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Evaluating the Impact of Agriculture Youth Organizations on Grit

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EVALUATING THE IMPACT OF AGRICULTURE YOUTH ORGANIZATIONS ON GRIT

A Master's Thesis

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Master of Science, Agriculture

By

Sarah Elizabeth Bishop

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ABSTRACT

This study examined the relationship between the involvement in high school activities, such as FFA and 4-H, and grit or long-term passion and perseverance. In a quantitative approach, respondents (N=501) completed a survey comprised of the Grit-S Scale to determine their level of grit and a self-reporting section on involvement in high school activities, involvement in FFA, and involvement in 4-H. Correlation analyses were conducted to determine if there was a relationship between individual high school activities, overall high school involvement, involvement in FFA, involvement in 4-H, and an individual's level of grit. Involvement in FFA was found to have a higher positive relationship with grit than any other activity. Independent *t*-Tests were conducted to determine if a difference in grit existed between those who were involved in FFA compared to those who were not, those involved in 4-H and those who were not, those highly involved in FFA or 4-H compared to those who were lowly involved. Regression Analyses were conducted to determine the influence of various high school activities on grit. The first regression and second models found all three of their individual models to be statistically significant. The third regression found two models to be statistically significant while gender was excluded. The fourth regression found all three models to be statistically significant. Recommendations for further research include conducting the same study with a larger sample of respondents involved in 4-H, conducting it on a larger scale, performing a more longitudinal study of how grit changes over time in an individual, or how organizations teach or build grit to find common themes or practices across organizations.

KEYWORDS: agriculture, youth organizations, grit, FFA, 4-H, high school organizations, high school involvement

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INTRODUCTION

A large population of Missouri high school students are involved in organizations such as 4-H and FFA, both of which began with a focus on agriculture education but have since grown into national, multidisciplinary organizations. These organizations have a variety of opportunities that allow members to become involved in activities and projects meant to teach life skills. Many former members of these organizations will go on to achieve collegiate and career success, which they then credit to their time in said organizations. People will often say that these organizations provided opportunities for them to build the character traits that are useful in many facets of their later life. Character is a broad term made up of categories such as social and emotional skill, non-cognitive traits and habits, growth mindset, cognitive and technological skills, soft skills, and grit (Kamenetz, 2015). Grit consists of a person's long-term passion and perseverance (Duckworth & Quinn, 2009). While there are many anecdotal stories about FFA and 4-H's contributions to peoples' success, there is little quantitative evidence to support these assertations. In this study we aim to answer two questions: first, does a relationship exist between involvement in 4-H and FFA and a student's self-assessment of grit? Second, what impact does a higher level of involvement in these organizations have when compared to others who were involved in other organizations?

Rationale for the Study

Grit is the trait-level perseverance and passion for long-term goals that predict achievement in challenging situations above and beyond measures of talent (Duckworth, 2016). Grit is the ability to maintain interest in, and devote effort to, projects that take months or longer

to finish (Duckworth & Quinn, 2009). The current study furthers research into the impact of extracurricular activities on grit, specifically FFA and 4-H. Discovering more about what develops or hinders grit creates a more robust concept of how to change or improve a person's level of grit. It has been shown those with higher levels of involvement experience better academic success, emotional and social outcomes, improved well-being, increased social capital, larger peer networks, personal development, safety/support, and community engagement (Barr, Birmingham, Fornal, Klein, & Piha, 2006). It has also been shown that the effects of intensity "extend well into young adulthood, as many as eight years after high school" (Gardener, Roth, & Brooks-Gunn, 2008, p. 826).

Research Objectives

The research objectives are as follows:

1. Determine if there is a relationship between involvement in FFA and level of grit.
2. Determine if there is a relationship between involvement in 4-H and level of grit.
3. Determine if there is a difference in level of grit between those who were involved in FFA and those who were not.
4. Determine if there is a difference in level of grit between those who were involved in 4-H and those who were not.
5. Determine if there is a difference in level of grit between those who were highly involved in FFA and those who were lowly involved in FFA.
6. Determine if there is a difference in level of grit between those who were highly involved in 4-H and those who were lowly involved in 4-H.

Significance of the Study

The potential value of the current study could enhance the current knowledge about the concept of grit. Identifying what events and activities can impact the way grit is developed allows people to change and develop programs and practices that help further grit. The research also furthers current knowledge into the benefits of high school organizations for their members.

This would potentially enhance the argument of high schools having extracurricular or intracurricular activities for their students to grow and develop skills and knowledge that are not easily found or developed in the classroom alone.

LITERATURE REVIEW

Both FFA and 4-H have the overarching goal of helping members as they provide "path to achievement in premier leadership, personal growth and career success through agricultural education" (National FFA Organization, 2017, p.8) and providing experiences for hands-on learning "in areas like health, science, agriculture and citizenship" (National 4-H Council, 2017b, para. 2). These organizations were both founded with the intent to foster the revitalization and education of agricultural practices at a time when interest was low and communication through other channels was not successful. Since then they have evolved to encompass much more.

Involvement in high school organizations and activities provide participants an opportunity to develop skills outside the classroom. These organizations give their members the chance to develop non-cognitive skills, communications skills, leadership skills, and hands-on skills which can benefit them beyond high school and into the rest of their lives (Barr et al., 2006). These organizations are also one of the few instances where members experience all of the necessary elements to develop initiative; intrinsic motivation, concerted engagement in the environment, and temporal arc or experiences over time, since other activities involve only one or two of the elements (Larson, 2000). Measuring the level of involvement in organizations can be done a variety of ways including Likert-type scales that measure number of hours a week, month, or even year. However, the most recommended method measures the hours involved per week (Bohnert, Fredricks, & Randall, 2010).

Grit, or the perseverance and passion for long-term goals, is found in highly successful individuals (Duckworth & Quinn, 2009). However, these individuals were not just born gritty, they developed it over time with deliberate practice, a mindset that cultivates growth and change,

and the help of the people an individual surrounds themselves with (Duckworth, 2016; Ericsson, Nandagopal, & Roring, 2009; Yeager & Dweck, 2012). While grit itself is a relatively new concept, the key factors that make it up; showing up, deliberate practice, and mindset, are not.

History of FFA

The National FFA Organization, formerly known as the Future Farmers of America, (FFA) began with an attempt to counteract the dying interest of sons to go back into farming by expanding their knowledge of agriculture, helping them develop confidence, and creating a sense of pride about being involved in agriculture (National FFA Organization 2015b; National FFA Organization, 2017). This was at the same time as the passage of the Smith-Hughes National Vocational Education Act in 1917 which aided in the creation of high school courses in vocational agriculture (National FFA Organization, 2017). As time passed, the organization quickly went from a state-wide organization to a national one and grew to include changes and new ideas aimed at keeping up with both the agriculture industry and growing membership. Today the organization's focus is not only on farming, but also includes a wide variety of sectors of the agriculture industry such as business operations, scientific research, engineering, and marketing and communications.

While in FFA, members are given the opportunity to participate in a wide variety of activities, pursue their interests, and develop skills through events at all levels (National FFA Organization, 2017). Members can participate in community development projects, various supervised agricultural experiences (SAEs) and compete in leadership development events (LDEs) and career development events (CDEs) which help develop specific agriculture-related knowledge and skills (National FFA Organization, 2017). Both the leadership and career

development opportunities FFA members have are structured in a way for them to learn valuable skills, whether it be for their future careers, or to help them become more aware and active citizens, community members, and leaders (Connors, 2004). These hands-on learning experiences allow members to practice and develop their skills and interaction styles in order to develop "their potential for premier leadership, personal growth, and career success (National FFA Organization, 2017, p.8)."

All of these activities help members earn different degrees in the FFA. Degrees in FFA are designed to reward active members who develop leadership, occupational, and life skills. The different levels of degrees include the Greenhand FFA Degree, the Chapter FFA Degree, the State FFA Degree, and the American FFA Degree (National FFA Organization, 2015a; National FFA Organization, 2017). The FFA Organization also awards honorary chapter, state, and American degrees to recognize agriculture educators and other community members who have gone above and beyond in service of the FFA at the various levels (National FFA Organization, 2017).

History of 4-H

The predecessor to 4-H began as a way for land-grant universities to disseminate new research and improved agricultural methods to youth in agriculture who were believed to be more receptive to new ideas than their adult counterparts and would be more likely to successfully take the information back to their family farming operation (National 4-H Council, 2017c). Like the FFA, 4-H began at a state level and quickly grew to become a national organization (National 4-H Council, 2017c). Today the structure of the organization is still similar to its origins. The organization is designed for children ages 8-18 but has also developed

a group for children aged 5-7 called clover buds or clover kids depending on the state (National 4-H Council, 2017a). Through involvement in 4-H, members have the opportunity to participate in a variety of programs. Each year members chose project areas they would like to learn more about (University of Missouri 4-H Center for Youth Development, 2017). Members can also participate in events such as local county fairs, state fairs, trap and archery shoots, public speaking and demonstration contests, regional energizers, camps, State 4-H Congress, and National 4-H Congress (University of Missouri 4-H Center for Youth Development, 2017). All of these opportunities are designed for members to gain as much hands-on skill, knowledge, and experience as they desire. This is accomplished through a system of parent and community volunteers and leaders who lead these different activities with the assistance of state 4-H employees (University of Missouri Extension, 2019). 4-H falls under the umbrella of land-grant universities' extension system which employs a variety of specialists across the state covering all of its counties. 4-H Youth Development Specialists in Missouri can be responsible for one or more counties but most handle three to four. It is their job to assist the local clubs with any matters that involve regional or state involvement (University of Missouri Extension, 2019).

As 4-H members grow older, they often become more involved in projects such as public speaking and community service and betterment. They have the opportunity to become involved at the regional and state levels and take on more responsibilities as they become club, regional, or state officers (Seevers & Dormody, 1995). They take on more leadership roles as they mentor younger members, participate in livestock shows, and participate in more complex demonstrations and public speaking events (Seevers & Dormody, 1995). As these members take a more active role in planning, executing, and reviewing leadership activities, it has been shown to help in the development of leadership life skills (Seevers & Dormody, 1995).

Involvement in High School

High school is a time for students to become involved in different organizations and find where their interests lie. What is sometimes not noticed is that this involvement will be setting them up for potential future success. As discussed previously, FFA and 4-H have a wide variety of interest areas for members that allow them to grow their skills, but they are not the only high school organizations to do so. In a study by Kosloski and Ritz (2014) students' involvement in DECA, a marketing-based organization, showed a positive influence on grades the longer they were involved. This could be attributed to the competitive events members can participate in and the variety of leadership opportunities (Kosloski & Ritz, 2014). There are other benefits also. Students involved in extracurricular activities spend more time around adults they view as role models. This can lead to them picking up on the habits of their role models in an attempt to emulate their mentors and make them proud. They also reevaluate the importance of school and broaden their view of what they can accomplish (Barr et al., 2006; Broh, 2002). In fact, Broh (2002) found that activities which promote development and social capital all have structure, adult supervision, and parental involvement as characteristics and those that do not are negatively related to achievement in high school grades and test scores.

These activities are also areas in which students can develop non-cognitive skills. It has been theorized the more organizations a student is involved in, the more likely they are to develop skills and traits to help them succeed in life (Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006). While it is widely accepted that various organizations focus on different topics or fields – and it has been shown that varied involvement does tend to create a more diversely developed student – there is no universally agreed upon cause (Rose-Krasnor et al., 2006). While

there is argument over why people are successful – personality type, multiple organizations that cover a large number of topics, or even the fact that being so busy means one does not have time to get into trouble and develop negative or harmful skills and habits – there is no definitive answer to what is the cause of success. In fact, many would attribute it to a combination of factors which include character traits such as grit (Rose-Krasnor et al., 2006).

When asked what things in high school prepared them most for college, a majority of students in a focus group credited their extracurricular involvement in helping them to develop and be ready for college (Kronholz, 2012). Involvement outside of the classroom has benefits for students across the board, whether they intend to attend college or not. It gives them a chance to learn hands-on skills where they can develop teamwork, problem solving, and communications skills, all of which are important to be successful (Barr et al., 2006). The fact these organizations and activities are linked to school, and therefore attendance, means they encourage students to be in school regularly.

Research by Larson (2000) into the development of initiative, or the ability to be motivated from within to direct attention and effort toward a challenging goal, concluded that these types of activities were the only place that children would experience the three crucial elements in developing initiative: intrinsic motivation, concerted engagement in the environment, and temporal arc or experiences over time (Larson, 2000). This is due to the fact that most aspects of a child's life, such as school or unstructured leisure time, involve some of these elements, but not all three.

Measuring Level of Involvement

While students may have been members of 4-H or FFA, there is a difference between simply being a member and being actively involved in the organizations. Level of involvement, or frequency of participation, has also been referred to as intensity or dosage (Bohnert et al., 2010). When measuring involvement, there are a variety of ways data can be gathered. Options include asking open-ended questions, having participants fill out a time diary, or using Likert-type scales. Researchers can look at number of hours a week, number of times a week, number of times a month, and number of times a year depending on the intent of the study (Bohnert et al., 2010; Harvard Family Research Project, 2004). These Likert-type scales can also range from never or rarely, to every day, almost every day, less than once a week to over 10 times a week, or other segmented hours a week (Gardener et al., 2008; Harvard Family Research Project, 2004; Rose-Krasnor et al., 2006). Various studies have used 4-point, 5-point, and 6-point scales (Tiffany, Exner-Cortens, & Eckenrode, 2012). It has been found that "using an intensity score that reflects the total number of hours per week engaged in either all or specific types of organized activities is the recommended, least flawed technique" (Bohnert et al., 2010, p. 589).

Limitations when studying involvement come from the potential effects of other factors such as duration or breadth of involvement. Other factors that can affect a student's involvement in organizations include socioeconomic status, the inability to distinguish between different reasons for non-participation, the fluctuation of involvement due to seasonality, and simultaneous involvement in multiple organizations (Gardener et al., 2008). One must also consider the fact that some research suggests there is a thing as too much involvement (Bohnert et al., 2010; Harvard Family Research Project, 2004; Rose-Krasnor et al., 2006). Rose-Krasnor et al. (2006) found that increasing the number of activities one is involved in was only beneficial

when involved in up to five or six different types of activities. They concluded that there was no apparent benefit from involvement past that point. The Harvard Family Research Project (2004) found involvement may fit into a more curvilinear model where involvement after a certain level could begin to negatively impact individuals as they could be using some of that time to pursue other beneficial opportunities. This fits with the economic concept of the Law of Diminishing Marginal Utility, which states that as one increases consumption of an item, each additional unit yields less and less marginal utility. Utility is the satisfaction or pleasure one gains from the consumption of goods or services.

Currently, there is little research into the direct effect of involvement in high school extracurricular activities on grit, but it has been shown those with higher levels of involvement experience better academic success, emotional and social outcomes, improved wellbeing, increased social capital, larger peer networks, personal development, safety/support, and community engagement (Gardener et al., 2008; Harvard Family Research Project, 2004; Randall & Bohnert, 2009; Rose-Krasnor et al., 2006; Tiffany et al., 2012). It has also been shown that the effects of involvement "extend well into young adulthood, as many as eight years after high school" (Gardener et al., 2008, p.826).

Grit

Grit is defined as the "trait-level perseverance and passion for long-term goals" (Duckworth & Quinn, 2009, p. 166, para. 2). Grit is the ability to maintain interest in and devote effort to projects that take extended time to finish and is often associated with highly successful individuals, or paragons of grit (Duckworth, 2016; Duckworth & Quinn, 2009). The concepts of passion, perseverance, and high achievers have been the subject of discussions and studies since

the 1800's with the work of both Galton and Darwin (Duckworth, 2016). People often look at highly successful individuals and see people who are born with innate talent that sets them apart from so-called normal people, however, that is not necessarily the case (Duckworth, 2016). It has been shown that while there is a certain level of innate grit, it is possible for an individual to change their level of grit, either increasing or decreasing (Duckworth, 2016; Ericsson et al, 2009). In a situation where two individuals are in identical scenarios, their effort and talent are what will differentiate them (Duckworth, 2016).This is partially due to the active use and practice of a skill, creating a feedback loop, and leading to further accomplishments in the long run (Duckworth, 2016). In fact, Duckworth and Quinn (2009) showed that grit predicted achievement in challenging situations above and beyond measures of talent.

Duckworth, Peterson, Matthers, and Kelly (2007) developed the Grit-O scale, a 12-item survey, which Duckworth and Quinn (2009) later used to create the shorter, 8-item, Grit-S scale. Both of these scales include questions such as "I have been obsessed with a certain idea or project for a short time but later lost interest," "new ideas and projects sometimes distract me from previous ones," "I finish whatever I begin," and "setbacks don't discourage me," among others.

Showing Up and Deliberate Practice. An important part of developing, growing, and maintaining grit is the act of showing up and giving every possible effort, every single time one works at a skill or project. This is in spite of any setbacks or failures one has faced, as well as when there are no immediate or pressing rewards, or no one else is watching (Chambliss, 1989; Duckworth, 2016). It has also been shown as people grow and mature, they figure out their life philosophy, allowing them to learn to recover from those setbacks and disappointments and prioritize goals. This is due in part to the fact that as people mature, they develop the capacity for

long-term passions and perseverance (Duckworth, 2016). There are four stages that most paragons of grit go through: interest, practice, purpose, and hope. These stages are not innate but are learned, developed, and grown (Duckworth, 2016). The beginning of this, interest, begins through play and activity, which over time leads to the gaining and improvement of skills (Duckworth, 2016).

Putting practice in is not enough to improve one's grit, the practice needs to be deliberate and focused on a specific purpose (Chambliss, 1989; Duckworth, 2016; Ericsson et al., 2009; Krampe & Ericsson, 1996). Chambliss (1989) found what sets expert level swimmers apart from others is their approach to each and every practice, in which they spend all of their time working to perfect and improve their skill. Ericsson et al. (2009) found as an individual's level of skill increases, the effort they put in must increase as well if they want to continue to grow. It requires increased levels of engagement and more difficult challenges one must overcome to continue improving one's skill. Experts in various fields from professional swimmers to musicians to chess masters, who are paragons of grit, spend thousands of hours in practice focused on seeking out challenges and improving their weaknesses, always working on improving themselves (Duckworth, 2016). When experts practice, they do so in a more effortful manner, separating themselves from their more casual or amateur counterparts in the techniques, discipline and attitude they exhibit during practice (Chambliss, 1989).

These three areas of difference may only lead to small quantitative differences in performance, however, those in turn lead to the large qualitative differences that really set the experts apart (Chambliss, 1989). These people are participating in what is called deliberate practice, which is designed to improve specific aspects of performance. In these practices the aim is to problem solve, find better practice or performance methods, and actively concentrate on

improvement (Ericsson et al., 2009). It has also been noted that once experts reach a certain level of performance, they do not lose that skill level overnight. The techniques, competitive attitudes, and strategies learned in order to reach an advanced level become habit and it is difficult to recede in skill level even after one no longer participates as often (Chambliss, 1989; Kampe & Ericsson, 1996). Experts also get more enjoyment out of the challenges and practice, whether it is because of positive experiences, the thrill of getting better, or the joy of performing at their best (Duckworth, 2016). Whether the challenges faced are directly related to the task they are involved in, or come from outside factors that impact their life, people who persevere and continue on are not only showing grit but are growing it as well (Broghammer, 2017).

The challenges faced and sacrifices made are also worth it when compared to the benefits that either the individual or others around them receive from their work. Grittier people are heavily motivated to seek a meaningful other-centered life (Duckworth, 2016). How a person sees their work is more important than the job title, and it can become a person's calling. This calling is not always found right away; sometimes it is found over time as a person begins to develop their values or see how their work can connect them to a larger picture (Duckworth, 2016).

Mindset. Grittiness is connected to a person's mindset; do they believe that a person can change or are they stuck in place and unable to do anything about their situation? The belief that a person can change, a growth-mindset, is connected to their level of grit (Duckworth, 2016; Yeager & Dweck, 2012). Students' beliefs about effort, goals, setback attributions, and learning strategies are all shaped by their belief in either a growth or fixed mindset (Yeager & Dweck, 2012). The use of informative sessions on brain development, regular mentoring, and additional study sessions at both the high school and collegiate level have been able to change or improve a

person's mindset, which leads to improvements in academics, achievements, social interactions, decreases in stress levels, and an increase in retention (Yeager & Dweck, 2014). A person's mindset is framed by language. Using phrases and statements that focus on the challenge of a task instead of a person's natural talent encourages grit (Duckworth, 2016).

Unfortunately, while instructors and mentors believe they are promoting a growth mindset, their words and actions may convey two different messages. Consequently, it is important to be aware of this in order to minimize or prevent these mixed signals (Duckworth, 2016). Instead of focusing statements and praise on a child's intelligence, one should instead commend them for the hard work they put forth or how they overcame adversity to achieve a goal (Bashant, 2014). Focusing on the work put forth tends to develop more hardworking and determined children; whereas a focus on intelligence may boost confidence temporarily, it leads to a drop in both confidence and motivation when the child is faced with difficulty (Bashant, 2014). An important part of growing grit is recognizing that people grow as they practice and get better (Duckworth, 2016). This is especially important for adolescents as they are more vulnerable to social adversities and their mindset plays a large role in how they respond to them (Bashant, 2014). While it is possible to modify the adult brain, it is more malleable during childhood and adolescence training (Ericsson et al., 2009; Broghammer, 2017).

Developing Grit. When helping to develop grit in yourself or others, it is important to recognize grit can be developed internally by working on the self, and externally based on the environmental factors that affect people (Duckworth, 2016). It is important for parents to encourage their children to emulate themselves and raise their children in an environment of respect, support, and high standards. Since people are able to reflect on their actions and judge what they admire in others as they age, creating an environment conducive for developing and

witnessing grit while people are young is more beneficial (Duckworth, 2016). Also, beginning to instill these behaviors in children when they are younger helps to further ingrain and create the habits that will continue into adulthood instead of trying to change old habits as an adult (Bashant, 2014). When it comes to teachers helping students develop grit, it is important to find a balance between being demanding – which shows measurable educational gains from year to year – and being supportive and respectful – which improves students' happiness, college aspirations, and likelihood to volunteer in classes (Duckworth, 2016). Ways to encourage and develop grit involve starting with smaller problems to help build confidence in children, talking about the importance of persistence and attitude, turning the situation into a puzzle or game, sharing the importance of the problem, having them work together in groups, and rewarding delayed gratification and hard work (Bashant, 2014).

If an individual wants to grow grit, it is important they not only work on it themselves, but also surround themselves in a culture that encourages grit (Bashant, 2014; Duckworth, 2016). It is important to recognize each group or geographic region will have a different approach or method to promote grit and each of these unique ideologies is as important and valid as the others (Bashant, 2014).The drive for an individual to fit into a group makes it easier to develop grit if grit is a key part of the group since people seek to conform, even without conscious effort (Duckworth, 2016). The level of support that comes from being in a group that places a high level of importance on grit are important because they seek out challenges to improve, can create and assist in the development of the passion and perseverance (Duckworth, 2016).

When it comes to the benefits of grit, they are wide and varied. When engaged in extracurricular activities, children are able to experience challenges while still having fun and enjoying the activity, the combination of which cannot be found in other activities (Duckworth,

2016). It has been shown that children who are involved in activities that promote grit do better academically, have more self-confidence, and are less likely to get in to trouble (Duckworth, 2016). Those that are involved for over one year are more likely to graduate college, volunteer as a young adult, have a job, and earn more money (Duckworth, 2016). If they are involved in at least two different extracurricular activities for multiple years, during which they advance significantly, they will be more likely to follow through in various tasks than those who were not (Duckworth, 2016; Gardener et al., 2008).

Grit and FFA. A mixed methods doctoral dissertation studied all of the participants/teams/coaches at North Carolina State FFA contests to see if motivational factors, including grit, could predict how well they would perform (Curry, 2017). The study was also conducted with three national contests at the FFA National Convention. Contests were separated into three categories; individual leadership-based, team leadership-based, and team content-based contests. Contest participants and coaches both completed surveys, while coaches also participated in semi-structured interviews and underwent non-participant descriptive observation (Curry, 2017).

It was found contestants in individual leadership-based contests had a higher level of grit than those in team leadership-based contests or team content-based contests. Coaches' motivation was more strongly correlated to team performance than competitors' motivation. When looking at factors besides goal orientation, team placings were only predicted by the coaches' interest in the contest. For participants, some of the motivational factors, including grit, were able to predict their individual and team placement.

Concerns

It is important to note experts and high achievers often have access to, or live in, a place that makes it easier to access resources to further improve their various skills, whether it be in terms of geographical location, ability to finance involvement in their given field, or even natural ability or physiology that help their performance (Chambliss, 1989). Some researchers are concerned with the amount of overlap between the concept of grit and other personality and character concepts which they worry may mean grit is not distinct enough to be considered a unique and separate concept (Muenks, Wigfield, Yang, & O'Neal, 2017). Unlike other constructs, grit focuses more on being goal or action-oriented and includes long-term behaviors, whereas individual interest is more of a predisposition to continue involvement in a given topic or area (Muenks et al., 2017). In addition, since grit is made up of two key factors, passion and perseverance, there is debate over these factors and if they are separated enough they should be treated as two different constructs or if they are simply two parts to one whole. However, the work of Duckworth and her colleagues in proving that grit is a single construct has been supported by the use of different testing methods from other researchers (Muenks et al., 2017).

While Duckworth created two different surveys to measure grit, the Grit-O Scale (Duckworth et al., 2007) and the Grit-S Scale (Duckworth & Quinn, 2009), the Grit-S Scale is more widely used given the shorter amount of time it takes a participant to complete since it only has eight items compared to the Grit-O Scale's 12 (Muenks et al., 2017). In Duckworth's Grit-S Score survey there are no items that directly involve long-term goals, which some find issue with given that grit is passion and perseverance over an extended period of time (Muenks et al., 2017).

METHODS

Research Design and Procedures

This study was conducted using quantitative methods, including a survey with Likert-type scales. The survey was administered to first year Missouri State University students to determine their involvement in 4-H and FFA, other high school organizations, and their grit level using the Grit-S scale (Duckworth & Quinn, 2009). Given that this study aims to analyze the relationship between grit and involvement in 4-H and FFA, first-year students would potentially have the most recent experience in either organization and be able to give a more accurate picture of their level of involvement. Their recent high school graduation would also mean their grit score would be less likely to be affected by college organizations and experiences.

Institutional Review Board

This project has been reviewed and approved by the MSU Human Subjects Review Committee. The committee believes the research procedures adequately safeguarded the subject's privacy, welfare, civil liberties, and rights. All procedures were approved by the Protection of Human Subjects Institutional Review Board at Missouri State University on December 4, 2018, see Appendix A. All data was kept on the Missouri State Campus in a secured office for the duration of the study.

Protocol

Missouri State University had 3,010 first-year college students in 2018. The goal was to have a 10% response rate or 301 responses. In the end there were 501 responses exceeding the

desired goal. This response rate also surpassed the 341 responses needed to achieve a 95% confidence level for the population of 3,010. In the state of Missouri in 2018 there were 233,080 high school students (Missouri State High School Activities Association, n.d.) and 27,395 Missouri FFA members (Missouri FFA Association, n.d.). This is 11.8% of the statewide high school students involved in FFA. The number of high school aged members involved in 4-H was not able to be found. There were 53 participants who were involved in FFA or 4-H out of the 485 participants who reported their involvement, or lack thereof, in the given organizations. This is 10.9% of study participants.

Instrumentation and Collection

The survey, see Appendix B., was administered to first-year Missouri State University students using the Qualtrics program. The survey was sent out through an email list to each first-year student. The email list was acquired from the University upon proof of IRB approval. The initial email was followed up by a second email six days after the first was sent out. In addition, an email was sent out to first year students in the College of Agriculture seven days after the second email, in an attempt to get more participants who were involved in FFA or 4-H. To ensure no bias was introduced when reaching out to the College of Agriculture students, data was analyzed before the email was sent out and the percentage of respondents involved in FFA or 4-H after sending the email out was not significantly different than before the more targeted email. Once an adequate number of responses had been collected, the data was downloaded and imported into Statistical Package for Social Sciences (SPSS) for analysis.

The survey was created in Qualtrics and nested based on user response to specific organization involvement, meaning respondents only saw pages relevant to their previous

answers. Those indicating they were involved in FFA only saw pages one, two, three, five, and six of the survey. Those involved in 4-H saw pages one, two, four, five, and six of the survey. Those involved in both FFA and 4-H saw pages one, two, three, four, five, and six of the survey. Those who were not involved in either FFA or 4-H only saw pages one, two, five, and six of the survey.

Research Hypothesis

The purpose of this study was to determine if a correlation existed between involvement in FFA or 4-H and level of grit. In addition, the study was to determine if there was a difference in level of grit between those who were involved in FFA or 4-H compared to those who were involved in other high school organizations. Previous research has found a positive relationship between involvement in activities and level of grit (Bashant, 2014; Broh, 2002; Duckworth, 2016). In this case a participant's grit would be positively impacted by their involvement in FFA, 4-H, or other high school activities. As a result, it was hypothesized that involvement in FFA or 4-H would have a positive relationship with level of grit. Also, it was hypothesized level of grit would be larger for those involved in FFA or 4-H compared to those involved in other high school activities. These were assessed using correlation analysis and independent *t*-tests. It was further hypothesized there is a difference between the grit score of those who were highly involved in FFA or 4-H compared to those who were lowly involved. This was assessed using independent *t*-tests.

Data Scoring

To begin analysis, the Grit Score had to be calculated. Questions from the Grit-S Scale were scored using the following guide from Duckworth & Quinn (2009). For questions 2, 4, 6, and 8 the following point values were assigned: 5 = Very much like me, 4 = Mostly like me, 3 = Somewhat like me, 2 = Not much like me, and 1 = Not like me at all. For questions 1, 3, 5, and 7 the following point values were assigned: 1 = Very much like me, 2 = Mostly like me, 3 = Somewhat like me, 4 = Not much like me, and 5 = Not like me at all. Participants' answers were assigned the corresponding points, totaled, and then averaged to find their grit score. The maximum score on this scale is 5, extremely gritty, and the lowest score on this scale is 1, not at all gritty (Duckworth & Quinn, 2009).

The questions regarding involvement in FFA, 4-H, or other high school activities used Likert-type scales to measure the number of hours per week students participated in a variety of categories. These categories were crafted in an effort to get participants to analyze their involvement a little deeper in order to get a more accurate answer. The number of hours were totaled and then compared to participant grit scores to see if any relationship between level of involvement and grit existed.

Comparisons were made using Pearson object-moment correlations, independent sample *t*-Tests, and ANOVA regressions. All of these were conducted using the SPSS program. Correlations were run between Grit Score and total FFA involvement, total 4-H involvement, overall high school activity involvement, and each of the individual high school activity categories.

In order to analyze the difference between those highly involved compared to those lowly involved in FFA or 4-H, first highly involved and lowly involved had to be defined. Two

methods were used for analysis in this case. One, referred to as Method-T1, looked at the participant's total point value for involvement and categorized them into low, moderate, and high involvement. These categories were evenly split based on the range of point values from the minimum possible score to the maximum possible score. For FFA, lowly involved was 7-17 points, moderately involved was 18-29 points, and highly involved was 30-40 points. For 4-H, lowly involved was 7-18 points, moderately involved was 19-29, and highly involved was 30-42 points. The other method, referred to as Method-T2, looked at the hours per week spent in each individual category for FFA or 4-H and determined if they were highly involved or lowly involved based on the given criteria. These criteria were defined as a participant was highly involved if they had at least two categories with the point values of 4, 5, or 6 or if they had at least three categories with a value of 3. These values were decided because a 3 value meant the participant spent one to three hours per week on an activity, a 4 meant they spent four to seven hours per week on an activity, a 5 meant they spent eight to ten hours per week on an activity, and 6 meant that they spent ten hours or more per week involved in a specific activity. So, a participant who reported three or more activities at a level of 3 spent at least three to nine hours per week involved in the organization, and those that reported two or more activities at a level 4 or higher would spend at least 8-20 hours a week total in the organization. Table 1 contains a description of all variables in this study including the minimum point value, maximum point value, mean, and standard deviation.

Table 1. Description of Variables

Variable	Description	Min. Value	Max. Value	Mean	Std. Dev.
HS_Total	Score Variable created by summing the scores of the individual high school activities	8.00	38.00	17.006	5.285
Publications	Individual high school activity category	1	6	1.66	1.348
Fine Arts	Individual high school activity category	1	6	3.11	2.076
Sports	Individual high school activity category	1	6	3.42	2.129
Honors Societies	Individual high school activity category	1	6	1.98	1.244
Student Government	Individual high school activity category	1	6	1.54	1.170
Vocational Clubs	Individual high school category	1	6	1.82	1.380
Service Clubs	Individual high school category	1	6	1.59	1.089
Hobby Clubs	Individual high school category	1	6	1.88	1.204
FFA_Total	Score variable created by summing the scores of FFA1-FFA7	7.00	36.00	19.725	8.797
FFA1	Agriculture Class – individual FFA activity	1	6	3.85	1.460
FFA2	Chapter Meetings – individual FFA activity	1	6	2.65	1.231
FFA3	CDE/LDE – individual FFA activity	1	6	2.90	1.865
FFA4	SAE – individual FFA activity	1	6	3.05	2.025
FFA5	Chapter Activities – individual FFA activity	1	6	2.95	1.600
FFA6	Other activities – individual FFA activity	1	6	2.45	1.431
FFA7	Highest FFA Degree earned – individual FFA activity	1	3	1.88	0.757
F4H_Total	Score variable created by summing the scores of F4H1-F4H7	7.0	29.00	20.000	6.351
F4H1	Club Meetings – individual 4-H activity	1	6	2.92	1.320
F4H2	Project Meetings – individual 4-H activity	1	5	2.69	1.251
F4H3	Projects – individual 4-H activity	1	6	3.23	1.301
F4H4	Community Service – individual 4-H activity	1	6	3.31	1.653
F4H5	Demonstrations/Speeches – individual 4-H activity	1	6	2.54	1.561
F4H6	County Activities – individual 4-H activity	1	4	2.69	1.251
F4H7	Other Activities – individual 4-H activity	1	6	2.62	1.387
Grit Score	Score variable created by averaging the scores of G1-G8	1.50	5.00	3.464	0.603
G1	New projects distract me	1	5	2.82	1.022
G2	Setbacks don’t discourage me	1	5	3.21	1.068
G3	I become obsessed with something but later loose interest	1	5	2.83	1.153
G4	I am a hard worker	1	5	4.37	0.77
G5	I set goals but later change them	1	5	3.15	1.072
G6	I finish what I begin	1	5	3.81	0.953
G7	It is difficult to finish projects that take a long time to complete	1	5	3.28	1.181
G8	I am a conscientious worker	1	5	4.26	0.834

RESULTS

Demographic Profile of Participants

When looking at demographic data it was found that 2.6% of participants were 17 or younger, 44.5% were 18, 40.1% were 19, 3.2% were 20, 1.0% were 21, and 2.0% were 22 or older. Of the participants 31.1% were male, 63.7% were female, and 0.6% chose not to identify. Of participants 4.4% identified as Hispanic or Latino while 91.0% did not. Of participants 0.6% identified as American Indian or Alaskan Native, 2.6% as Asian, 3.0% as Black or African American, 0.2% as Native Hawaiian or Pacific Islander, 81.2% as White, 1.0% as other, and 0.8% chose not to identify. Census data from Missouri shows there are 50.9% females, 49.1% male, while 83.1% white, 11.8% Black or African American, 0.6% American Indian or Alaskan Native, 2.1% Asian, 0.1% Native Hawaiian or Pacific Islander, 2.3% other, 4.2% Hispanic or Latino, and 79.5% not Hispanic or Latino (United States Census Bureau, 2018). Table 2 shows age demographics, while Table 3 gender demographics, Table 4 shows ethnicity demographics, and Table 5 shows race demographics. The tables compare the study sample to the Missouri Census data where available.

Of the 485 participants who reported on their involvement in FFA and 4-H, or lack thereof, 53 were involved in either FFA or 4-H, which is 10.9% of the sample population. This percentage is slightly less than the 11.8% of high school students across the state of Missouri who are involved in FFA. The percentage for the state was calculated using the 2018-2019 high school populations reported by the Missouri State High School Activities Association (n.d.) and the Missouri FFA Association's report of 2018 members (Missouri FFA Association, n.d.). The number of high school age students involved in 4-H was unable to be found. Table 6 shows the

breakdown of respondents' involvement in FFA and 4-H. Table 7 holds the minimum and maximum scores for Grit Score, total FFA involvement, total 4-H involvement, and total high school involvement as well as their means and standard deviations.

Table 2. Age Demographics

Age	Study Sample
17 or younger	2.6
18	44.5
19	40.1
20	3.2
21	1.0
22 or older	2.0

Table 3. Gender Demographics

Gender	Missouri Data	Study Sample
Male	49.1	31.1
Female	50.9	63.7
Choose not to identify		0.6

Table 4. Ethnicity Demographics

Ethnicity	Missouri Data	Study Sample
Hispanic or Latino	4.2	4.4
Not Hispanic or Latino	79.5	91.0

Table 5. Race Demographics

Race	Missouri Data	Study Sample
American Indian or Alaskan Native	0.6	0.6
Asian	2.1	2.6
Black or African American	11.8	3.0
Native Hawaiian or Pacific Islander	0.1	0.2
White	83.1	81.2
Other	2.3	1.0
Chose not to identify		0.8

Table 6. Involvement in FFA and 4-H

	Frequency	Percent
FFA	38	7.6
4-H	8	1.6
FFA and 4-H	7	1.4
Neither	432	86.2
No Response	16	3.2

Table 7. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Grit Score	501	1.50	5	3.4643	0.60348
FFA_Total	40	7.00	36.00	19.7250	8.79682
F4H_Total	13	7.00	29.00	20.000	6.35085
HS_Total	501	8.00	38.00	17.0060	5.28526

Frequencies

The frequency of participants who identified with the various levels of involvement in high school activities are as follows for individual high school activity categories (Table 8) FFA involvement categories (Tables 9 and 10) and 4-H involvement categories (Table 11).

Table 8. Percentage of Participants Involved in High School Activities

Activity	Less than 1 hour a week	1-3 hours a week	4-7 hours a week	8-10 hours a week	More than 10 hours a week	Cumulative Total
Publications (ex. Journalism, Yearbook, News, etc.)	4.0	5.6	7.2	3.4	3.2	23.4
Performing Arts (ex. Band, choir, orchestra, theater, speech/debate, etc.)	4.0	8.0	12.2	10.6	22.4	57.2
Sports (individual and team)	2.4	5.6	12.6	13.4	27.3	61.3
Honor Societies (ex. National Honor Society, Music Honor Society, Math Honor Society, etc.)	17.2	21.0	6.0	2.6	2.2	49.0
Student Government	4.4	8.6	5.0	1.4	2.4	21.8
Vocational/Professional Clubs (ex. DECA, FBLA, FCCLA, SkillsUSA, etc.)	10.4	11.4	5.0	3.6	4.0	34.4
Service Clubs (ex. Lion's Club, Red Cross, Key Club, etc.)	8.0	14.0	3.2	1.6	1.4	28.2
Hobby Clubs (ex. Book club, art club, movie club, Spanish club, etc.)	13.2	20.4	6.6	1.2	2.0	43.4

Table 9. Level of FFA Degree Earned

Degree	Percentage of FFA participants
Greenhand Degree	35.0
Chapter FFA Degree	42.5
State FFA Degree	22.5
American Degree	0.0

Table 10. Percentage of Participation in FFA

Activity	No Involvement	Less than 1 hour a week	1-3 hours a week	4-7 hours a week	8-10 hours a week	More than 10 hours a week
Agriculture Class	12.5	2.5	17.5	35.0	20.0	12.5
Chapter FFA Meetings	17.5	30.0	35.0	7.5	7.5	2.5
CDEs/LDEs (contests)	42.5	2.5	12.5	17.5	15.0	10.0
SAE (Supervised Agriculture Experience)	37.5	12.5	7.5	15.0	5.0	22.5
Chapter Activities	25.0	15.0	30.0	7.5	15.0	7.5
Other Activities	35.0	20.0	25.0	7.5	10.0	2.5

Correlation Analysis

Before conducting any Pearson's product-moment correlation, the data was checked to ensure it met all necessary assumptions. Normality was assessed by looking at graphs in SPSS: grit was normally distributed, involvement in FFA was kurtotic, involvement in 4-H was skewed slightly negative, and high school involvement was skewed slightly positive. The relationship between Grit Score and all three activities were found to have a linear relationship based on scatter plot graphs. The assumption of homoscedasticity was found to be met when looking at

Table 11. Percentage of Participation in 4-H

Activity	No Involvement	Less than 1 hour a week	1-3 hours a week	4-7 hours a week	8-10 hours a week	More than 10 hours a week
Club Meetings	7.7	38.5	23.1	23.1	0.0	7.7
Project Meetings	15.4	30.8	38.5	0.0	15.4	0.0
Projects	15.4	0.0	46.2	30.8	0.0	7.7
Community Service	23.1	7.7	15.4	30.8	15.4	7.7
Demonstrations/Speeches	30.8	23.1	30.8	0.0	7.7	7.7
County Level Activities or Higher	23.1	23.1	15.4	38.5	0.0	0.0
Other Activities	23.1	23.1	38.5	7.7	0.0	7.7

scatter plot graphs as well. There was one outlier in participants who were not involved in FFA or 4-H but the other was found to not have an effect on data analysis results. Table 12 shows there was a positive correlation between Grit Score and involvement in FFA $r= 0.552$, $p<0.001$, Grit Score and involvement in 4-H $r=0.269$, $p=0.374$, and Grit Score and involvement in high school organizations $r= 0.214$, $p< 0.001$. It must be noted that the sample size of people involved in 4-H was 13 so results should be considered with reservation as the results could be much different with a larger sample population. Given this information research questions one and two can be answered.

Table 12. Correlation to Grit Score

	Pearson Correlation	Significance (2-tailed)	N
FFA Involvement	0.552	0.000	40
4-H Involvement	0.269	0.374	13
High School Involvement	0.214	0.000	501

A Pearson's product-moment correlation was also performed to assess the relationship of each individual high school activity category and level of grit (Table 13). Of the activities, all but two were found to be positively correlated with Grit Score and had statistical significance. Involvement in publications was found to be positively correlated with Grit Score $r = 0.089$, $p < 0.05$, involvement in performing arts was found to be negatively correlated to Grit Score $r = -0.014$, $p = 0.749$, involvement in sports was found to be positively correlated with Grit Score $r = 0.239$, $p < 0.001$, involvement in honor societies was found to be positively correlated to Grit Score $r = 0.140$, $p < 0.05$, involvement in student government was found to be positively correlated to Grit Score $r = 0.102$, $p < 0.05$, involvement in vocational/professional clubs was found to be positively correlated with Grit Score $r = 0.116$, $p < 0.05$, involvement in service clubs was found to be positively correlated with Grit Score $r = 0.098$, $p < 0.05$, and involvement in hobby clubs was found to be negatively correlated with Grit Score $r = -0.024$, $p = 0.593$.

Independent *t*-Tests

An independent samples *t*-Test was analyzed to determine if there was a difference in Grit Score between those involved in FFA and those who were not. The results are presented in Table 14. There was homogeneity of variance, as assessed by Levene's test for equality of variances ($p = 0.548$). Grit scores were higher for those involved in FFA ($M = 3.6278$, $SD = 0.57806$) than those not involved in FFA ($M = 3.4476$, $SD = 0.60087$). This was indicated by the slightly significant difference between the groups, $t(475) = 1.921$, $p = 0.055$.

Table 13. Correlation between Activities and Grit

Activity	Pearson Correlation	Significance	Number of Participants (out of 501)
Publications (ex. Journalism, Yearbook, News, etc.)	0.089	0.046	117
Performing Arts (ex. Band, choir, orchestra, theater, speech/debate, etc.)	-0.014	0.749	286
Sports (individual and team)	0.239	0.000	307
Honor Societies (ex. National Honor Society, Music Honor Society, Math Honor Society, etc.)	0.140	0.002	245
Student Government	0.102	0.022	109
Vocational/Professional Clubs (ex. DECA, FBLA, FCCLA, SkillsUSA, etc.)	0.116	0.009	172
Service Clubs (ex. Lion's Club, Red Cross, Key Club, etc.)	0.098	0.029	141
Hobby Clubs (ex. Book club, art club, movie club, Spanish club, etc.)	-0.024	0.593	217

An independent samples *t*-Test was analyzed to determine if there were differences in Grit Score between those involved in 4-H and those who were not. The results are presented in Table 14. There was homogeneity of variances, as assessed by Levene's test for equality of variances (p=0.176). The grit score was higher for those involved in 4-H (M=3.700, SD=0.54854) than those who were not (M=3.4476, SD=0.60087). This was a small and insignificant difference between the groups, $t(475)$=1.603, p=0.110. Given this information research questions three and four can be answered.

Independent *t*-Tests were also run to see if there was a difference in Grit Score for those who were highly involved in FFA or 4-H compared to those who were lowly involved. Two

Table 14. Independent Samples t-Test – FFA and 4-H to High School Activities

	Levene's Test for Equity of Variances		t-Test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Involvement in FFA	0.361	0.548	1.921	475	0.055	0.18015	0.09380	-0.00416	0.36446
Involvement in 4-H	0.176	0.675	1.603	445	0.110	0.25237	0.15740	-0.05697	0.56171

Table 15. Level of Involvement Distribution

	Lowly Involved	Moderately Involved	Highly Involved
Method-T1 FFA	18	19	8
Method-T1 4-H	4	9	0
Method-T2 FFA	6	16	23
Method-T2 4-H	1	2	10

methods were used for analysis in this case: Method-T1and Method-T2. Using Method-T1 for 4-H ended up having no participants highly involved as shown in Table 15. Therefore, instead of comparing lowly involved to highly involved, lowly involved was compared to those moderately involved as shown in Table 16.

The results showed there was no statistical significance for all but Method-T1 FFA, which was not surprising once the data had been collected and the small sample sizes for those involved in FFA and 4-H at the various level were found. Given this, it was determined that research questions five and six could not be answered with any degree of confidence.

Table 16. Independent Samples t-Test – Highly to Lowly Involved

	Levene's Test for Equity of Variances		t-Test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Method-T1 FFA	0.742	0.398	-3.903	24	0.001	0.86458	0.22153	-1.32180	-0.40736
Method-T1 4-H	2.965	0.113	0.130	11	0.899	0.04514	0.34766	-0.72006	0.81034
Method-T2 FFA	1.191	0.285	-1.533	27	0.137	-0.39946	0.26058	-0.93413	0.13522
Method-T2 4-H			-0.790	9	0.450	-0.5000	0.63328	-1.93258	0.93258

Regression Analysis

Multiple stepwise regressions were conducted to determine the influence on grit, the dependent variable, from various activity involvement breakdowns. In the first regression, predictor variables were high school total involvement, involvement in FFA or 4-H as a binary variable, and gender with Grit Score as the dependent variable as shown in Table 17. This regression had three models; Model One where grit score $=\alpha+\beta_1$ high school total, Model Two where grit score $=\alpha+\beta_1$ β_2 involvement in FFA or 4-H, and Model Three where grit score $=\alpha+\beta_1$ β_2+ β_3 gender. All findings were found to be statistically significant $p< 0.05$. In Model One a one-unit change in high school involvement resulted in a 0.025 change in Grit Score. In Model Two a one-unit change in high school total results in a 0.024 change in Grit Score and a one-unit change in involvement results in a 0.207 change in Grit Score. In Model Three a one-unit change

Table 17. Model Summary 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.218[a]	0.047	0.045	0.59017
2	0.241[b]	0.058	0.054	0.58749
3	0.259[c]	0.067	0.061	0.58529

Table 18. Coefficients[a] 1

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model One	(Constant)	3.046	0.092		33.086	0.000
	HS_Total	0.025	0.005	0.218	4.856	0.000
Model Two	(Constant)	3.040	0.092		33.159	0.000
	HS_Total	0.024	0.005	0.210	4.695	0.000
	Involve	0.207	0.090	0.103	2.309	0.021
Model Three	(Constant)	2.977	0.096		31.019	0.000
	HS_Total	0.023	0.005	0.200	4.453	0.000
	Involve	0.215	0.089	0.107	2.404	0.017
	Female	0.123	0.058	0.096	2.134	0.033

in high school total results in a 0.023 change in Grit Score, a one-unit change in involvement results in a 0.215 change in Grit Score and being female results in a 0.123 higher Grit Score. Full results are shown in Table 18.

The second regression had the predictor variables of the individual high school activities, involvement in FFA or 4-H as a binary, and gender, with Grit Score as the dependent variable. Results are presented in Table 19. This regression had three models; Model One where grit score $=\alpha+\beta_1$ sports, Model Two where t score $=\alpha+\beta_1+\beta_2$ gender, and Model Three where t score $=\alpha+\beta_1+\beta_2+\beta_3$ vocational clubs. All findings were found to be statistically significant $p< 0.01$. In Model One a one-unit change in involvement in sports resulted in a 0.071 change in Grit Score. In Model Two, a one-unit change in sports resulted in a 0.073 change in Grit Score and being

Table 19. Model Summary 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.251[a]	0.063	0.061	0.58535
2	0.280[b]	0.078	0.074	0.58117
3	0.302[c]	0.091	0.085	0.57770

female resulted in a 0.159 higher Grit Score. In Model Three a one-unit change in sports resulted in a 0.071change in Grit Score, being female resulted in a 0.159 higher Grit Score, and a one-unit change in involvement in vocational clubs led to a 0.049 change in Grit Score. Full results are shown in Table 20.

Table 20. Coefficients[a] 2

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model One	(Constant)	3.225	0.052		62.608	0.000
	Sports	0.071	0.013	0.251	5.640	0.000
Model Two	(Constant)	3.114	0.65		47.971	0.000
	Sports	0.073	0.013	0.256	5.790	0.000
	Female	0.159	0.057	0.124	2.796	0.005
Model Three	(Constant)	3.029	0.072		41.818	0.000
	Sports	0.071	0.013	0.251	5.696	0.000
	Female	0.159	0.056	0.124	2.818	0.005
	Vocational Clubs	0.049	0.019	0.114	2.586	0.010

In the third regression, predictor variables were high school total involvement, a combined involvement score for FFA and 4-H involvement, and gender, with Grit Score as the dependent variable as shown in Table 21. This regression had two models since gender was excluded; Model One where grit score $=\alpha+\beta_1$ high school total, and Model Two where grit score $=\alpha+\beta_1+\beta_2$ FFA and 4-H involvement score. All findings were found to be statistically significant

Table 21. Model Summary 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.465[a]	0.216	0.201	0.50747
2	0.636[b]	0.405	0.381	0.44659

$p< 0.001$. In Model One a one-unit change resulted in a 0.049 change in Grit Score. In Model Two a one-unit change resulted in a 0.049 change in Grit Score and a one-unit change in FFA & 4-H involvement score resulted in a 0.019 change in Grit Score. Full results are presented in Table 22.

Table 22. Coefficients[a] 3

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model One	(Constant)	2.738	0.253		10.825	0.000
	HS_Total	0.049	0.013	0.465	3.753	0.000
Model Two	(Constant)	2.348	0.243		9.652	0.000
	HS_Total	0.049	0.011	0.469	4.298	0.000
	FFA&4-H Total	0.019	0.005	0.434	3.982	0.000

In the fourth regression, predictor variables were individual high school activities, FFA total involvement score, and gender, with Grit Score being the dependent variable as shown in Table 23. This regression had three models, Model One where grit score $=\alpha+\beta_1$ sports, Model Two where grit score $=\alpha+\beta_1+\beta_2$ FFA total, and Model Three where grit score $=\alpha+\beta_1+\beta_2+\beta_3$ hobby clubs. All findings were found to be statistically significant $p< 0.01$. In Model One a one-unit change in involvement in sports led to a 0.130 change in Grit Score. In Model Two a one-unit change in sports led to a 0.128 change in Grit Score and a one-unit change in FFA total led

Table 23. Model Summary 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.449[a]	0.201	0.186	0.51231
2	0.575[b]	0.331	0.304	0.47370
3	0.651[c]	0.424	0.388	0.44407

to a 0.018 change in Grit Score. In Model Three a one-unit change in sports led to a 0.142 change in Grit Score, a one-unit change in FFA total led to a 0.018 change in Grit Score, and a one-unit change in hobby club involvement led to a 0.168 change in Grit Score. Full results are shown in Table 24.

Table 24. Coefficients[a] 4

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Model One	(Constant)	3.107	0.167		18.579	0.000
	Sports	0.130	0.036	0.449	3.586	0.001
Model Two	(Constant)	2.850	0.175		16.263	0.000
	Sports	0.128	0.033	0.442	3.816	0.000
	FFA_Total	0.018	0.006	0.360	3.107	0.003
Model Three	(Constant)	2.506	0.205		12.229	0.000
	Sports	0.142	0.032	0.492	4.471	0.000
	FFA_Total	0.018	0.005	0.353	3.257	0.002
	Hobby Clubs	0.168	0.060	0.309	2.810	0.007

Summary

Based on the information and analysis it can be determined there is a significant, positive relationship between involvement in FFA and Grit Score. However, there is a non-significant, positive relationship between involvement in 4-H and Grit Score. There is a slightly significant difference between Grit Score for those involved in FFA compared to those who were involved

in other activities. While there was a difference in Grit Score for those involved in 4-H compared to those involved in other activities, it was not significant and again, given the small sample size, all results must be taken with caution. Due to the small sample sizes of those involved in FFA and 4-H, it was not possible to confidently determine if there was a difference in Grit Score for those who were highly involved in FFA or 4-H compared to those who were lowly involved in FFA or 4-H.

DISCUSSION

Implications

Given the results, a positive relationship between involvement in FFA and 4-H and a person's level of grit exists. This research also further validates previous research into the positive impact of extracurricular activities as a whole on grit. While there was a slight difference between Grit Score for those involved in FFA compared to those who were not, it is important to note Angela Duckworth (2009) has stated that based on the various research she has conducted pertaining to grit, there is not a real difference between different activities in regards to how gritty a person is. This does seem to be consistent when analyzing the correlation between grit and the categories of high school involvement given that six of the eight categories had some form of positive correlation with grit.

Moreover, this falls into line with research conducted by Duckworth, Kirby, Tsukayama, Berstein, & Ericsson (2011) into Scripps National Spelling Bee competitors. In their research, Duckworth et al. found that those participants who went further in the competition had taken part in more deliberate practice prior to the competition, showed enjoyment for what they were doing, and had higher grit scores than those participants who did not go as far (Duckworth, 2009; Duckworth et al., 2011). The small to non-existent difference between activities' impact on grit has also been commented upon by Gardener (2009) et al., where they found that the particular high school activity does not matter in the development of grit. Instead, being involved for more than one year, being involved in more than one activity, and showing growth in those activities played a bigger role in influencing a participant's development and success in the long term. The

results also support Larson's research (2000) into the development of initiative and the importance of intrinsic motivation, concerted engagement in the environment, and temporal arc.

Limitations

Given the voluntary nature of the study, there is going to be voluntary response bias. Self-reporting has a certain level of bias as individuals tend to inaccurately self-report in order to make themselves feel better or potentially look better in the eyes of others. In addition, given that participants were reporting on past involvement in organizations there is also the potential for recall bias. While this study was conducted during participants' first year in college and involvement in college activities would be limited, it is still possible for those activities to have begun to impact a participant's level of grit. The small sample size of 13 participants involved in 4-H means results involving 4-H participation must be taken with caution and it must be further noted the results may differ with a larger sample size.

Future Research

Given this study's small sample size of participants involved in 4-H, further research could be conducted looking into a larger sample population of 4-H members and the impact their involvement has on level of grit. Research could also be conducted on a more regional or national scale to see if there is an impact on grit in either organization based on how involved the members were. A longitudinal study that measures a student's grit when they begin high school, graduate high school, graduate college, and then four years post-graduation could be done to see how grit changes in individuals over time and to discover how various life factors play into its development, growth, or hinderance. Research could also look into the manner in which these

organizations teach skills and knowledge to see if there are any common factors among them that could be beneficial in developing an individual's grit.

CONCLUSION

In conclusion, a person's involvement in FFA is shown to have a slightly significant, positive relationship to an individual's level of grit. A person's involvement in 4-H was not statistically significant in relationship to one's level of grit but given the small sample size this could differ than the results of a larger study of the organization. A significant correlation between grit was found for six of the eight categories of high school activities: publications, sports, honors societies, student government, vocational clubs, and service clubs. The two categories that showed no statistically significant correlation with grit were fine arts and hobby clubs. These findings further support previous research into the importance of involvement in activities in regard to developing and growing grit.

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APPENDICES

Appendix A. Institutional Review Board Approval

IRB-FY2019-94 - Initial: Initial Approval

irb@missouristate.edu
Tue 12/4/2018 11:00 AM
To: Rimal, Arbindra <ArbindraRimal@MissouriState.edu>; Bishop, Sarah E <Bishop7130@live.missouristate.edu>; Sudbrock, Christine E <CSudbrock@MissouriState.edu>; Fent, Nathan <NathanFent@MissouriState.edu>; Busdieker-Jesse, Nichole L <NBusdiekerJesse@MissouriState.edu>

Missouri State University

To:
Arbindra Rimal
School of Agriculture, Agriculture - SPFD Campus
Christine Sudbrock, Nichole Busdieker-Jesse, Nathan Fent

RE: Notice of IRB Approval
Submission Type: Initial
Study #: IRB-FY2019-94
Study Title: Evaluating the Impact of Agriculture Youth Organizations on Grit
Decision: Approved

Approval Date: December 2, 2018
Expiration Date: December 2, 2019

This submission has been approved by the Missouri State University Institutional Review Board (IRB) for the period indicated.

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented. Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

Researchers Associated with this Project:
PI: Arbindra Rimal
Co-PI: Christine Sudbrock, Nichole Busdieker-Jesse, Nathan Fent
Primary Contact: Sarah Bishop
Other Investigators: Sarah Bishop

Appendix B. Survey

Informed Consent

You are being asked to participate in a study focused on involvement in high school organizations and various character traits. This project is being done by a graduate student at Missouri State University as a part of their thesis requirement.

Participation in the study is voluntary. There is no penalty for choosing not to participate and you may stop participating at any point. Your answers will be kept confidential. Results will be presented to others in summary form only, without names or other identifying information. Your participation will take approximately 15 minutes. During this time, you will answer questions about personal character traits and your involvement in high school organizations.

The potential risks faced by participants are minimal. However, participants may feel some discomfort when self-analyzing their own beliefs about their level of participation in organizations. While there are no direct benefits of the research for participants, it will give a better understanding of the relationship between involvement in organizations and the development of character traits. Since the study analyzes the experiences of first-time students the information could potentially be used to improve University programs targeting first-time students. The results of the study may also be used as a recruitment tool for the organizations.

All data containing your information will be coded and no personal information such as name or email will appear on the questionnaire. The data will be stored on a password-protected University desktop computer in a locked office for the duration of the study. You will not be identified by name in any publications of the study. All data will be deleted three years after the final submission and approval of the study.

This project has been reviewed and approved by the MSU Human Subjects Review Committee. The committee believes that the research procedures adequately safeguard the subject's privacy, welfare, civil liberties, and rights. The project is being supervised by Dr. Arbindra Rimal, Professor and Department Head, Agricultural Business, Education, and Communication, MSU (417-836-5094). Please contact Dr. Rimal or the researcher Sarah Bishop, bishop7130@live.missouristate.edu, with any questions or to voice concerns or complaints regarding the study. If you have any questions regarding your rights as a participant in this study, you may also contact Missouri State University Review Board (which is a group of people who review research studies to protect participants rights) at researchadministration@missouristate.edu or by phone at 417-836-5972.

Thank You.

Do you agree to participate in the following study, described previously? You may withdraw at any point without prejudice.

Yes

No

Where you involved in 4-H and/or FFA in high school?

- Yes, I was involved in FFA
- Yes, I was involved in 4-H
- Yes, I was involved in both 4-H and FFA
- No, I was not involved in 4-H or FFA

Select the option that most describes your involvement in the following activities/organizations.

	No Involvement	Less than 1 hour a week	1-3 hours a week	4-7 hours a week	8-10 hours a week	More than 10 hours a week
Publications (ex. Journalism, Yearbook, News, etc.)						
Performing Arts (ex. Band, choir, orchestra, theater, speech/debate, etc.)						
Sports (individual and team)						
Honor Societies (ex. National Honor Society, Music Honor Society, Math Honor Society, etc.						
Student Government						
Vocational/Professional Clubs (ex. DECA, FBLA, FCCLA, SkillsUSA, etc.)						
Service Clubs (ex. Lion's Club, Red Cross, Key Club, etc.)						
Hobby Clubs (ex. Book club, art club, movie club, Spanish club, etc.)						

Select the option that most describes your agreement with the following statements.

	Very Much Like Me	Mostly Like Me	Somewhat Like Me	Not Much Like Me	Not Like Me at All
New ideas and projects sometimes distract me from previous ones.					
Setbacks don't discourage me.					
I have been obsessed with a certain idea or project for a short time but later lost interest.					
I am a hard worker.					
I often set a goal but later choose to pursue a different one.					
I finish whatever I begin.					
I have difficulty completing projects that take an extended amount of time to complete.					
I am highly aware of expectations and take great care in my work.					

If involved in FFA, which of the following would describe your level of involvement? The example is only a guideline and does not mean you have to meet all listed points.

	No Involvement	Less than 1 hour a week	1-3 hours a week	4-7 hours a week	8-10 hours a week	More than 10 hours a week
Agriculture Class						
Chapter FFA Meetings						
CDEs/LDEs (contests)						
SAE (Supervised Agriculture Experience)						
Chapter Activities						
Other Activities						

What was the highest FFA degree you earned?

- Greenhand FFA Degree
- Chapter FFA Degree
- State FFA Degree
- American FFA Degree

If involved in 4-H, which of the following would describe your level of involvement?

	No Involvement	Less than 1 hour a week	1-3 hours a week	4-7 hours a week	8-10 hours a week	More than 10 hours a week
Club Meetings						
Project Meetings						
Projects						
Community Service						
Demonstrations/Speeches						
County Level Activities or Higher						
Other Activities						

What is your age?

- 17 or younger
- 18
- 19
- 20
- 21
- 22 or older

What is your gender?

- Male
- Female
- Chose not to identify

What is your ethnicity? (please select one)

- Hispanic or Latino
- Not Hispanic or Latino

What is your race? (you may choose one or more)

- American Indian or Alaskan Native
- Asian
- Black or African American

- Native Hawaiian or Pacific Islander
- White
- Other
- Chose not to identify

Thank you for your time and participation. If you have any questions or concerns regarding the study please contact Dr. Rimal, arbindrarimal@missouristate.edu, or the researcher Sarah Bishop, bishop7130@live.missouristate.edu.