties. Students do not allow themselves to be defeated in their musical journeys.

Furthermore, in discussing how an individual can grow grit from the outside-in, Duckworth (2016b) discusses three distinct areas that individuals can have influence in growing grit in others: parenting, extracurricular activities, and being part of a gritty culture. Parenting involves seeking out how to best generate interest, practice, purpose, and hope in individuals. Extracurricular activities are devised to develop interest, practice, purpose, and hope for participants. Gritty cultures produce grittier individuals, as being a member of a culture greatly impacts many aspects of an individual's identity (Duckworth, 2016b). It is plausible to argue that all three areas are directly involved with the satisfaction of basic psychological needs when postulating that autonomy satisfaction births interest, competence satisfaction stems from practice, and relatedness

satisfaction includes feelings of purpose and hope through making connections with others. Music ensemble environments, which are argued to be supportive of basic psychological needs satisfaction, offer parenting as teachers and other adults guide young musicians in a parentlike manner. Additionally, school music performance ensembles are an extracurricular activity in which an adult that is usually not a student's parent leads by being both demanding and supportive while also expecting students to engage in deliberate practice. Lastly, school music performance ensemble environments are cultures in which students receive a music education and display myriad positive outcomes (Adderley et al., 2003). Music participation also fosters grit development (Fellows et al., 2019).

Evans et al. (2012) offer examples of how music education can support the satisfaction of basic psychological needs of autonomy, competence, and relatedness in students. Student autonomy can grow as instructors allow young musicians to see how their actions contribute to certain sounds, rhythms, and melodies produced by a coordinated group. Internal control and volition also build through an openness to student input in the selection of performance repertoire and when students decide how to play and improve different pieces of music. Competence is supported through stimulating and optimally challenging work that involves direct and immediate feedback that students use to identify good performance and areas where the sound falls short of expectations. Music educators have the opportunity to promote feelings of relatedness among their students by nurturing healthy peer relationships within music ensembles as well as other relationships that form through a shared joy of music.

In short, music performance environments offer students experiences in which they form attachments with peers and adults, develop a sense of inner control, and experience moments of effective performance. Consistent with substantive self-determination theory evidence, such a context is one in which inner psychological states can be ignited. Grit, in particular, stands out as a psychological trait that is duly suited for the challenging and engaging experiences provided by a music ensemble. Students learn through hours of deliberate practice, they receive constant and immediate feedback on their performance, they set and work toward mastery goals, and they work through their frustrations on a path toward achieving a desired end state (Evans, 2015; Miksza & Tan, 2015). Such experiences are theorized to underlie grit (Duckworth, 2016b).

Building upon the theoretical framework that serves as the basis for this study, two research questions were advanced for examination:

1. Do students who actively participate in a school music performance ensemble have higher self-reported grit than comparable students who do not actively participate in a school music performance ensemble?
2. Is perceived needs satisfaction related to music ensemble students' self-reported grit?

Chapter 4: Research Methods

Introduction to Research Methods

The purpose of this study was to examine the self-reported grit of students in a school music ensemble and to compare it with grit reported by non-music ensemble students. Empirical evidence of the many varied cognitive and non-cognitive benefits of music are well-documented (Adderley et al., 2003; Azizinezhad et al., 2013; Broh, 2002; Campbell et al., 2007; Cole, 2011; Fellows et al., 2019; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Johnson & Memmott, 2007; Miksza & Tan, 2015; Phillips, 2010; Schellenberg, 2004; Schlaug, 2001; Schlaug et al., 1995; Zimmerman & LaHav, 2012). There is a paucity of research in establishing that the specific experiences, challenges, interactions, and opportunities found within active participation in a school music performance ensemble trigger grit. For this reason, the empirical study sought to determine if self-reported grit was higher for students who actively participated in school music performance ensembles, than for students who did not actively participate in a school music performance ensemble but did participate in a school extracurricular activity, and for students who did not actively participate in either a school music performance ensemble or another school extracurricular activity.

The research study also sought to determine if music ensemble students displayed high satisfaction of basic psychological needs of autonomy, competence, and relatedness. School music performance ensemble environments have been previously found to be conducive to needs support and satisfaction (Evans et al., 2012). These musical environments can trigger positive psychological traits through the fulfillment of students' autonomy, competence, and relatedness satisfaction needs (Evans et al.,

2012). For this reason, the empirical study measured needs satisfaction of students who actively participated in school music performance ensembles to test the relationship between needs satisfaction and grit.

Research Design

The research study used a non-experimental, cross-sectional design to examine differences in self-reported grit between students who actively participated in school music performance ensembles and non-ensemble students. The empirical study specifically sought to identify differences in self-reported grit among students who actively participated in a school music performance ensemble, students who did not participate in a school music performance ensemble but did participate in a school extracurricular activity, and students who did not actively participate in either a school music performance ensemble or another school extracurricular activity. The empirical study also investigated students who actively participated in a school music performance ensemble and self-reported basic psychological needs satisfaction by first performing an exploratory factor analysis with principle axis factoring and later a multiple regression analysis. Furthermore, a bivariate correlation analysis was employed to scrutinize the relationship among grit and autonomy satisfaction, relatedness satisfaction, competence satisfaction, free and reduced lunch status, and participation in private music lessons taken outside of school. Additional tests encompassed within the empirical study's non-experimental, cross-sectional design are discussed within the empirical study's data analysis.

A cross-sectional research design involves data being collected over a short period of time to provide a snapshot of relevant information at a specific time point

(Hua & David, 2008; Mertens, 1998). This empirical study is staunchly cross-sectional in its design in that the respective data samples consist of 157 high school junior and senior music ensemble students surveyed during their regular school schedule on a day in May 2017. Additionally, the sample of 111 non-music ensemble juniors were similarly surveyed during their regular school schedule on a day earlier in the same school term. The self-reported data supplied by those surveyed are theoretically accurate at the specific time they were assessed.

A limitation of cross-sectional research is that the findings do not address causal relationships or attributions. Cross-sectional research studies investigate relationships between variables, but do not prove causality. Despite being unable to prove causality, cross-sectional research can be used to make strong claims backed by data that can be utilized for future research with high replicability (Hua & David, 2008). The non-experimental nature of this study allows an individual to make preliminary conclusions subject to future research about active student participation in school music performance ensembles and increased grit. It also allows an individual to draw preliminary conclusions subject to future research about active participation in school music performance ensembles and the satisfaction of basic psychological needs of autonomy, competence, and relatedness. Both conclusions are indicated through an investigation of the empirical study's findings that show strong correlational relationships supported by research data.

Data Source

Data for this study came from Sooner Public Schools. Sooner Public Schools is a midsize urban school district that lies within a metropolitan area of approximately

900,000 residents. Sooner Public Schools has a long and accomplished history of myriad high-quality extracurricular offerings being offered to students at all grade levels. During the 2014-2015 school year, 14,425 of the approximately 16,000 students in the school district participated in some form of fine or performing arts programs. Within that school year, 6,922 elementary students participated in both music and art classes. During the same school year, many 6th-12th grade students participated in school music performance ensembles at the secondary level. Specifically, 1,401 secondary students participated in choir, 1,017 secondary students participated in band, and 598 secondary students participated in orchestra. Other fine and performing arts participation involved 1,556 secondary students who participated in drama, 235 secondary students who participated in competitive speech/debate, and 2,462 secondary students who participated in a wide-ranging array of visual arts disciplines. Additionally, more than 1,600 7th-12th grade students took part in at least one of the 23 competitive athletic and spirit programs Sooner Public Schools offered. Furthermore, almost 2,500 K-12th grade students partook in the school district's 167 non-competitive teams and spirit squads. Lastly, Sooner Public Schools offered 51 different clubs and organizations for high school students to participate in.

Data Collection

One hundred and fifty-seven Sooner High School juniors and seniors who actively participated in a school music performance ensemble were surveyed in May 2017 during music ensemble class sessions. Within the sample, 93% of the sample identified themselves as having actively participated in a school music performance ensemble for four or more years. An additional sample of 111 non-music ensemble

juniors were surveyed and used as a comparison group for the study. Within the comparison group, students were further divided into those who participated in a school extracurricular activity that was not a music performance ensemble and those who did not participate in any form of school extracurricular activity.

Free and reduced lunch status information was also included in the data samples. Of the 157 students who actively participated in school music performance ensembles, 34 students (21.7%) stated that they received a federal lunch subsidy, 120 students (76.4%) stated that they did not receive a federal lunch subsidy, and 3 students (1.9%) declined to answer. Of the 111 students who did not actively participate in school music performance ensembles, 69 students (62.2%) stated that they received a federal lunch subsidy, 42 students (37.8%) stated that they did not receive a federal lunch subsidy, and 0 students (0%) declined to answer.

An additional data point that was collected exclusively from the school music performance ensemble participants was whether students took private music lessons outside of school. Of the 157 students, 55 students (35%) stated that they did participate in private music lessons outside of school, 100 students (63.7%) stated that they did not participate in private music lessons outside of school, and 2 students (1.3%) declined to answer.

Measures

Grit was measured with the Grit Scale developed by Rojas, Reser, Usher, and Toland (2012) to measure student grit. Items on the Grit Scale measured student passion and perseverance to pursue long-term academic goals. Students responded to surveys

which included 10 statements to assess students' self-reported grit. The survey employed a Likert scale scoring system with a number continuum from one to four. The continuum went from strongly disagree to strongly agree. The following statements were included: (a) If a task is hard, I try even harder, (b) When I have responsibilities for school, I do them, (c) Whenever I do something, I put all my effort into it, (d) I keep at my homework until I am done with it, (e) Once I make a plan, I stick to it, (f) Once I make a commitment, I keep it, (g) I am a hard worker, (h) I keep trying even after I fail, (i) I keep working at something new even when it's hard, and (j) I get things done that need to be done, even when I don't feel like doing them.

Basic psychological needs satisfaction was measured with the Basic Psychological Needs Scale constructed by Evans et al. (2012). The scale was adapted by adding, deleting, and editing items from the original scale to focus on specific student experiences related to active participation in a school music performance ensemble. The scale was then used to measure students' autonomy, competence, and relatedness needs fulfillment. Students responded to surveys which included 12 statements to assess students' self-reported needs fulfillment. The survey employed a Likert scale scoring system with a number continuum from one to four. The continuum went from strongly disagree to strongly agree. The following statements were included: (a) I am good at singing or playing my instrument, (b) I have a sense of pride in my musical abilities, (c) People tell me I am good at singing or playing my instrument, (d) I receive feedback on my performance within the music ensemble, (e) I have made new friends within my music ensemble, (f) My music ensemble is a fun way to be with friends, (g) I have friends in my music ensemble with similar musical interests, (h) I

feel a musical connection with the teacher of my music ensemble, (i) I sing or play my instrument for fun, (j) My music teacher allows me to have input in the music ensemble, (k) My music teacher allows me to experiment in my musical interpretation, and (l) My individual musical actions contribute to the music ensemble.

In examining the relationship between self-reported grit and basic psychological needs satisfaction among students who actively participated in a school music performance ensemble, the study employed an exploratory factor analysis with principle axis factoring. The results displayed that the basic psychological needs satisfaction items load strongly on all three factors. All competence satisfaction items were related to one another. All relatedness satisfaction items were related to one another. All autonomy satisfaction items were related to one another.

Within each psychological needs satisfaction category, one survey item displayed a low factor reading. Within competence satisfaction, survey statements a, b, and c ranged from .74 - .83. Survey item d, however, displayed a .39 factor loading. Within relatedness satisfaction, survey statements e, f, and g ranged from .63 - .83. Survey item h, however, displayed a .39 factor loading. Within autonomy satisfaction, survey statements j, k, and l ranged from .69 - .82. Survey item i, however, displayed a .46 factor loading. Considering the results, the lowest factor loading survey statement from each psychological needs satisfaction category was removed from further data analysis.

Analytical Technique

The first step of data analysis was to describe the distribution of grit scores across combined samples. Normality of data were tested and illustrated in histograms shown in Appendix C. Evidence on both skewness and kurtosis was reported. Additionally, the distribution of basic psychological needs satisfaction scores was also tested. The next step of data analysis included calculating group means for students who actively participated in school music performance ensembles, students who did not participate in school music performance ensembles but did participate in a school extracurricular activity, and students who did not actively participate in school music performance ensembles nor participated in another school extracurricular activity. A table was constructed to report means, standard errors, and 95% confidence intervals for grit and later utilized to determine which group had the highest mean score.

An additional step of data analysis was a two-way Analysis of Variance (ANOVA) with extracurricular participation as one independent variable and free and reduced lunch status as a second independent variable. Extracurricular participation had three levels: students who actively participated in school music performance ensembles, students who did not participate in school music performance ensembles, but did participate in a school extracurricular activity, and students who did not actively participate in school music performance ensembles nor participate in another school extracurricular activity. Free and reduced lunch status had two levels with students having either qualified for free and reduced lunch status or not having qualified for free and reduced lunch status. Because extracurricular status was measured by three groups, a Tukey's post hoc test was used to isolate differences in grit by extracurricular status.

A bivariate correlation analysis was then executed to examine the relationship between grit and autonomy satisfaction, competence satisfaction, relatedness satisfaction, free and reduced lunch status, and participation in private music lessons taken outside of school. Lastly, a multiple regression analysis was performed to observe the relationship between grit (as reported by students who actively participated in a school music performance ensemble) and basic psychological needs satisfaction. IBM SPSS Statistics 24 was utilized in the analysis of data.

Chapter 5: Results

Introduction to Results

Data gathered within this study were collected to see whether students who actively participated in a school music performance ensemble had higher self-reported grit than non-participating students. Additionally, within the music ensemble students, relationships between grit and student experiences were tested. Tested student experiences included autonomy satisfaction, competence satisfaction, and relatedness satisfaction. Participation in private music lessons taken outside of school and free and reduced lunch status were included in the study. Subsequent findings of the study are reported within this chapter.

As stated in the previous chapter, the research study used a non-experimental, cross-sectional design to examine differences in self-reported grit between students who actively participated in school music performance ensembles and non-ensemble students. The empirical study specifically sought to identify differences in self-reported grit among students who actively participated in a school music performance ensemble, students who did not participate in a school music performance ensemble but did participate in a school extracurricular activity, and students who did not actively participate in either a school music performance ensemble or another school extracurricular activity. The study also investigated students who actively participated in a school music performance ensemble and self-reported basic psychological needs satisfaction by first performing an exploratory factor analysis with principle axis factoring and later a multiple regression analysis. Furthermore, a bivariate correlation analysis was employed to scrutinize the relationship among grit and autonomy

satisfaction, competence satisfaction, and relatedness satisfaction, free and reduced lunch status, and participation in private music lessons taken outside of school. Additional tests encompassed within the empirical study's non-experimental, cross-sectional design are discussed within this chapter.

Research Questions

Building upon the theoretical framework that serves as the basis for this study, two research questions were advanced for examination.

1. Do students who actively participate in a school music performance ensemble have higher self-reported grit than comparable students who do not actively participate in a school music performance ensemble?
2. Is perceived needs satisfaction related to music ensemble students' self-reported grit?

Research Results for Question 1

Skewness and kurtosis estimates report on the distribution of grit scores for all student data as shown in Table 1.

Table 1. *Combined Grit Score Analysis for Skewness and Kurtosis*

	Mean	Standard Deviation	Skewness	Kurtosis
All Student Sample	3.04	.454	-.29	.14

Note. N = 268 students.

Results showed that skewness for students' self-reported grit was -.29, suggesting that the degree of asymmetry of the mean displayed a small amount of negative skewness, but fell within the acceptable range of normality (Huck, 2004). Results also show that kurtosis for students' self-reported grit was .14, suggesting that the measure of

dispersion and shape relative to a normal distribution displayed a slightly leptokurtic kurtosis, but fell within the acceptable range of normality (Huck, 2004). A histogram exhibiting the combined grit score analysis of student data is presented in Appendix C as Figure C1.

Table 2 reports means, standard errors, and 95% confidence intervals for grit as shown below.

Table 2. *Descriptive Statistics for Grit Groups*

			95% Confidence Interval	
	Mean	Standard Error	Lower Bound	Upper Bound
No School Extra	2.78	.07	2.64	2.92
Non-Music Extra	2.90	.05	2.79	3.00
Music Ensemble	3.15	.04	3.07	3.23

Note. N = 268 students.

As reported in Table 2, students' grit had the highest mean amongst those who actively participated in school music performance ensembles with a mean grit score of 3.15, 95% CI [3.07, 3.23]. Students who did not actively participate in school music performance ensembles, but did participate in a school extracurricular activity, had the second highest average with a mean grit score of 2.90, 95% CI [2.79, 3.00]. The lowest average grit was for students who did not actively participate in a school music performance ensemble nor any school extracurricular activity with a mean grit score of 2.78, 95% CI [2.64, 2.92].

A two-way ANOVA with extracurricular participation as one independent variable and free and reduced lunch status as a second independent variable was analyzed. Extracurricular participation had three levels: students who actively participated in school music performance ensembles, students who did not participate in

school music performance ensembles, but did participate in a school extracurricular activity, and students who did not actively participate in school music performance ensembles nor participate in another school extracurricular activity. Free and reduced lunch status had two levels with students having either qualified for free and reduced lunch status or not having qualified for free and reduced lunch status. Table 3 reports results of the two-way ANOVA as shown below.

Table 3. *Statistical Significance of Grit*

	Type III Sum of Squares	df	Mean Square	F	Significance	Partial Eta Squared
Corrected Model	6.88[a]	5	1.38	7.54	.00	.13
Intercept	1500.87	1	1500.87	8223.45	.00	.97
FRL	.01	1	.01	.03	.87	.00
Extra	4.76	2	2.38	13.03	.00	.09
FRL & Extra	.32	2	.16	.88	.42	.01

Note. a. R Squared = .13 (Adjusted R Squared = .11).

Results report a statistically significant difference in grit attributed to type of extracurricular activity ($F = 13.03$, $p < .01$). The partial eta squared suggests that 9% of overall variance in grit was attributed to extracurricular activity, with music ensemble students having the highest average grit score. There was not a statistically significant difference in grit between free and reduced lunch students and non-free and reduced lunch students ($F = .03$, $p > .01$). Additionally, there was no interaction effect between free and reduced lunch status and type of extracurricular activity ($F = .88$, $p > .01$).

A Tukey's post hoc test was used to test the statistical significance of grit across the three student groups with results shown in Table 4 on the following page.

Table 4. *Statistical Significance of Grit Between Samples*

				95% Confidence Interval	
	Mean Difference	Standard Error	Significance	Lower Bound	Upper Bound
0 & 1	-.11	.08	.43	-.31	.10
0 & 2	-.38*	.08	.00	-.56	-.20
1 & 0	.11	.08	.43	-.10	.31
1 & 2	-.27*	.06	.00	-.42	-.13
2 & 0	.38*	.08	.00	.20	.56
2 & 1	.27*	.06	.00	.13	.42

Note. The error term is Mean Square (Error) = .183.
*. The mean difference is significant at the 0.05 level (2-tailed).
0. Students who did not actively participate in a school music performance ensemble nor any school extracurricular activity.
1. Students who did not actively participate in a school music performance ensemble but did participate in a school extracurricular activity.
2. Students who did actively participate in a school music performance ensemble.

Table 4 shows a statistically significant difference in the mean grit score for students who actively participated in school music performance ensembles when compared with non-ensemble students in a school extracurricular activity. Results also show a statistically significant difference in the mean grit score for students who actively participated in school music performance ensembles when compared with students not involved in a school extracurricular activity. There was not a statistically significant difference in the mean grit scores when comparing students in another extracurricular activity and no school-based extracurricular activity.

Estimated grit marginal means of all three student sample groups are displayed in Figure 1 on the following page.

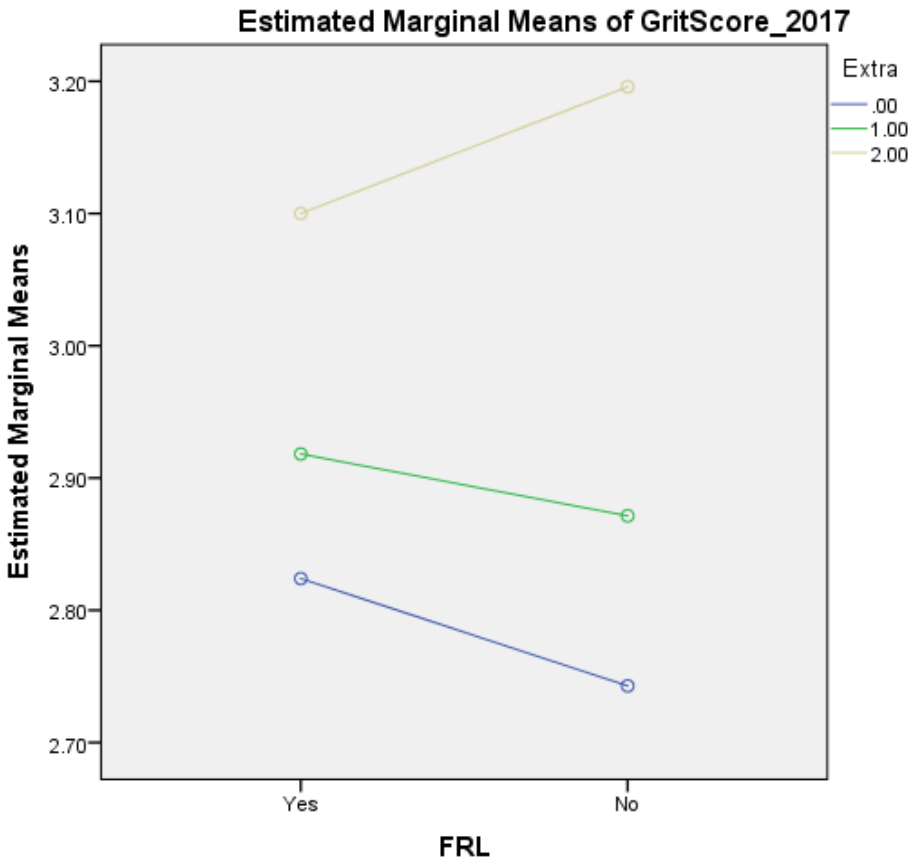

Figure 1. *Estimated Grit Marginal Means of Sample Groups*

Note. .00. Students who did not actively participate in a school music performance ensemble nor any school extracurricular activity.
1.00. Students who did not actively participate in a school music performance ensemble but did participate in a school extracurricular activity.
2.00. Students who did actively participate in a school music performance ensemble.

Music ensemble students had higher average grit than other students in the sample. Higher scores were for free and reduced lunch and non-free and reduced lunch ensemble students. Interestingly, non-free and reduced lunch students had the highest average grit score in the analysis. As illustrated in the figure, among students who actively participated in school music performance ensembles, those who did not qualify for free and reduced lunch status displayed higher estimated marginal means than those

who did qualify for free and reduced lunch status. The opposite effect, however, occurred with students who did not participate in school music performance ensembles, but did participate in a school extracurricular activity and students who did not actively participate in school music performance ensembles nor participate in another school extracurricular activity. These two groups displayed lower estimated marginal means among students who did not qualify for free and reduced lunch status than those who did qualify for free and reduced lunch status.

Research Results for Question 2

Skewness and kurtosis estimates report on the distribution of basic psychological needs satisfaction scores for music ensemble students as shown in Table 5.

Table 5. *Basic Psychological Needs Satisfaction Analysis for Skewness and Kurtosis*

	Mean	Standard Deviation	Skewness	Kurtosis
Autonomy	3.05	.678	-.53	.19
Competence	3.27	.646	-.93	1.34
Relatedness	3.59	.542	-1.41	1.75

Note. N = 157 students.

Results show that skewness for students' autonomy satisfaction was -.53, suggesting that the degree of asymmetry of the mean displayed a small amount of negative skewness, but fell within the acceptable range of normality (Huck, 2004). Results also show that kurtosis for students' autonomy satisfaction was .19, suggesting that the measure of dispersion and shape relative to a normal distribution displayed a slightly leptokurtic kurtosis, but fell within the acceptable range of normality (Huck, 2004). A

histogram exhibiting autonomy satisfaction among music ensemble students is presented in Appendix C as Figure C2.

Results show that skewness for students' competence satisfaction was -.93, suggesting that the degree of asymmetry of the mean displayed a small amount of negative skewness, but fell within the acceptable range of normality (Huck, 2004). Results also show that kurtosis for students' competence satisfaction was 1.34, suggesting that the measure of dispersion and shape relative to a normal distribution displayed a small leptokurtic kurtosis, but fell within the acceptable range of normality (Huck, 2004). A histogram exhibiting competence satisfaction among music ensemble students is presented in Appendix C as Figure C3.

Results show that skewness for students' relatedness satisfaction was -1.41, suggesting that the degree of asymmetry of the mean displayed a negative skewness and fell outside the acceptable range of normality (Huck, 2004). Results also show that kurtosis for students' relatedness satisfaction was 1.75, suggesting that the measure of dispersion and shape relative to a normal distribution displayed a small leptokurtic kurtosis, but fell within the acceptable range of normality (Huck, 2004). Relatedness support was highest among the needs satisfaction categories. A histogram exhibiting relatedness satisfaction among music ensemble students is presented in Appendix C as Figure C4.

Correlation and regression analyses were used to determine the association between music ensemble students' grit and experiences like needs satisfaction, free and

reduced lunch status, and participation in outside of school private music lessons. The findings are shown in Table 6.

Table 6. *Personal Factors of Music Ensemble Students and Grit*

	Grit	Autonomy	Competence	Relatedness	FRL	Lessons
Grit	1.00	.33**	.28**	.18*	.10	.23**
Autonomy		1.00	.44**	.39**	.04	.36**
Competence			1.00	.29**	.04	.31**
Relatedness				1.0	.06	.13
FRL					1.00	.07
Lessons						1.00

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Grit had statistically significant relationships with autonomy satisfaction ($r = .33$, $p < .01$), competence satisfaction ($r = .28$, $p < .01$), relatedness satisfaction ($r = .18$, $p < .05$), and private lessons ($r = .23$, $p < .01$). Grit was not related to free and reduced lunch status. Table 6 displays the results of a bivariate correlation analysis used to examine the relationship between grit and autonomy satisfaction, competence satisfaction, relatedness satisfaction, free and reduced lunch status, and participation in outside of school private music lessons. Relationships between grit and autonomy satisfaction, grit and competence satisfaction, and grit and participation in outside of school private music lessons were statistically significant at the .01 level. Relationship between grit and relatedness satisfaction was significant at the .05 level. There was not a statistically significant relationship displayed between grit and free and reduced lunch status.

Table 7 displays the results of a multiple regression analysis performed to observe the relationship between grit as reported by students who actively participated in a school music performance ensemble and basic psychological needs satisfaction. Table 7 is found on the following page.

Table 7. *Psychological Needs Satisfaction and Grit*

			95% Confidence Interval	
	Unstandardized	Standardized	Lower Bound	Upper Bound
Competence	.09	.14	-.02	.19
Autonomy	.15	.26	.05	.26
Lessons	.08	.09	.22	.06
R	.39			
R^2	.15			

Note. N = 157 students.

When combined, competence satisfaction, autonomy satisfaction, and private music lesson participation explained about 15% of the variance in grit for the students who actively participated in a school music performance ensemble ($R^2 = .15$, $p < .01$). Of the predictor variables, autonomy satisfaction had the only statistically significant effect on grit ($\beta = .26$, $p < .01$), explaining about 6% of the variance.

Research Results Summary

In conclusion, a brief summary of the findings related to the two research questions show that in answer to Research Question 1, students who actively participated in a school music performance ensemble displayed higher levels of self-reported grit than students who did not actively participate in a school music performance ensemble ($F = 13.03$, $p < .01$). Additionally, in answer to Research Question 2, students who actively participated in a school music performance ensemble showed statistically significant relationships between self-reported grit and basic psychological needs satisfaction reflected in autonomy satisfaction ($r = .33$, $p < .01$), competence satisfaction ($r = .28$, $p < .01$), and relatedness satisfaction ($r = .18$, $p < .05$). In addition to basic psychological needs satisfaction, grit among music ensemble students also displayed a statistically significant relationship with participation in

private music lessons taken outside of school ($r = .23$, $p < .01$), but not with free and reduced lunch status.

Chapter 6: Discussion

Introduction to Discussion

The purpose of this study was to determine if students with active participation in a school music performance ensemble possessed higher levels of self-reported grit than comparable students who did not actively participate in a school music performance ensemble. The study also aimed to ascertain if active participation in a school music performance ensemble manifested satisfaction of basic psychological needs of autonomy, competence, and relatedness. The research study sought to utilize a cross-sectional analysis involving students who actively participated in a school music performance ensemble, students who did not participate in a school music performance ensemble but did participate in a school extracurricular activity, and students who did not actively participate in either a school music performance ensemble or another school extracurricular activity. The research study, therefore, sought answers to the following research questions:

1. Do students who actively participate in a school music performance ensemble have higher self-reported grit than comparable students who do not actively participate in a school music performance ensemble?
2. Is perceived needs satisfaction related to music ensemble students' self-reported grit?

An examination of both questions, in addition to thoughts on the relevance of findings for 21st century education, is found within the discussion chapter. The discussion

chapter concludes with limitations and recommendations for future research, especially longitudinal in nature.

Research Question 1 Discussion Music Participation and Grit

This study's findings showed that students who actively participated in a school music performance ensemble had higher self-reported grit than other students. This included students participating in another school extracurricular activity (e.g., football, yearbook, student council, etc.) and students not in a school extracurricular activity. Music ensemble students had a mean grit score of 3.15, 95% CI [3.07, 3.23]. Non-music ensemble students who participated in a different school extracurricular activity had a mean grit score of 2.90, 95% CI [2.79, 3.00]. Non-music ensemble students who did not participate in any school extracurricular activity had a mean grit score of 2.78, 95% CI [2.64, 2.92]. These mean differences were statistically significant ($F = 13.03$, $p < .01$) with 9% of overall variance in grit being attributed to extracurricular activity.

It is important to point out that higher self-reported grit for students in the music ensemble group does not establish a causal relationship, nor does it support causal claims about music participation. Establishing causality was not the intent of this research. The purpose was more descriptive and exploratory than confirmatory and explanatory. The question not addressed by the empirical findings, and the one to conceptually and theoretically tease out here, has to do with why. Why did the music ensemble students in this sample report higher grit than comparison students? Existing theorizing on grit formation is used to flesh out plausible claims that future research might consider addressing.

A plausible explanation for higher self-reported grit among students who actively participate in school music performance ensembles may be that school music performance ensembles offer unique participatory experiences that contain elements theorized to underlie the formation of grit. Students who actively participate in a school music performance ensemble often have interest in music. Students who actively participate in a school music performance ensemble often engage in deliberate practice. Students who actively participate in a school music performance ensemble often find purpose. Students who actively participate in a school music performance ensemble often experience hope. Students who actively participate in a school music performance ensemble experience an extracurricular activity that is often led by adults engaging in parenting within a gritty culture. All the aforementioned outcomes of active participation in a school music performance ensemble are in line with Duckworth's (2016b) theory on inner and outer determinants of growing grit which expresses that gritty individuals possess four specific inner psychological assets: interest, practice, purpose, and hope. She further argues that there are three explicit outer areas in which individuals can affect grit growth: parenting, extracurricular activities, and culture. All these elements may be experienced through active participation in school music performance ensemble environments.

Interest motivates students to work with great passion and perseverance (Duckworth, 2016b). Students who actively participate in music ensembles may make the choice to do so because of an interest in the inherent benefits that potentially may come with membership. A student's love of music and interest in music making may be reason enough to actively participate in a school music performance ensemble

curricular offering. Through participation in school music performance ensembles, student interest in music may be nurtured. Furthermore, students' love of music and interest in making music may be enriched through the experiential joy and excitement of creating tonal melodies and harmonies while participating within a school music performance ensemble.

Deliberate practice contains stretch goals, concentration, effort, feedback, repetition, reflection, and refinement and is linked to flow states of intense concentration and expert performance (Duckworth, 2016b; Miksza & Tan, 2015; Pink, 2009; Von Culin et al., 2014). Students participate in deliberate practice as they explore a means to overcome weaknesses and seek improvements in musical proficiency. Students not only want to improve as individuals, but also as a music ensemble. Students practice as individuals and as a group when they are active participants within a school music performance ensemble. In addition to practice with other ensemble participants, individual members of a music ensemble are expected to take part in individual, deliberate practice so that both the individual and the music performance ensemble can make great musical improvements. This practice plays a significant role in heightening musical proficiency (Miksza & Tan, 2015). It takes many hours of practice to develop skill (Pellegrino & Hilton, 2012), but it is skill combined with myriad hours of gritty musical practice that yields significant musical achievement (Miksza & Tan, 2015).

Grit development is linked to deliberate practice and its stretch goals, concentration, effort, feedback, repetition, reflection, and refinement (Duckworth, 2016b). Deliberate practice is also linked to flow and its inherent deep concentration

and expert performance (Duckworth, 2016b; Miksza & Tan, 2015; Pink, 2009; Von Culin et al., 2014). As students engage in deliberate practice they are continually working towards eliminating weaknesses and improving in proficiency. As students are met with improvements in skill acquisition and refinement, they gain increased confidence and self-esteem. Thus, students who engage in deliberate practice are also working towards enhanced passion and perseverance for long-term goals or grit for academic purposes.

Purpose is manifested when students work towards long-term goal realization in their musical interests. Specifically, students who actively participate in school music performance ensembles experience purpose as they passionately endeavor to work towards long-term goals with persistence and hard work. Music ensemble participation supports purposeful collaboration towards goals and performance outputs. When students actively participate within a school music performance ensemble, they not only pursue musical purpose toward performance goals, but also experience social connectedness (Evans, 2015). Students find purpose in making connections with one another as music performance ensemble environments present opportunities to make friends who are supportive and have similar interests. School music performance ensembles give relational purpose to participants as students experience a sense of belonging amongst a supportive social network of fellow musicians (Hallam, 2010).

Lastly, music is a guiding force that inspires long-term hopes and dreams in the lives of students who actively participate in school music (Campbell et al., 2007). When students participate in music, they face tribulations and impediments along their musical paths towards performance. There are opportunities for both success and failure that are

inherent with music participation and performance, but students who actively participate in school music show inspiration and determination towards uncertain outcomes (Fellows et al., 2019).

Parenting, extracurricular activities, and being part of a gritty culture are three distinct areas in which individuals can grow grit from the outside in. Parenting involves seeking out how to best generate interest, practice, purpose, and hope in individuals. Extracurricular activities are devised to develop interest, practice, purpose, and hope for participants. Gritty cultures produce grittier individuals, as being a member of a culture greatly impacts many aspects of an individual's identity (Duckworth, 2016b).

In examining Duckworth's (2016b) outer determinants of grit and music ensemble participation, extracurricular activities, such as school music performance ensembles, have adults in charge who are demanding and supportive. They engage in parenting as they seek out ways in which they can trigger interest and practice. They also enhance purpose and hope in younger individuals. In doing so, individuals drive grit formation within participants.

A further outer determinant driving grit formation is that extracurricular activities, such as school music performance ensembles, involve practice that is challenging, fun, and intrinsically motivating. The practice required of participants empowers the development of passion and perseverance toward long-term goal satisfaction which is at the core of Duckworth's academic definition of grit (Duckworth et al., 2007).

The final outer determinant in growing grit is culture. School music performance ensembles are subcultures within a school (Adderley et al., 2003). Students who actively participate in the culture of a school music performance ensemble, experience a sense of belonging (Evans, 2015). Being part of a culture involves assimilating to group norms and values. Participation within gritty cultures drives grit formation within individuals (Duckworth, 2016b).

In summation, school music performance ensembles may offer unique participatory experiences that contain elements theorized to underlie grit. The experiences associated with school music ensemble participation are in alignment with Duckworth's (2016b) theoretical argumentation on inner and outer determinants of growing grit. School music performance ensembles may feature active participants displaying interest, practice, purpose, and hope. Furthermore, school music performance ensembles are extracurricular activities that may be led by adults engaging in parenting within gritty cultures. The study found that students who actively participated in a school music performance ensemble exhibited higher levels of self-reported grit than students who did not participate in a school music performance ensemble ($F = 13.03$, $p < .01$) with 9% of overall grit variance attributed to extracurricular activity. The data analysis showed a statistically significant difference in the mean grit score for students who actively participated in school music performance ensembles when compared with non-ensemble students in a school extracurricular activity. Results also showed a statistically significant difference in the mean grit score for students who actively participated in school music performance ensembles when compared with students not involved in a school extracurricular activity. There was not a statistically significant

difference in the mean grit scores when comparing students in another extracurricular activity and no school-based extracurricular activity. Therefore, the study showed that in answer to Research Question 1, students who actively participate in a school music performance ensemble have higher self-reported grit than comparable students who do not actively participate in a school music performance ensemble. However, these results neither imply nor prove causality.

Research Question 2 Discussion Needs Satisfaction and Grit

The study also sought to discover if active participation within a school music performance ensemble generated satisfaction of basic psychological needs of autonomy, competence, and relatedness. In determining to what extent active participation in school music performance ensembles satisfied basic psychological needs of autonomy, competence, and relatedness, empirical data indicated evidence of relationship between self-reported grit and the satisfaction of basic psychological needs. Data from music ensemble students showed statistically significant relationships with autonomy satisfaction ($r = .33$, $p < .01$), competence satisfaction ($r = .28$, $p < .01$), and relatedness satisfaction ($r = .18$, $p < .05$). Grit among music ensemble students also showed a statistically significant relationship with participation in private music lessons taken outside of school ($r = .23$, $p < .01$) but did not display a statistically significant relationship with free and reduced lunch status. A multiple regression analysis revealed that the combination of competence satisfaction, autonomy satisfaction, and private music lesson participation showed about 15% of grit variance for music ensemble students ($R^2 = .15$, $p < .01$). Among predictor variables, autonomy satisfaction had the

lone statistically significant effect on grit ($\beta = .26$, $p < .01$), showing roughly 6% of the variance.

The empirical findings support the theoretical argument that grit is a positive psychological trait that is particularly well-matched to the conditions and experiences of actively participating in a school music performance ensemble. Of importance for research and practice is to understand why and how the music ensemble experience may facilitate beliefs consistent with emotional states of grit. Such understanding derives from theoretical speculation on sources of grit formation. Empirical research has been limited in identifying if the unique experience of actively participating in a school music performance ensemble can galvanize positive personality traits such as grit. Grit formation is speculative in nature as scholars have largely theorized based on other evidence surrounding the nurturing aspects involved in grit formation and sustenance (Duckworth, 2016b; Shechtman et al., 2013).

The social context provided through active participation in school music performance ensembles is attuned to compatibility with needs support and satisfaction and has been theorized to trigger positive psychological traits through a nurturing of student autonomy, competence, and relatedness (Evans et al., 2012). Students who actively participate in school music performance ensembles have numerous opportunities to experience autonomy, competence, and relatedness. Music performance ensemble environments may satisfy student needs of autonomy when young musicians have input into music activities and curricula. Music performance ensemble environments may fulfill student needs for competence by providing optimally challenging opportunities for music students to obtain new musical skills. Furthermore,

music performance ensemble environments may stimulate fulfilling peer relationships that meet students' need for relatedness. In summation, school music performance ensembles may offer participants numerous experiences in which they cultivate inner control, experience moments of effective performance, and form attachments with fellow musicians (Evans et al., 2012).

According to basic psychological needs theory, the activation or constraining of autonomous motivation is dependent upon how individuals experience the social conditions in which they find themselves (Deci & Ryan, 2002). This study advances that basic psychological needs theory rationalizes the linkage between music ensemble participation and grit because the nurturing of autonomy, competence, and relatedness in music performance environments can trigger positive psychological traits (Evans et al., 2012). Grit appears to be a psychological trait that is well-matched for the demanding and engaging experiences inherent with active participation in a school music performance ensemble. The social environments sustained within school music performance ensembles present unique participatory experiences (Evans, 2015; Miksza & Tan, 2015) that encompass elements believed to underlie grit (Duckworth, 2016b). In conclusion, the study showed that in answer to Research Question 2, perceived needs satisfaction related to music ensemble students' self-reported grit. However, these results neither imply nor prove causality.

Relevance for 21st Century Education

Despite empirical research on grit and its influence on achievement and retention in numerous varied topical areas, a large empirical gap remains regarding how individuals and school systems can go about forming grit within students (Shechtman et

al., 2013). This study is presented with the hope that school systems will begin to recognize the power that music education possesses to trigger grit formation through the satisfaction of basic psychological needs of autonomy, competence, and relatedness. When school systems deemphasize music programs, they choose to ignore myriad empirical studies that demonstrate the countless positive cognitive and non-cognitive benefits that students receive through an education that includes music (Adderley et al., 2003; Azizinezhad et al., 2013; Broh, 2002; Campbell et al., 2007; Cole, 2011; Fellows et al., 2019; Hallam, 2005; Hallam, 2010; Hallam & MacDonald, 2013; Johnson & Memmott, 2007; Miksza & Tan, 2015; Phillips, 2010; Schellenberg, 2004; Schlaug, 2001; Schlaug et al., 1995; Zimmerman & LaHav, 2012).

School systems of the 21st century are tasked with equipping students with 21st century skills and competencies required by the modern workforce (Pellegrino & Hilton, 2012; Shechtman et al., 2013) while also operating within an educational era of restrictive budgets, narrowed curriculums, and high-stakes accountability measures (Pellegrino & Hilton, 2012; Perkins-Gough, 2013; Robinson & Aronica, 2015; Ryan & Weinstein, 2009; Shechtman et al., 2013; Shorner-Johnson, 2013). Modern school systems are faced with the challenge of motivating students and enhancing non-cognitive skills while also satisfying system level accountability (Pellegrino & Hilton, 2012; Ryan & Weinstein, 2009; Shechtman et al., 2013). Examining the results from the study, it makes sense to infer that school systems consider using music to grow grit in their students through a satisfaction of students' basic psychological needs of autonomy, competence, and relatedness. In doing so, school systems work towards realizing inherent goals of high achievement and non-cognitive skill development for its students

while also fostering positive accountability results. The diminished autonomous motivation for school and learning evident within the modern high-stakes testing era (Ryan & Weinstein, 2009) will be combated by increased grit and intrinsic motivation triggered by students' active participation in school music performance ensembles.

Limitations and Implications for Future Research

A limitation of cross-sectional research is that findings are unable to prove causality. However, variables are analyzed for interrelationships and can produce robust data-based claims (Hua & David, 2008). Despite lacking causality, cross-sectional research has high replicability which is of great value for future research (Hua & David, 2008). This study examined correlational relationships supported by empirical data that allowed for strong conclusions about active student participation in school music performance ensembles and increased grit, as well as, active participation in school music performance ensembles and the satisfaction of basic psychological needs of autonomy, competence, and relatedness.

The research study involved a cross-sectional analysis of one midsize urban public school district with an established commitment to quality fine and performing arts curriculum and performance ensembles. Despite potential criticism that the scope of the research was limited to one school from one public school district and that the district had an established commitment to quality fine and performing arts curriculum and performance ensembles, the interrelationships explored hold strong external validity as there is a long history and current association of myriad schools offering varied academic, athletic, and artistic extracurricular activities (Broh, 2002). Furthermore,

school systems often have music performance ensembles as part of their curricula at the secondary level (Miksza, 2013).

Comparable demographic data were limited to students and free and reduced lunch status, but this potentially perceived limitation does not have a negative effect on the study's validity as known empirical research has not found specific correlations between free and reduced lunch status and grit. Although data analysis was based upon information taken from self-report surveys, the cross-sectional design of the research study was founded upon accurate and honest reflections from individuals at specific time points. The authenticity of real time data indicates strong internal validity of the data at the time of assessment.

A potential limitation of the study involves the possibility of selection bias. The study showed evidence that students who actively participate in a school music performance ensemble have higher self-reported grit than comparable students who do not actively participate in a school music performance ensemble. It is theorized that this may be due to students' satisfaction of basic psychological needs of autonomy, competence, and relatedness from actively participating within a school music performance ensemble environment. An argument may, however, be articulated that students who choose to actively participate in school music performance ensembles already display higher levels of self-reported grit and are, therefore, drawn to participate in an activity in which grit, in particular, stands out as a psychological trait that is duly suited for the challenging and engaging experiences found within a school music performance ensemble. This scenario could present selection effects because the student samples within the study could have differing levels of self-reported grit before

participating or not participating (Vogt, 2007). Although identical equivalence among student samples would be theoretically impossible (Vogt, 2007), selection bias and selection effects should be explored further in future research.

Another potential limitation of the study involves the directionality of correlational relationships, specifically between grit and autonomy. A multiple regression analysis was performed within the study to observe the relationship between grit as reported by students who actively participated in a school music performance ensemble and basic psychological needs satisfaction. Among predictor variables, autonomy satisfaction had the only statistically significant effect on grit ($\beta = .26$, $p < .01$), explaining about 6% of the variance. Directionality may, however, be considered as to whether autonomy affects grit or grit affects autonomy. There is no way of specifically knowing within this study, but the directionality of correlational relationships is a topic that should be explored further in future research.

Although a cross-sectional analysis of one midsize urban public school district was utilized for this study, it is recommended that future research should expand the scope of the data sample to include differing school demographics. Future studies can include public, private, and charter schools across urban, suburban, and rural areas to be more representative of the multitude of school systems that offer diverse academic, athletic, and artistic extracurricular activities.

This empirical study centered on junior and senior students at one high school site. Subsequent research can expand to additional grade levels at various schools where music ensembles are a part of the school curriculum. It is recommended that in addition

to high school age student samples, middle school and junior high school age student samples should also be included in future studies to enhance the overall generalizability of data regarding the effects of participation in school music performance ensembles on grit formation and needs satisfaction. It is also recommended that elementary schools that offer school music performance ensembles, as well as higher education institutions, should also be considered for future research to better understand the positive effect that active participation in school music performance ensembles has on student grit formation and the satisfaction of basic psychological needs of autonomy, competence, and relatedness. Furthermore, it is recommended that as this study involved a school district with an established commitment to quality fine and performing arts curriculum and performance ensembles, future empirical research should expand to include school systems and educational entities that have wide-ranging levels of program quality and district commitment.

Although the study focused upon distinct samples of students who actively participated in a school music performance ensemble, students who did not participate in a school music performance ensemble but did participate in a school extracurricular activity, and students who did not actively participate in either a school music performance ensemble nor another school extracurricular activity, it is recommended that future empirical investigation should increase the scope of current research and further break down differences in self-reported grit and needs satisfaction between differing music performance ensembles, as well as, other academic, athletic, and artistic extracurricular school activities.

It is strongly recommended that further research studies, especially those of a longitudinal design, should be conducted in the areas of grit formation and basic psychological needs satisfaction within the context of active participation within school music performance ensembles. Studies at every educational level from elementary education through higher education could provide further valuable information on the relationship between grit formation and basic psychological needs satisfaction through active participation within school music performance ensembles across many years.

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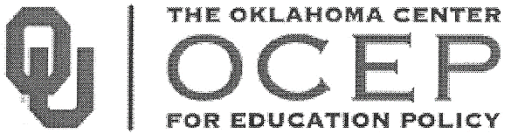
Appendix A

Music Ensemble Student Survey



STUDENT SURVEY

We need your help to better understand your experiences in a music ensemble. Information collected in this survey will help OCEP and [redacted] better understand some of the psychological effects of participation in music ensembles. Completion of the survey is voluntary. You don't have to complete the survey if you do not want to participate. If you decide to help, please complete the survey and return it to the appropriate person. Completion of the survey will take approximately 8 minutes. The survey is anonymous and answers will be treated as confidential. If you choose not to participate, please return the survey blank. We sincerely appreciate your willingness to participate.

Please completely shade in the bubble that is closest to how you feel or what you

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. If a task is hard, I try even harder	①	②	③	④
2. Whenever I do something, I put all my effort into it	①	②	③	④
3. When I have responsibilities for school, I do them	①	②	③	④
4. I keep at my homework until I am done with it	①	②	③	④
5. Once I make a plan, I stick to it	①	②	③	④
6. Once I make a commitment, I keep it	①	②	③	④
7. I am a hard worker	①	②	③	④
8. I keep trying even after I fail	①	②	③	④
9. I keep working at something new even when it's hard	①	②	③	④
10. I get things done that need to be done, even when I don't feel like doing them	①	②	③	④

Please completely shade in the bubble that is closest to how you feel or what you

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I am good at singing or playing my instrument	①	②	③	④
2. I have a sense of pride in my musical abilities	①	②	③	④
3. People tell me I am good at singing or playing my instrument	①	②	③	④
4. I receive feedback on my performance within the music ensemble	①	②	③	④
5. I have made new friends within my music ensemble	①	②	③	④
6. My music ensemble is a fun way to be with friends	①	②	③	④
7. I have friends in my music ensemble with similar musical interests	①	②	③	④
8. I feel a musical connection with the teacher of my music ensemble	①	②	③	④
9. I sing or play my instrument for fun	①	②	③	④
10. My music teacher allows me to have input in the music ensemble	①	②	③	④
11. My music teacher allows me to experiment in my musical interpretation	①	②	③	④
12. My individual musical actions contribute to the music ensemble	①	②	③	④

CONTINUE ON THE BACK PAGE

Please respond to each of the questions below.

1. What school music ensembles do you participate in?

2. How many school years have you participated in a music ensemble at school?

1 Year	2 years	3 Years	4 or more Years
①	②	③	④

3. Do you take music lessons outside of school?

Yes	No
①	②

4. What other arts, athletic, or academic clubs or organizations do you participate in at school?

5. What do you plan to do after high school (you may select more than one)?

2-year college	4-year college	Military	Trade school/Job training	Work	Volunteer/Intern
①	②	③	④	⑤	⑥

6. Do you receive free or reduced price lunch?

Yes	No
①	②

Thank you for your help. Please return this to the appropriate person.

Appendix B

Additional Self-determination Mini Theories

Cognitive evaluation theory discusses the relationship between social contexts and intrinsic motivation. The needs for autonomy and competence are directly attached to intrinsic motivation (Deci & Ryan, 2002). When a person is intrinsically motivated, they tend to find fulfillment and pleasure in the activity (Niemiec & Ryan, 2009). Perceived locus of causality corresponds to autonomy, and as control is perceived to become more externalized, intrinsic motivation decreases. The inverse is also true. Also, as perceived competence increases, intrinsic motivation also increases (Deci & Ryan, 2002).

Organismic integration theory discusses the internalization of regulation. It specifically examines a person's degree of autonomy while participating in activities that are extrinsically motivated (Deci & Ryan, 2002). Organismic integration theory further states that an individual is able to internalize regulations that are originally extrinsically motivated to differing levels of autonomy as evidenced on a continuum of degrees of regulation (Deci & Ryan, 2002).

Causality orientations theory discusses the way individuals orient to the outside world through behavior regulation (Deci & Ryan, 2002). There are three major orientations that show various degrees of self-determination. Autonomy orientation conveys basic inclinations involving intrinsic motivation and integrated extrinsic motivation. Controlled orientation focuses on external and introjected regulation. Impersonal orientation is aligned with amotivation (Deci & Ryan, 2002).

Goal contents theory discusses individuals' life goals and how they relate to wellness via needs satisfaction. Life goals that constitute intrinsic aspirations are in and of themselves rewarding and satisfy basic psychological needs of autonomy, competence, and relatedness. Life goals that constitute extrinsic aspirations are not rewarding in and of themselves and serve as vehicles for seeking alternate forms of satisfaction for otherwise unmet needs (Ryan & Deci, 2017).

Relationship motivation theory discusses that high-quality relationships contain positivity, regard, and autonomy among individuals. This is true between pairs of individuals, as well as, within groups. This finding also holds true regardless of age. Relationship motivation theory further posits that relatedness is also found within high quality relationships and that the presence and fusion of autonomy and relatedness are paramount for relationships to be mutually satisfying (Ryan & Deci, 2017). Furthermore, Ryan and Deci (2017) state that "satisfactions of all three psychological needs within the context of a close relationship promote psychological and relational well-being at both the within-person and between-person levels of analysis" (p. 316).

Appendix C

Skewness and Kurtosis Histograms

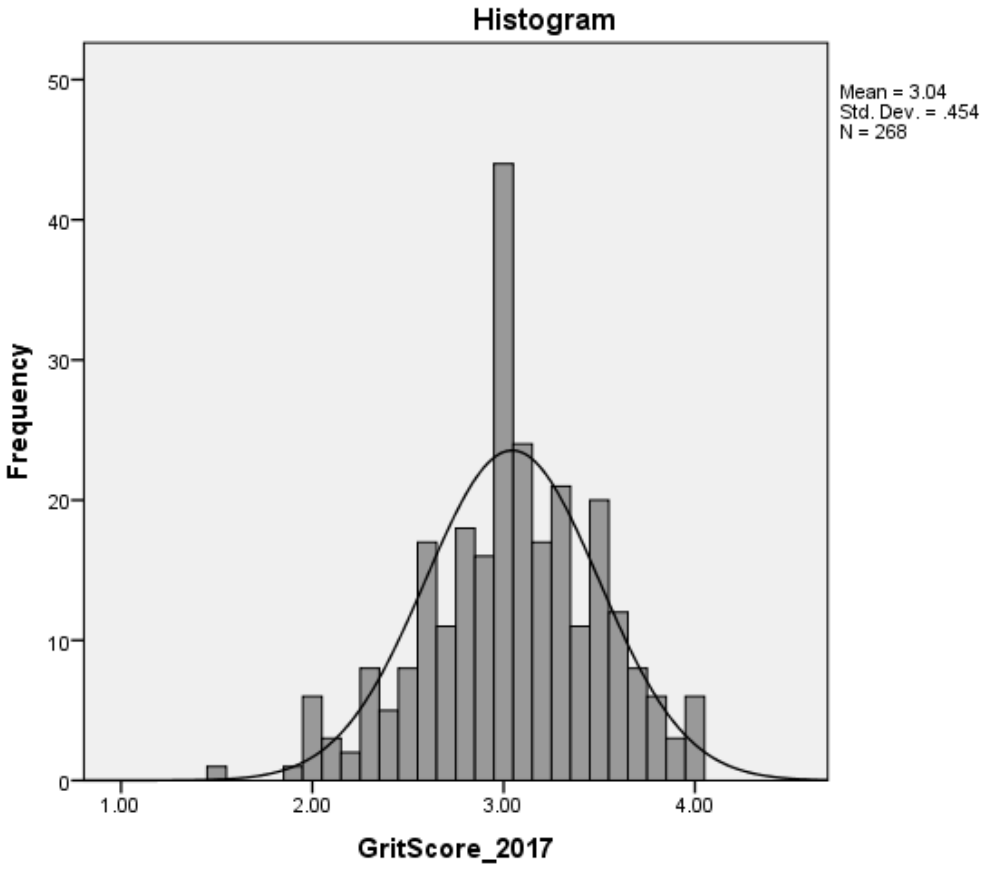


Figure C1. *Combined Grit Score Analysis for Skewness and Kurtosis*

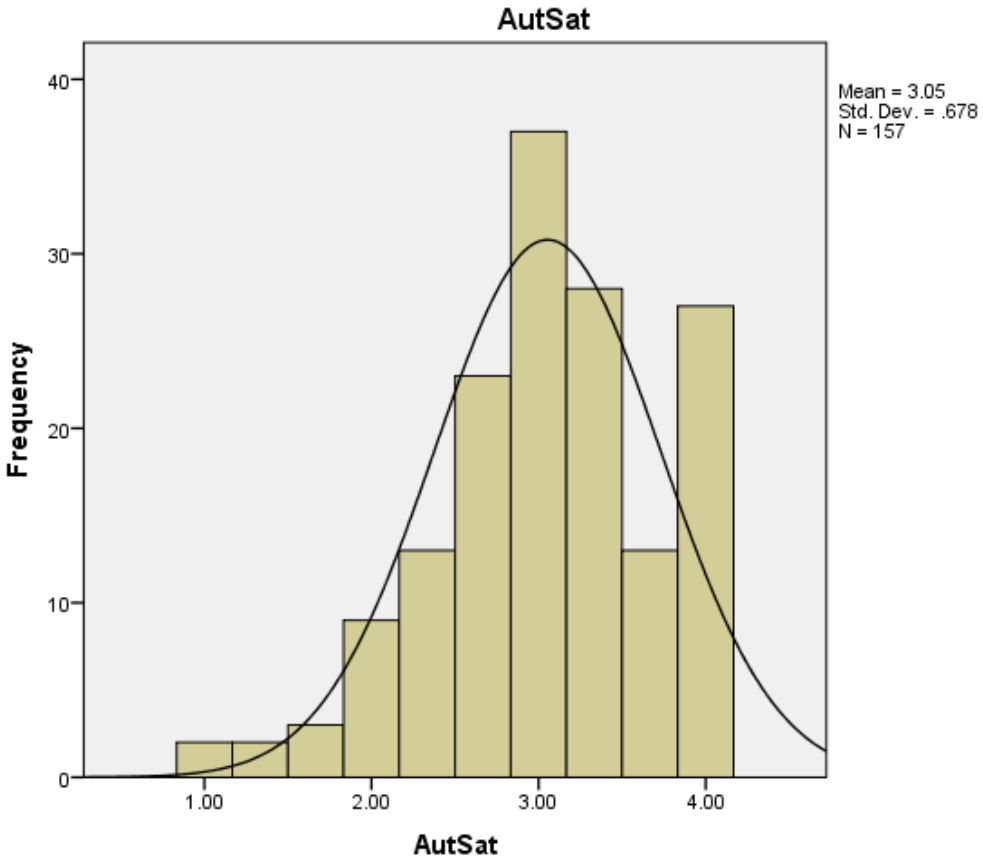


Figure C2. *Autonomy Satisfaction Analysis for Skewness and Kurtosis*

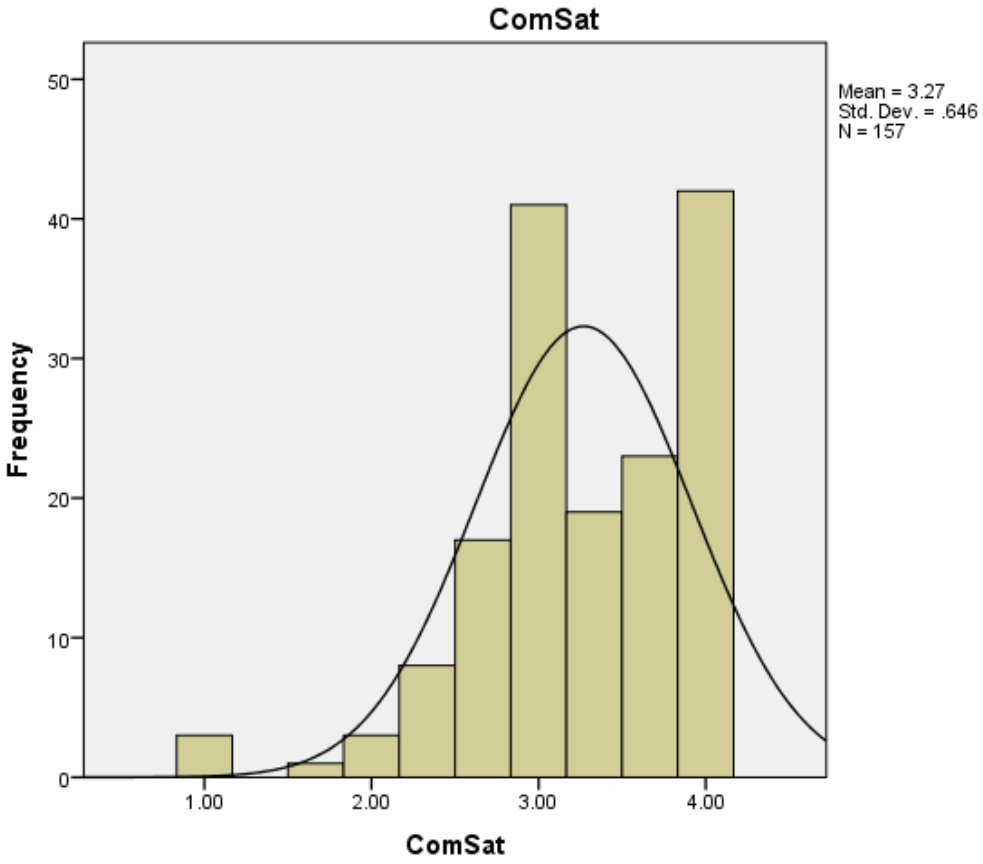


Figure C3. *Competence Satisfaction Analysis for Skewness and Kurtosis*

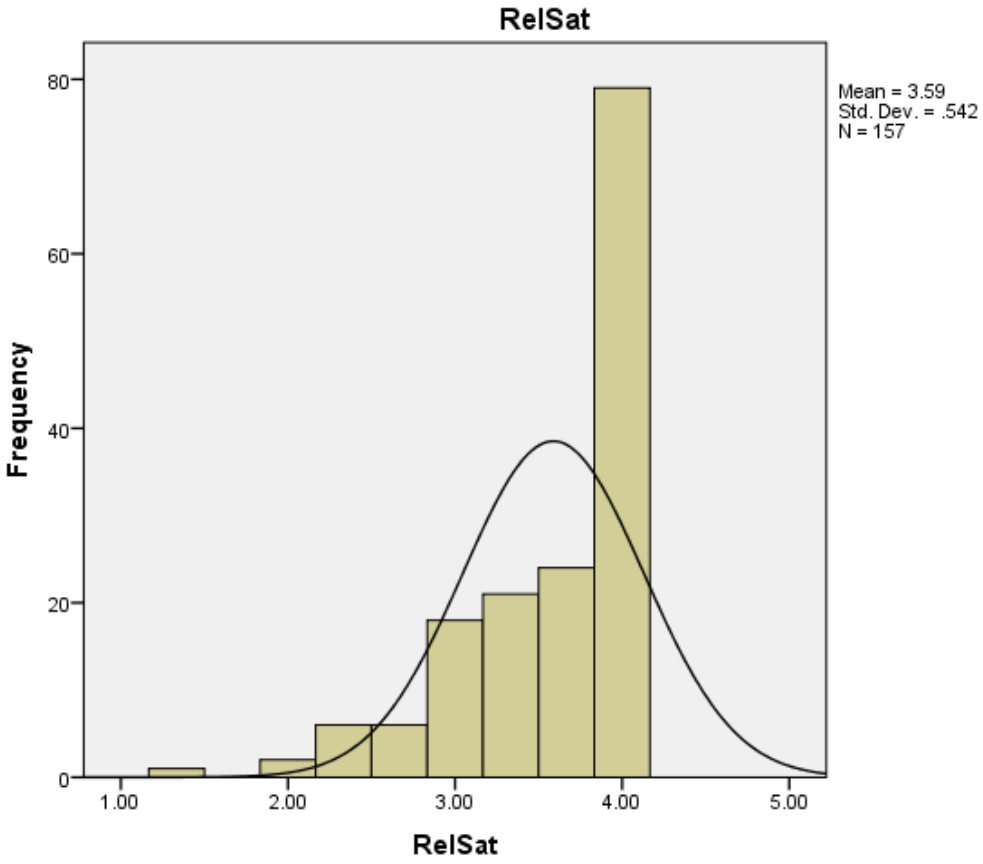


Figure C4. *Relatedness Satisfaction Analysis for Skewness and Kurtosis*

Appendix D

IRB Approval Letter

The UNIVERSITY of OKLAHOMA

Institutional Review Board for the Protection of Human Subjects

Human Research Determination Review Outcome

Date: February 13, 2018

Principal Investigator: Schuyler Ray Adkins

Study Title: Music Performance Ensemble Participation and the Cultivation of Student Grit

Review Date: 02/12/2018

I have reviewed your submission of the Human Research Determination worksheet for the above-referenced study. I have determined this research does not meet the criteria for human subject's research. The proposed activity does not consist of Human Subjects' Research, as defined by DHHS regulations, 45CFR46.102(f). The OU Investigator will not intervene or interact with living individuals or obtain secondary data that consist of individually identifiable, private information. Therefore, IRB approval is not necessary so you may proceed with your project.

If you have questions about this notification or using iRIS, contact the HRPP office at (405) 325-8110 or irb@ou.edu. Thank you.

Cordially,

Fred Beard, Ph.D.
Vice Chair, Institutional Review Board