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Motivations of division I student-athletes to participate in strength and conditioning programs.

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MOTIVATIONS OF DIVISION I STUDENT-ATHLETES TO PARTICIPATE IN STRENGTH AND CONDITIONING PROGRAMS

By

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DEDICATION

This Dissertation is dedicated to my late father, Charles B. Ledford,

who was embarrassed he couldn't afford to send me to preschool when I was younger,

yet always proud of my academic accomplishments despite this "adversity".

I like to think he would be smiling and say, "you done good, kid."

I love you dad.

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ABSTRACT

MOTIVATIONS OF DIVISION I STUDENT-ATHLETES TO PARTICIPATE IN STRENGTH AND CONDITIONING PROGRAMS

Liza Reader

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The purpose of this study was to understand the motivations of Division I collegiate athletes to participate in strength and conditioning programs as a part of their sports performance program. Specifically, this study examined what the motivations were and whether there were any differences between the athlete subpopulations of age group, gender, sport played, sport type, and injury status. In contrast to existing sport participation motivation research, this study focused on the participation of strength and conditioning as a part of sport participation, an area barren of motivational understanding and literature.

This study utilized Self-Determination Theory (SDT) and Achievement Goal Theory (AGT) as theoretical frameworks by adapting existing instruments originally designed for sport participation to strength and conditioning training participation. This was in effort to capture athlete motivations in their approach to training as a portion of their sport participation. The SDT identified motivations along a scale according to the level of self-determination each motivation expresses while AGT identifies two primary goal-orientations one may espouse when participating in an activity.

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INTRODUCTION

Athletic performance is not limited to the playing field. It includes practice and physical training, which extend far beyond competition. National Collegiate Athletic Association (NCAA) athletes spend up to 20-hours a week in sport preparations, including their team's tactical practice, travel, and strength and conditioning training in the weight room (National Collegiate Athletic Association [NCAA], 2020). Sport practice and competition offer limited stress and stimulus for physiological growth (Bompa & Buzzichelli, 2018; Hoffman, 2014), requiring a need for external training to achieve higher levels of physical development (i.e., strength and conditioning). The purpose of strength and conditioning is to build the best possible sports performance through resistance training and varying metabolic conditioning strategies (Bompa & Buzzichelli, 2018; Haff & Triplett, 2015; Hoffman, 2011).

The initial steps in designing a tailored strength and conditioning program for specific athletes and sports requires time and effort studying the sport's movements and metabolic components, while also understanding the areas of the athlete that are most vulnerable to injury (Haff & Triplett, 2015; Hoffman, 2011; Hoffman, 2014). These sport evaluations are combined with the athlete's specific physical abilities and areas of deficiency, to set sport and athlete appropriate training goals (Haff & Tiplett, 2015; Hoffman, 2011). A charge of the strength and conditioning coach is to analyze the sport

and the athlete to write the most appropriate training program. These analyses are limited to physical measures (Ebben et al., 2004; Hoffman, Tenenbaum et al., 1996; Simenz et al., 2005). Psychological evaluations are absent from most sports performance testing batteries athletes complete throughout their seasons, limiting the information gathered by strength and conditioning coaches solely to the physical readiness of the athlete, not the mental readiness. A training program is only effective when the athlete puts forth strong effort, which requires mental stamina and motivation. With no current understanding of athletes' motivation for training, practitioners are left with partial understanding of athletes' readiness to participate.

Statement of the Problem

For training to be effective and manifest physiological adaptations, an athlete must participate in a range of diverse, yet sport-relevant activities (Winkleman, 2012), often to levels of effort causing physical discomfort (Powers & Howley, 2007). While sport competitions provide opportunities for objective achievements through winning, achievements in strength and conditioning programs are often less tangible. Should an athlete be driven by competition or the urge to win, they may experience lower motivation to train, as participation in training does not yield clear cut competition. An unmotivated athlete may not give sincere effort to a training program (Howard et al., 2016) and end up with minimal results (Fransen et al., 2018). If a coach was able to motivate an athlete to give greater effort in their training, this would result in greater physical adaptations gained. Currently, the literature pertaining to athlete motivations for participating in strength and conditioning is limited (Gilson et al., 2008), with much of the research residing primarily in the realm of athletes' perceptions of strength and

conditioning (see Boyd et al., 2017; Elder et al., 2014; Gaston-Gayles, 2004; Poiss et al., 2004; Zach & Adiv, 2016).

Strength and conditioning coaches spend a great amount of time with their athletes and develop working relationships with them. Often, the coach will ask the athlete to perform an exercise or activity which yields discomfort to the athlete. In instances like this, the coach will often encourage the athletes to try hard, knowing the elevated effort will be rewarded with a physical adaptation, increasing performance later. By understanding how the athlete is motivated to train, the coach can encourage the athlete, accordingly, yielding a greater effort and better adaptation (Fransen et al., 2018). There is currently no established instrument that measures an athlete's motivation to train, or any clear understanding in terms of what motivates an athlete to participate and give effort toward their strength and conditioning programs. Literature in this area only highlights how athletes train, not what motivates them to train (see Munn et al., 2005; Newton et al., 2002). Should a strength and conditioning coach better understand an athlete's motivation, they will have the necessary insight to create a more athlete-appropriate training program and effective strategies to better reinforce an athlete's dedication to training. Without this understanding, the program may yield marginal results and limited benefits to sport performance.

Motivation

Motivation is defined as a person's initiation and persistence of behaviors to the extent that they believe the behavior will lead to desired outcomes or goals (Deci & Ryan, 2000). To understand motivation is to understand why certain behaviors are initiated, why they persist and/or stop, what choices are made, and the determinants of

thoughts and actions (Sullivan & Strode, 2010). Multiple fields have paid special attention to motivation as it pertains to performance and sustainability in their respective participants' actions. Research regarding motivation in the workplace (Meyer & Gagne, 2008), education (Reeve, 2002), psychology (Deci, & Vansteenkiste, 2003; Van den Broeck et al., 2008), and sport participation (Fenton et al., 2014; Frederick-Recascino, 2002; Gaston-Gayles, 2005; Keshtidar & Behzadnia, 2017; Ntoumanis & Standage 2009; Vlachopoulos et al., 2000; Zahariadis et al., 2006) have revealed several different sources and consequences of motivational types, such as partaking in an activity because it brings them joy, or participating in an activity because there is a related outcome or reward resulting from participation. The drive to participate may come from several different locations (Deci & Ryan, 2001). *Intrinsic motivations* originate within the participant from the enjoyment of the activity or inherent interest in the activity (Ryan & Deci, 2020). Three specific types of intrinsic motivation have been identified pertaining to the enjoyment derived from the *sense* of participation, *achievements* derived from participation, and the pleasure of better *learning* an activity (Deci & Ryan, 2000). All three forms of intrinsic motivations originate from within the participant; they are not connected to external influences associated with participation. *Extrinsic motivation* is influenced by outside factors including external rewards or consequences, results from participation, and the benefits associated with participating (Ryan & Deci, 2020).

Early motivational theory research suggested that motivation may be tied to many primal needs such as hunger and thirst, sex, and safety, stating that once these physiological needs are met, other behavioral drives are associated with meeting psychological needs of self-actualization (Maslow, 1947). Deci and Ryan (2020)

expanded upon this concept by identifying three basic psychological needs including autonomy, competence, and relatedness. Autonomy is a person's choice and ownership over their actions and decisions, competence is one's feeling of mastery of a task or activity, and relatedness is one's sense of belonging and connection to others (Ryan & Deci, 2020). The concept of self-determination would meet all three needs. Intrinsic motivation is associated with the highest form of self-determination. Extrinsic motivation has ties to autonomy, relatedness, and competence; however, Deci and Ryan have identified several different types of extrinsic motivation and ordered them on a spectrum according to their level of self-determination. This spectrum of motives, ordered by levels of self-determination, is known as the Self-Determination Theory.

Self-Determination Theory

In Self-Determination Theory (SDT), extrinsic motivation is divided into four separate motivations, which are arranged from least to most self-determined: External Regulation, Introjected Regulation, Identified Regulation, and Integrated Regulation (Ryan & Deci, 2020). External Regulation is participation driven by an external factor such as a reward or a consequence. Introjection is the beginning of internalization of extrinsic motivations, where the drive to participate comes from an avoidance of guilt from failure or increased self-esteem from participation success. The individual participates not because of an external influence such as punishment, but to avoid guilt or increase self-esteem, regardless of the actual activity. Identified Regulation acknowledges the value of participating, such as a benefit from the activity. In this instance, the individual willingly chooses to participate. Integrated regulation is the most

self-determined form of extrinsic motivation in which the participant respects the value of the activity and finds congruency with their own values and participation in the activity.

At the other end of the self-determination scale is intrinsic motivation and its three tenets of sense, learn, and achievement. However, there is a form of motivation completely lacking in self-determination qualities. Amotivation is a lack of motivation to participate. In this instance, the person finds no reason to engage in the behavior. By definition, amotivation opposes intrinsic motivation. Its place on the spectrum is on the side associated with lower levels of self-determination, next to external regulation. In organizing motivation along a spectrum of self-determination, researchers are better able to identify how goals and goal-orientations can drive both intrinsic and extrinsic motivations (Vlachopoulos et al., 2000).

Achievement Goal Theory

A goal is the object or aim of an action (Latham, 2004), which helps shape our choices by providing direction for anticipated decisions to participate in the identified activity (Duda et al., 1995; Dweck, 1986; Nicholls, 1989). A decision to participate based on one's goals is considered goal-orientation. Achievement Goal Theory (AGT) identifies two primary factors found to influence participation, including *task-orientation* and *ego-orientation.* In task-orientation, a person's participation aim is to accomplish their own competence in the task, regardless of how others perform the same task (Dweck, 1986; Nicholls, 1989). Ego-orientation is goal setting based off social comparison in a task, and one's competence in the task is relative to others' performances (Dweck, 1986; Nicholls, 1989). Furthermore, the better one performs in a task compared to others and the more they perceive themselves as competent in the activity is what

guides ego-orientation. Between the two forms of goal orientation, for ego-orientation, the activity is seemingly interchangeable, as long as the social comparison is made. Task-orientation is acutely activity-specific, where the whole outcome of success is centered around the actual task performance in comparison to objective competence rather than subjective social standing. If one were to align these goal orientations to the spectrum of motivations identified in SDT, task-orientation would align with intrinsic motivation, while ego-orientation would align with extrinsic motivation.

Purpose of the Study

The purpose of this study was to understand the motivations of Division I collegiate athletes to participate in strength and conditioning programs as a part of their sports performance program. Self Determination Theory (SDT) and Achievement Goal Theory (AGT) was be used to better understand what motivates an athlete to train in their strength and conditioning programs. Instruments examining athletes' motivations for sport participation were adapted to strength and conditioning participation. By understanding what motivates athletes, current strength and conditioning practitioners may alter their coaching methods to best complement athlete motivations, which will lead to more driven athletes who give greater efforts when training. The study also aimed to identify differences in motivations and goal-orientations in college athlete population subgroups including sport played, gender, athlete's year in school, sport type, and athletes experiencing injury. Should significant differences be identified, strength and conditioning practitioners may modify their approaches to different populations when coaching. This change in approach may be significant in increasing athletes' motivations to participate, resulting in greater training effort given, stimulus applied, and adaptations

gained. It would be significant to identify trends within Division I collegiate athletes in terms of their motivations to participate in strength and conditioning, as it will fill gaps within the literature, as well as improve practices in the strength and conditioning coaching community. The purpose of the study was addressed by answering the following research questions.

Research Questions

RQ1: What are the motivations of Division I collegiate student-athletes to participate in strength and conditioning programs?

RQ2: Are there differences in motivations to participate in strength and conditioning programs across athlete gender, sport played, sport type, age, and sport injury, controlling for years of previous strength and conditioning experience?

RQ3: Will sport injury requiring a return-to-play protocol moderate key independent variables (age, gender, sport played, and sport type) of motivation for strength and conditioning participation?

Significance of the Study

The current study is significant in its contributions to both the theoretical and practical realms of strength and conditioning as well as sport performance. Strength and conditioning is an evidence-based field. Identifying motivations and possible trends will provide practitioners with a theoretical basis for applying new coaching methods. New coaching methods may be produced and supported because of these, and future findings related to athletes' motivations to participate in strength and conditioning programs.

The strength and conditioning exercises and drills athletes experience, and the approach taken to writing appropriate training programs are similar based on sex, sport,

age, and sport type (Duehring et al., 2009; Haff & Triplett, 2015; Peterson et al., 2004). While athletes' personalities are learned over time, their motivations are not always clearly stated. Should there be a difference between one or more of these populations in terms of motivations, the coach may adjust accordingly. For instance, should an individual-based sport athlete compare themselves to their teammates, coaches may establish leaderboards for certain drills and exercises. This change may yield encouragement in competitions ensuring greater effort is given. Yet, this approach may not land favorably with team-based sport athletes where they must all work together to accomplish a goal. The team-based sport athletes may respond better to a task-based motivational strategy including global encouragement across the team, rather than acknowledging one's performance over another's.

Practically, strength and conditioning coaches must gain the trust of their athletes by relating and connecting to them. By appreciating the athlete's motivations from the onset of the relationship, the coach can appeal to the athlete personally and use their motivations to strengthen trust and understanding with the athlete. As trust is developed, the athlete will likely be more willing to participate and try new exercises offered by their coaches, as trust is paramount in a coaching relationship (Machin, 2010). This willingness is valuable because as athletes develop higher levels of fitness and strength, the coach will progress training to include new and more difficult exercises and activities. In cases where athletes already trust their coaches, they may be more inclined to execute the activity (Zhang & Chelladurai, 2013), as well as set good examples for their teammates. Morale may be positively affected, and consistent leadership may be established.

The current study will be the first to address specific motivations and goal-orientations among collegiate student-athletes, specifically focusing on strength and conditioning participation. It will also be the first to examine relationships between different populations. Research has identified subtle personality differences between different subpopulations within sports such as gender (Kilpatrick et al., 2005; Kirkcaldy, 1982), sport types (Laborde et al., 2016; Nia, & Besharat, 2010; Peterson et al., 1967), sport played (Boyd et al., 2017; Elder et al., 2014), and athlete age groups (De Pero et al., 2009; Inceoglu et al., 2012; Stern et al., 1995). As such, it is expected motivations will also differ among these groups. Identifying these differences may highlight different needs and approaches for athletes, leading to more holistic and specialized support for athletes. Sport performance is not limited to the competitive field. The work done behind the scenes also contributes to athletic success. Strength and conditioning is recognized as a supporting element, specially designed to improve physical performance. By understanding athletes' motivations to train, practitioners will be better able to communicate and serve their athletes. Furthermore, future studies will be able to expand on the findings of this research and gain greater clarity with more sports and different contexts.

This study will add to the research of both SDT and AGT individually, as well as highlight how these theories work in concert when examining participation in strength and conditioning. These two theories have not yet been examined in strength and conditioning. However, they are often used in tandem when examining sport participation. Highlighting the differences between sport participation and strength and conditioning motivations will be useful to theory and practice. As sport and strength and

conditioning activities are related, but different, exploring the differences to participate in either activity can shed light on how the two should be approached differently in research and in practice. Existing literature has shown greater performance in athletes who possess stronger overall competence, autonomy, and relatedness, which are the three variables of self-determination (Fransen et al., 2018). Adding to the work of Fransen et al. will strengthen the coach's understanding of their athletes and may result in future coaching style changes and adaptations for greater training results and program adherence. The results of the current study will identify patterns of both motivation types and goal-orientations among strength and conditioning participants. Additionally, this study will determine if there is any variance or relationship between genders, sports, sport types, and age in terms of motivations.

Delimitations

This study will be concerned with the motivations of collegiate student-athletes to participate in strength and conditioning programs. Therefore, data will be collected at the intercollegiate level. The results of this study may be generalizable to other athletic populations and should assist in improving coaching performance. However, it is integral to note that the findings of this study will not be prescriptive for all aspects of strength and conditioning coaching. There are many qualities a coach must possess to be an effective leader and educator to athletes in strength and conditioning. Successful strength and conditioning coaches at all levels, must possess proper technical knowledge and appropriate communication skills to be effective. Understanding what motivates athletes to give great effort in the weight room is important to improving coach-athlete relations. However, it is not the only element that makes a coach effective.

Additionally, the athletes in this study will represent an institution within a power-5 conference of Division-I college athletics. Their motivations may be influenced by the university's specific community and context. Other divisions do not have the same resources as Division I or power-5 conference schools, and some programs do not mandate strength and conditioning participation, as formal strength and conditioning programs do not exist at all institutions (Schmidt, 1999). As such, athletes would likely display different motivational patterns and trends, especially when strength and conditioning participation is of their own choice and not mandated as part of their athletic program participation. Separate studies should be carried out to capture the population-specific differences among different divisions and college conferences.

Limitations

Collegiate strength and conditioning programs are increasingly common in athletic departments. However, high school strength and conditioning is not as consistent across the nation. While much progress has been made to normalize this training in high schools, many schools still rely on sport coaches to deliver the tactics of sport and the physical training required to prepare bodies for competition. Many sport coaches are not equipped with the scientific knowledge, experience, and technical skills needed to properly organize and execute an appropriate strength and conditioning program. Athletes graduating from high schools with professionally led strength and conditioning programs are more familiar with training and as such, may approach future programs differently than athletes graduating from schools without such developed programs. This will likely influence the population's motivation, as these athletes will be more familiar with the physical demands and positive results of training, which likely will be included

in the data analysis of this study. A limitation of this study is that the data may be skewed by those with more experience in strength and conditioning programs, though I intend to control for such effects.

The current study will be carried out remotely, in compliance with current COVID-19 recommendations. General participation in athletics and strength and conditioning programs has heavily been affected by the pandemic, and for some, strength and conditioning has been the only opportunity for athletes to participate in sport-related activities. The competitive season in the spring semester of 2020 was cut short, and sport participation was largely limited over the summer of 2020. As a result, individual athlete's strength and conditioning training has been the only connection to sport practices. Through this unique time, motivations related to strength and conditioning participation may have changed for several athletes, as this training was the sole physical focus for the better part of the year.

Additionally, some athletes are not yet participating in their collegiate strength and conditioning programs due to physical distancing limitations. The university's weight room is limiting the number of athletes allowed in the building at one time, which limits which athletes on the team can train. Over the summer, only approximately 10 athletes per team participated in structured strength training programs at the university, which may also affect motivations to participate in these programs and activities. The impact of COVID-19 has not yet been fully realized. However, it would be wise to assume that athletes' motivations have been affected by the global pandemic and the restructuring of program activities and participation.

Another limitation of the study would be the logistics for collecting survey data. It is anticipated that the athletes will complete the instrument digitally with researchers in the room to answer questions. However, given the current limitations of facility capacities and limitations in terms of which athletes are allowed to participate, there is a possibility the instrument will be emailed to athletes so they can fill it out at home. While the pilot study is anticipated to limit confusion within the instrument itself, having access to a researcher as athletes fill out the survey helps to clear up any unforeseen issues with language or the survey's lexicon.

To summarize, the limitations of this study include the possibility that athletes with greater familiarity with strength and conditioning due to previous programs in high school may have different motivations than those experiencing strength and conditioning for the first time in college. The research will be carried out during the global pandemic of COVID-19, which has impacted college sports and athletic activities at all levels. The Spring 2020 semester sport seasons were dramatically cut short, and as a result, the only tie these athletes had to their sport was to continue their strength and conditioning training as sport competitions were cancelled. Some athletes were able to access their training programs and sufficient facilities to maintain physical fitness. While questions to measure this impact will be employed, it is impossible to measure all impacts the quarantine has had on athletes and their motivations to participate in strength and conditioning. Universities are still experiencing limitations in athletic activity practices, and because of this, I will not be able to have all athletes in the same room completing the questionnaire. This may leave some athletes confused if a researcher is not available to answer questions and some may choose to not participate due to the lack of

accountability. These limitations have been accounted for as best as possible, with the understanding that not everything can be predicted or accounted for ahead of time.

Definitions of Key Terms

Amotivation: the lack of drive to participate or understand why one would participate in an activity (Ryan & Deci, 2020)

Autonomy: one's sense of initiative and ownership (Ryan & Deci, 2020)

Competence: a feeling of mastery and one's sense of the ability to succeed and grow (Ryan & Deci, 2020)

Ego-orientation: the desire to participate in an activity where success is measured in terms of how well one performs the activity compared to other participants (Dweck, 1986; Nicholls, 1989)

External regulation: behavior driven by externally imposed rewards or punishments (Ryan & Deci, 2020)

Extrinsic motivation: participation in an activity other than for inherent satisfaction (Ryan & Deci, 2020)

Goal: the object or aim of an action (Latham, 2004)

Goal-Orientation: dispositional tendencies reflecting different ways of cognitively processing participation in each activity (Latham, 2004)

Identified regulation: behavior which a person acknowledges or personally endorses the value of an activity and experiences a high degree of willingness to participate in the activity (Ryan & Deci, 2020)

Individual-based sport: a sport in which the outcome is solely reliant upon the performance of one person (Chelladurai, & Saleh, 1978)

Integrated regulation: a person not only agrees with the value of an activity but finds participation in it consistent with their own core values and interests (Ryan & Deci, 2020)

Intrinsic motivation: performance and participation in an activity for inherent interest and enjoyment (Deci & Ryan, 2020)

Introjected regulation: partially internalized extrinsic motivation; behavior is regulated by the internal rewards of self-esteem for success and by avoidance of anxiety, shame, or guilt of failure (Ryan & Deci, 2020)

Motivation: the initiation and persistence of behaviors to the extent that an individual believes the behavior will lead to desired outcomes or goals (Deci & Ryan, 2020).

Relatedness: a sense of belonging and connection (Ryan & Deci, 2020)

Strength and Conditioning: the practice of physical conditioning through resistive, force-based exercises and metabolic conditioning pieces for the primary purpose of improving performance in a particular activity or sport (Haff, & Triplett, 2015)

Task-orientation: the desire to participate in an activity with competence in an activity without concern for others level of ability or performance (Dweck, 1986; Nicholls, 1989)

Team-based sport: a sport in which the outcome is reliant upon multiple players on the same team working together to achieve a common goal (Chelladurai, & Saleh, 1978)

CHAPTER II

REVIEW OF LITERATURE

Collegiate Athletes and Strength & Conditioning

The practice of strength and conditioning involves resistance-based exercises combined with power and conditioning pieces selected to mimic sport movement and metabolic demands (Haff & Triplett, 2015; Hoffman, 2011; Hoffman, 2014), but strength and conditioning does not directly involve participation in sport. To properly train these movements, athletes are often required to push themselves outside of their comfort zones to exhaustive efforts in order to tax the body into developing greater performance abilities (Singh et al., 2007; Sweet et al., 2004). Sports performance programs are curated in such a way that an athlete should become a better performer in their sport as the season progresses, peaking in optimal performance during the most important competition at the end of the season (Bompa & Buzzichelli, 2018; Haff & Triplett, 2015; Hoffman, 2011, 2014).

Most athletes at the Division I level are expected to participate in strength and conditioning programs as a part of their sport participation (NCAA bylaw 2.14). Yet, it is understood that a more motivated person will likely give greater efforts (Deci & Ryan, 2000; Howard et al., 2016), maximizing their potential by fully complying with their training programs. Compliant athletes are likely more fit, stronger, and less prone to injuries (Fleck & Falkel, 1986). Stronger athletes with greater levels of fitness are shown

to be more effective in sports and have less time lost to injuries when compared to their weaker athletic peers (Croisier et al., 2008; Rippetoe, & Kilgore, 2017).

While American collegiate sporting events began in 1852 with the Harvard-Yale Regatta (Shiff, 2017), the first collegiate strength and conditioning program was not instituted until 1969 at the University of Nebraska (Lukacs, 2010). Since the 1970s, the profession of strength and conditioning has gained acceptance and merit (Powers & Howley, 2008). There are nearly 500,000 athletes in the National Collegiate Athletic Association (NCAA) and 65,000 in the National Association of Intercollegiate Athletics (NAIA) (NCAA, 2020; National Association of Intercollegiate Athletics [NAIA], 2016). Most of these athletes participate in an institution-associated strength and conditioning program to support their performance and contribute to overall wellness. The design of these athletic development programs is primarily serving the university's student-athletes with the intention of improving sport performance (Haff & Triplett, 2015). Working directly with student-athletes, coaches use strength, speed, power, and conditioning training methods to challenge and stress an athlete's body to yield adaptations and physical changes to best support sport performance.

Significant resources are devoted to college strength and conditioning and athletic departments. Large amounts of money are designated to strength and conditioning facilities, as we see multi-million-dollar facilities across the country from the proposed $143 million-dollar facility upgrades at the University of Colorado to the $15 million-dollar Varsity Village on the University of Cincinnati's campus (Zirm, 2014). Division I collegiate strength and conditioning coach salaries soared in 2019, seeing some as high as $800,000 (Berkowitz et al., 2019). When addressing resource allocation the athlete level,

the NAIA and NCAA combined, award $4.1 billion in scholarships a year to student-athletes (NCAA, 2020; NAIA, 2016), and student-athletes spend approximately 20 hours a week devoted to athletic activities with considerable time in strength and conditioning training (NCAA bylaw 2.14).

The field of strength and conditioning is growing quickly, evidenced by the number of governing bodies and certifications made available to coaches. However, these certifications are primarily focused on physiology and the science of training, with limited attention being paid to the science of psychology and motivation (NSCA, 2020). Dorgo (2009) put out a call for greater understanding and application of the athlete's personality and psychology to practice in the strength and conditioning field's continuing education guidelines. In this call, Dorgo recognized the present knowledge of most coaches is that of traditional training, such as anatomical science and exercise physiology. However, he identified the need for strength and conditioning coaches to understand athletes' personalities better, to better relate to their athletes. Greater knowledge of their athletes could lend to better trust and more open communication. Understanding what drives athletes in training can offer the coach a more effective approach to their athletes through stronger coaching relationships and yield better overall training results.

The only study available focusing on motivations of athletes to participate in strength and conditioning at the collegiate level is by Gilson et al. (2008). In this study, athletes at a major Midwestern university, representing a wide range of sports, completed surveys, and participated in semi-structured interviews on motives for participation based off goal orientations. The study found five main motivating themes for participation in

strength and conditioning programs: significant others (not in the romantic sense, but significant other people motivating their participation), improvement, competitive demands, being stronger than others, and miscellaneous. Motivations were identified through the lens of goal orientations. Trends recognized among the collegiate athletic population yielded greater understanding of motivating factors. The study added to the literature by discussing the nature of athletes to be task-oriented and ego-oriented in their goals for participating in strength programs. However, gaining an understanding about how athletes set goals, what current motivations drive athletes, and if there are any patterns among teams, genders, age groups, sports, etc. is needed to better meet athlete needs through coaching. Currently, there is more research available on athletes' perceptions of strength and conditioning than their actual motivations for participation (Boyd et al., 2017; Elder et al., 2014; Poiss et al., 2004), leaving great room for research that examines what motivates athletes to participate.

Elder et al. (2014) studied male and female athletes at the NCAA Division I and II levels in terms of their perceptions of strength and conditioning training and the strength and conditioning coaching staff. Student-athletes consistently perceived their training programs to improve athletic performance, with males exhibited stronger perceptions than females. In the study, Division II athletes perceived strength and conditioning programs to have larger effects on their sport performance than Division I athletes. Extending these findings to the Division III level, Poiss et al. (2004) surveyed male and female athletes on the differences in their perceptions of strength and conditioning programs. The study also found that both males and females generally accept strength training as an important part of their athletic success. It should be noted the results from

Poiss et al.'s study are from a sample where participation in weight training and conditioning programs is not mandatory. All athletes agreed that both males and females should participate in strength training for many reasons, most notably that strength training made them feel better mentally and physically.

Boyd et al. (2017) surveyed athletes from five sports at a Division I, mid-major university. The study's purpose was also to explore student-athletes' perceptions of strength and conditioning programs. Results showed no significant differences in perceptions between males and females, or within class rank. However, significant findings were found when exploring differences between sports, with some sports (softball and soccer) perceiving strength and conditioning as more favorable to their performance than others. The difference in strength and conditioning approaches among sport played requires further study as it is not established if these findings are generalizable to the collegiate athletic population.

At this time, there is no instrument that has been specifically designed to examine athletes' motivations for participating in strength and conditioning programs. Therefore, there is limited understanding if athletes approach strength and conditioning similarly or if any differences exist between sport played, sport types, gender-equivalent sports, and age groups of athletes. There are anticipated differences between these groups as we see similar occurrences in the general population between genders (Ebben, & Brudzynski, 2008; Zach, & Adiv, 2016). For example, when identifying the motivations to participate in strength training exercises between male and female physical education major students, females were more motivated to participate to lose weight while males used strength training exercises to improve their appearance and muscularity (Zach, & Adiv,

2016). Zach and Adiv also found stereotypical assumptions about resistance training and femininity, with the certain assumption women should be smaller and athletic to be attractive, but "not too muscular" (p. 324). The study found students with more knowledge of the benefits of strength training possessed fewer stereotypical beliefs about women and strength training. Those with less knowledge of this area possessed greater stereotypes.

While these findings are interesting, it is questionable whether we can apply them to the athletic population. For one, the physical education students have formal education in the benefits of strength training on the body, this is not necessarily true for all athletes. Current collegiate athlete perceptions of strength and conditioning acknowledge males and females should both participate in strength training for the benefit of sport improvement (Boyd et al., 2017; Poiss et al., 2004), but no formal study has identified whether the motivations of collegiate athletes are the congruent across the many sub-populations of sport. Understanding this would assist the coaching staff in their approaches to athletes and contouring their encouragement tactics to meet the needs of their athletes.

Motivation Research

There is an abundance of research on motivation types, the origin and classifications of different motivations, as well as how people make decisions based off these established motivational patterns. Freud (1957) suggested a balance of hedonistic and rational motivations derived from life-preserving sexual and life-risking death instincts. Satisfying general instincts can give way to improvements to the psychological factors of self-worth and esteem (Maslow, 1943; Ryan & Deci, 1989). These instincts

come at multiple levels of awareness, thus establishing the psychoanalytical approach to human motivations. In the psychoanalytical perspective, motivating factors are either conscious, preconscious, or unconscious, based off how aware the person is of their driving needs (Willmott et al., 2018). To fully understand oneself, the unconscious drives must first be known. All levels of consciousness in Freud's theory are driven by the need to seek gratification.

Contrary to the psychoanalytical perspective is the humanistic perspective, established by Rogers (1967). In the humanistic perspective, one has their *ideal-self*, or who they would like to be, and their *self-concept*, or their current perception of themselves. According to Rogers (1967), humans are future-oriented, and motivations of physiological and psychological needs are met to realize one's full potential. The constant innate drive to maximize one's ideal version of themselves is referred to as the self-actualization tendency, which is considered the most important and basic motive of human function (Willmott, 2018).

Maslow (1943) classified a hierarchical scale of motivations from the most basic physiological needs to the most complex psychological needs. These unmet needs drive behaviors, providing a motivation for actions. The presiding factor controlling one's actions is the unsatisfied need at the lowest rudimentary level within the hierarchy. At the most basic level is the desire to meet physiological needs such as shelter, hunger, thirst, sex, and safety. Without satisfying these needs first, the individual will not acknowledge or focus on other needs. For example, someone would not be concerned with how competent they feel if they were experiencing extreme thirst. It is suggested, only after the basic needs are satisfied will other needs present themselves, and the behavioral drive

then shifts to satisfy the newly presented needs. Maslow identifies the level above basic physiological needs as social and esteem. Social needs establish a sense of belonging or relatedness, which Maslow suggests is satisfied by non-sexual love. Esteem needs are recognized by the need to feel competent in participated activities. Accomplishment and success satisfy the individual's needs of self-esteem and feeling good about oneself.

When basic physiological needs and general psychological needs are satisfied, the next needs are revealed. As Maslow (1943) suggested, the highest-level psychological needs include self-actualization and fulfillment. Self-actualization is the maximizing of one's potential, and the jurisdiction a person possesses in doing so. Motivation to fulfill one's potential relates to autonomy and control over the outcome of one's life. When someone reaches the meeting of these needs, all other needs lower in the hierarchy are fulfilled and no longer affect a person's motivation of actions. Needs from social, esteem, and self-actualization are all reflected in the work of Deci and Ryan (2000) and they serve as the basis of future motivational theories.

Deci and Ryan expanded on Maslow's *Hierarchy of Needs* by identifying the basic need for all humans to seek autonomy, relatedness, and competence in the activities they perform (Deci & Ryan, 2000). By these terms, people want to be able to have a choice in what they do, feel connected to others in their activities, and excel and perform well at their tasks. Applying the concept of psychological motivations to participation in strength and conditioning, an athlete's choice to participate would, in theory, be related to at least one of these three psychological factors as research supports the use of similar frameworks for studying motivations for exercise (Wilson et al., 2003). Wilson and colleagues (2003) examined how exercise can satisfy psychological needs and identified

certain exercise behaviors associated with greater needs satisfaction. In their study, participants increased their perceived competence and relatedness as they adhered to an exercise program. Within this study, positive motivational consequences (more frequent exercise participation, positive attitudes towards exercise, and better overall physical fitness) were observed in participants with greater psychological needs satisfactions in terms of competences and autonomy. Some of the motivations highlighted within the study originated within the participant in the form of intrinsic motivation, as well as externally regulated motivations, as in the identification of positive benefits resulting from exercise. These externally derived motivations are termed extrinsic motivations (Vallerand & Losier, 1999). Previous literature acknowledged the possible shift in motivations from extrinsic to intrinsic as a result of participating in prolonged exercise programs (Mullen & Markland, 1997).

Intrinsic and Extrinsic Motivation

Motivation is defined as the determinants for initiation and persistence of behaviors (Deci & Ryan, 2000; Sullivan & Strode, 2010). The origin of these determinants may come from different places, or psychological needs. Intrinsic motivation (IM) is the drive of someone to participate in an activity because they find it interesting or enjoyable (Vallerand & Losier, 1999). IM has been identified as the enjoyment of participating to learn new things, accomplish new things, or the general sensation of the activity (Pelliter et al., 1995). A tangible example of this would be someone enjoys cooking for the enjoyment of learning new skills in the kitchen.

Extrinsic motivation stems from the external consequences of the activity, not the activity itself (Vallerand & Losier, 1999). Other forms of external motivation include

instances of peer-pressure or even coercion. Avoiding an external consequence is an example of extrinsic motivation, which limits the attention to the task and highlights the avoidance of a negative outcome (Elliot, 1999). Choosing to take part in a task to acquire the positive benefits coming from the activity yields concerns with participation sustainability if those positive outcomes are removed or diminish over time (Wilson et. al, 2003). Should someone's sole motivation be to be better than everyone else at the task, the person's desire may wain if a more suitable rival threatens their top-performer position (Nicholls, 1984).

The concept of competition is a unique motivator as it covers many different sensations or origins of motivation (Abuhamdeh, & Csikszentmihalyi, 2009). The competition outcome (i.e., a win or a loss) is an extrinsic motivator. However, if the person enjoys the act of competing because it brings them enjoyment, or they appreciate the challenge from competing, these are intrinsically based motivators (Abuhamdeh, & Csikszentmihalyi, 2009). Using competition as a blanket term can mask the meaning or motivation behind it. Competition could mean the record of wins and losses which is an external driving factor of social comparison, and a prime example of extrinsic motivation. Competition could alternatively refer to the satisfaction one feels when being challenged by an adept opponent, which would transfer the motivation to an internal drive as intrinsic motivation. The interchangeability of the term confounds the locust of motivation and may mask the true motivational intentions and should be further explored.

Amotivation is the lack of desire to perform or participate in an event or activity (Pelletier et al., 1995). Choices to participate in an activity resulting from IM are more sustained than participation from extrinsic motivation alone, as IM satisfy the

psychological needs of relatedness, autonomy, and competence (Deci & Vansteenkiste, 2003; Zahariadis et al., 2006). Athlete dropout rates are higher with lower levels of IM and extrinsic motivation and higher levels of amotivation (Calvo et al., 2010). Participating in an activity with purely extrinsic motivations has been associated with a reduction in wellness such as excessive social comparisons and unstable self-esteem (Vansteenkiste et al., 2004). Research also suggests a mixture of intrinsic and extrinsic motivations support strength training participation (Gilson, et al., 2008). Amorose and Horn (2000) found athlete intrinsic motivation to be related to the coaches' behavior. A coach with more frequent positive and informally based feedback on player performances would be successful in facilitating athlete IM even among older and higher skilled levels of play (Amorose, & Anderson-Butcher, 2007; Amorose, & Horn, 2000). Internal and external factors of motivation may affect the participant's own beliefs in their effectiveness of the outcome of participation.

Self-efficacy is the "belief in one's capabilities to organize and execute the courses of action required to produce given attainments" (Gilson & Curnock, 2012, p. 443). This belief is a form of internal or intrinsic motivation most associated with autonomy, and it has been shown to be effective in behavior influence (Gilson et al., 2012; Gilson et al., 2008; Strachan et al., 2005). Gilson et al. (2012) studied student athletes' self-efficacy effects on their efforts in strength and conditioning over time during an off-season. The study looked at subjects' efforts over time in relation to their self-efficacy (within subjects), as well as the differences between an athlete's self-efficacy and efforts in the weight room. The study found that athletes with greater self-efficacy gave more effort in the weight room than those with less self-efficacy.

Significantly, this was the first time comparing the relationship between self-efficacy and effort given among elite athletes over a sport season.

When studying self-efficacy and athlete self-identity on running duration, Strachan, Woodgate et al. (2005) found the stronger a person identified as being a runner, the greater confidence they possessed in their running and recorded longer duration and greater frequency of vigorous exercise than less identified runners. Following these findings, it would be logical to reason those athletes who identify more strongly with being an athlete could more readily participate in strength and conditioning programs than those with lower athlete identities. Going forward, it is important to understand the collegiate athletic population has many subpopulations such as gender, sport the athlete plays, type of sport, and age. All subpopulations may have individual effects on an athlete's motivation and how they approach participation in an activity.

Self-Determination Theory

Deci and Ryan (1980) conceptualized Self-Determination Theory (SDT) in 1980 as an expansion of their Cognitive Evaluation Theory. SDT outlines a range of motivations satisfying psychological needs relating to one's ability to determine their own actions. Self-determination is derived from the natural desire for autonomy, competence, and relatedness (Deci & Ryan, 2000). The theory was first applied in organizational research and it has since been used in multiple areas including the workplace (Meyer & Gagne, 2008), education (Reeve, 2002), psychology (Deci, & Vansteenkiste, 2003; Van den Broeck et al.,, 2008) and sport (Fenton, Duda, & Barrett, 2014; Frederick-Recascino, 2002; Gaston-Gayles, 2005; Keshtidar & Behzadnia, 2017; Ntoumanis & Standage 2009; Vlachopoulos et al., 2000; Zahariadis et al., 2006).

Autonomy is one's personal control of their behavior and self-organization, relatedness refers to one's connection to others, and competence denotes the ability to affect one's environment and to obtain desired outcomes (Deci & Ryan 2000). In a circumstance with great self-determination, all three needs are satisfied (Deci & Ryan, 1980). In contrast, when one or more of the three needs are not met, there is little self-determination. Activities with less self-determination are found to be less enjoyable and there is a lower chance of continuing the activity (Deci & Ryan, 2000; Deci, & Vansteenkiste, 2003; Gagné & Deci, 2005).

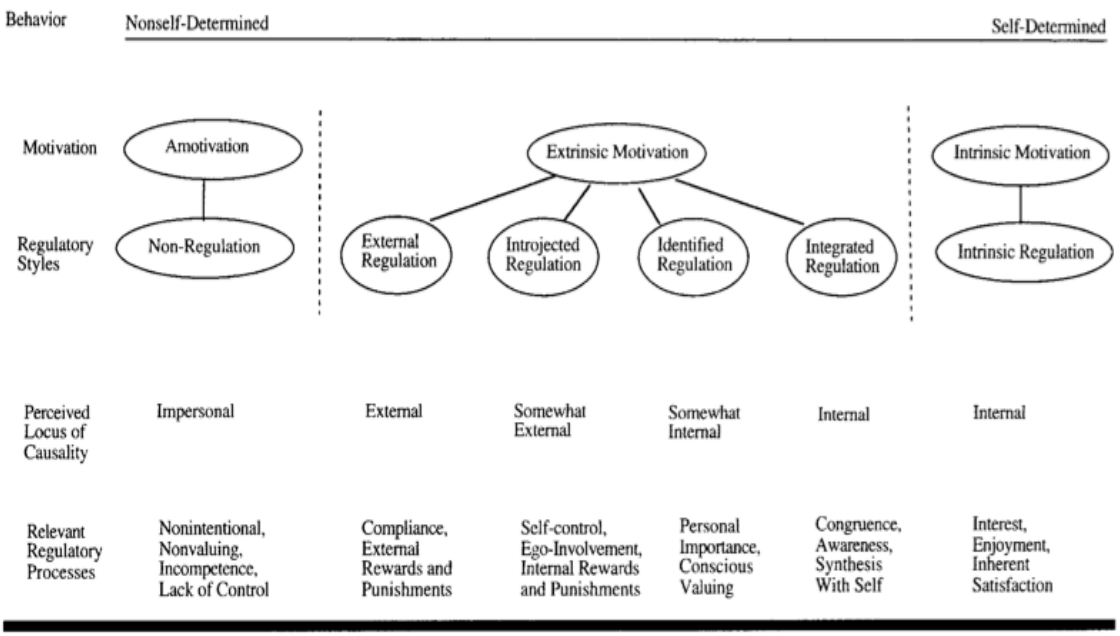
The self-determination spectrum organizes driving factors along a range of motivations according to the level of autonomy, relatedness, and competence the factor offers the participant (Deci & Ryan, 2000). Motivations with very low levels of self-determination will be on an opposite side of the gamut from motivations conferring a great level of self-determination; at one end of the continuum is amotivation and at the opposite end is intrinsic motivation. Several external motivations reside in the space between amotivation and intrinsic motivation. The arrangement of motivations is not meant to indicate that as a person's motivation changes, they adopt the next motivation in line, but rather that some forms of motivation possess greater levels of self-determination than others. At the current time, there are six separate motivations along the self-determination spectrum.

Intrinsic motivation is considered significantly autonomous, and greater levels of autonomy support more intrinsic motivations (Deci & Vansteenkiste, 2003). Regulated or controlled motivations, like those impressed upon someone by others, are accompanied by a sense of pressure of having to behave a certain way, and these are considered

extrinsic motivation (Gagné & Deci, 2005). Motivations towards the end of lower self-determination often thwart the satisfaction of psychological needs (autonomy, competence, and relatedness), and are associated with maladaptive behaviors (Deci & Vansteenkiste, 2003; Vlachopoulos et al., 2000). Maladaptive behaviors impede individuals from adapting and growing and are associated with acts which lead to cessation of activity participation, enjoyment of activity, and desire to participate (Cervelló & Santos-Rosa, 2001; Deci & Vansteenkiste, 2003; Duda et al., 1995).

Internalization comes from taking external motivations and using the associated outcomes of an activity as sources of desire for participation (Deci & Ryan, 2000). This is still not an intrinsic motivation as the activity is not what is driving the motive, but rather, the outcomes associated with the activity are the compelling factors. Peer pressure or coercion are two prominent examples of internalized external regulation, as the genesis of motivation comes from the participant, but it is imposed by external factors. Deci and Ryan (2000) continued to classify the three internalized regulations of actions in SDT as *introjection, identification,* and *integration. Introjection* occurs when an external motivation is internalized but not considered as the person's own choice. *Identification* regulation revolves around the choice to participate in an activity as a person finds value and importance in doing so. *Integration*, the most self-determined external motivation, is present when the choice to participate in an activity aligns with the person's values and identity. The authors also produced the visual below aligning motivations according to self-determination (see Figure 1).

Figure 1
The Self-Determination Continuum Showing Types of Motivation With Their Regulatory Styles, Loci of Causality, and Corresponding Processes



Much of the research using SDT analyzes the influence of an autonomy-supported climate or approach, as seen in teaching (Abery & Zajac, 1996; Hu, & Zhang, 2017; Reeve, 2002), parenting (Joussemet et al., 2008), and even healthcare providers (Ng et al., 2012). The desire to obtain autonomy supports the highest level of psychological needs satisfaction and self-actualization (Deci & Ryan, 2000; Ng et al., 2012). Joussemet et al. (2008) conducted a meta-analysis on parenting styles across three different types of studies and the corresponding child behavior outcomes. The three approaches included were observational studies where parents played with their children while being videotaped, parent interviews, and child perceptions of parental behavior. The study found that children of parents with behaviors consistent in supporting their child's autonomy persisted in tasks and showed greater task-specific interest, adopted parental beliefs (internalization), and were rated higher in academic tasks with less acting-out

(Joussemet et al., 2008). Additionally, when parents used guidance in a gentle manner rather than a controlling manner, their child's behavior resulted in higher levels of committed compliance (the child doing what the parent desired after the parent left the room). The authors also found that parents' nurturing of autonomy yielded more favorable results both behaviorally and academically across age ranges from infants to elementary-school aged children. Studies support the inclusion of SDT approaches to children with disabilities (Abery & Zajac, 1996; Gordey, 2020). Developing self-determination can help alleviate the challenges in social and learning environments in children with hearing loss (Gordey, 2020). Children with disabilities raised in home environments supporting self-determination assume greater control over their lives, relying less on external care than their counterparts without self-determination opportunities (Abery & Zajac, 1996).

We see similar effects in the classroom behavior with reference to autonomy-support. Teaching studies support autonomy-based approaches in classrooms (Abery & Zajac, 1996; Hu, & Zhang, 2017; Reeve, 2002). Reeve (2002) identified that a student's autonomic motivation level directly relates to higher academic achievements, higher self-worth, higher perceived competence, and higher rates of retention. Autonomy was associated with a student's preference for optimal challenge and greater pleasure from optimal challenge (Reeve, 2002). Meaning, when a child felt greater autonomy, they were more likely to seek out a challenge and derived more pleasure from that challenge, yielding more intrinsic motivation. Giving a child the choice of what they want to learn in the classroom helps support this autonomy-enhancing environment (Abery & Zajac, 1996). When teachers promote and support child-initiated activities with respect to the

child's preferences, studies show greater skill development than traditional, pre-selected lessons (Abery & Zajac, 1996). English as a second language learning classrooms implementing action programs for student autonomy yielded a transition of student motivations from dependent to autonomous motivations, and as the motivations progressed autonomously, English proficiency improved (Hu, & Zhang, 2017). As the students possessed greater autonomy, they achieved greater success in the task, further supporting the findings of Abery and Zajac (1996) as well as Reeve (2002).

In a meta-analysis by Ng and colleagues (2012), mental and physical health outcomes were measured according to the healthcare provider's support of patient autonomy. The study reviewed 184 datasets concerning health behaviors such as diabetes management, weight control, tobacco use, physical activity, and the patient's perception of the healthcare provider's autonomy support. The study found positive correlations with autonomy-supporting healthcare providers and positive patient mental and physical health behaviors. An example of autonomy-supported healthcare climate included "I feel understood by the physician" (p. 327). The connection and relatedness felt by the patient provides greater support for the patient's autonomy. In a circumstance where a behavioral change is required to improve the patient's mental or physical health, the authors recognize "behavior change is more effective and lasting when patients are autonomously motivated" (Ng et al., 2012, p. 325). Unsurprisingly, negative health behaviors for both mental and physical health were correlated with controlling healthcare climates (Ng et al., 2012). An example of a controlling healthcare environment included "My physician tries to motivate me to exercise by promising to reward me if I do so. She is less accepting of me if I fail to do so" (p. 327). Here, we see the physician is emphasizing the choice and

applying an extrinsic reward, rather than supporting the patient's choice to engage in exercise. When assessing the use of SDT to study antecedent factors and corresponding outcomes, Ng and colleagues (2102) found SDT an appropriate conceptual framework to use.

Environments can influence the emphasis of motivation (Weinstein & Ryan, 2011). When the environment supports autonomy, the person will be able to better achieve autonomous feelings, however when the environment harbors greater control over one's decisions, greater stress is perceived and fewer needs are met (Deci & Ryan, 2000; Weinstein & Ryan, 2011). The satisfaction of psychological needs has been impacted by the environment thrust upon people through the COVID-19 pandemic. Researchers identified the restrictions of self-determined behaviors have had a negative impact on well-being (Šakan et al., 2020). Relatedness and autonomy were directly impacted through complete lockdowns and social distancing guidelines. These two psychological needs were the most impactful on well-being when they were not met (Šakan et al., 2020).

Well-being and stress management is impacted by autonomy and aspirational type. When individuals act according to intrinsic aspirations and attaining goal outcomes, psychological needs are satisfied (Deci & Ryan, 2000; Weinstein & Ryan, 2011). The same cannot be said for the pursuit of extrinsic aspirations and goals. Thus, when fulfilling intrinsic interests, individuals can satisfy psychological needs better than when following extrinsic interests. Due to this, when extrinsic motivations like image, social standing, and money are the primary drivers of behaviors, one's self-esteem is more fragile and contingent upon the attainment of these external factors (Weinstein & Ryan,

2011). When acting according to extrinsic influences and control, a person experiences greater levels of stress, especially when one feels a level of competition with others in an activity. However, not all activities should avoid competition, some, like sports, are designed to emphasize it.

SDT and Sport

Several studies have applied SDT to sport and coaching, with a variety of research concentrations including sport dropout rates (Calvo et al., 2010), anticipated continuation in sport (Keshtidar & Behzadnia, 2017), sport commitment (Zahariadis et al., 2006), influences of coach's style of leadership (Amorose & Anderson-Butcher, 2007), and athlete morality behaviors (Ntoumanis & Standage, 2009). Fendon and colleagues (2016) studied the relationship between autonomy and the participant's level of effort given in a sport setting. The study results concluded that athletes with greater autonomous motivations gave a greater effort than those with lower autonomous motivations. While tactical and strategic knowledge of a certain activity is imperative to the job of a coach (Kraemer, 1983), coaches are often tasked with the obligation to motivate, drive, and encourage their athletes into giving greater levels of effort even during times of fatigue and low-morale (Amorose & Anderson-Butcher, 2003; Spence & Oades, 2011). A coach may apply the components of SDT to sport to aid athletes in pressing on during those difficult times, even modifying their encouragement styles to reach different athletes and help influence the ways athletes think and approach certain situations (Amorose, 2007). These subtle changes may result in greater effects because of the coaching style appealing to the athlete (Amorose, & Anderson-Butcher, 2007; Spence, & Oades, 2011).

When using SDT as the theoretical framework, studies found sport dropout to be related to higher levels of amotivation, external regulated, and introjected regulated motivations, as well as lower satisfaction in terms of relatedness and autonomy (Calvo et al., 2010). This is significant as sustained participation is associated with higher levels of identified regulated, integrated regulated, and intrinsic motivations (Calvo et al., 2010). With identified and integrated regulated motivations residing on the higher end of the self-determined spectrum, it makes sense that the study found that athletes with higher self-determination will persist in an activity, as their participation was their autonomous choice and not based on the influence of others. Results of Calvo et al. (2010) support the importance of relatedness, as it can help root someone to an activity if they feel connected to their fellow teammates while performing the activity.

Supporting these findings, Keshtidar and Behzadnia (2017) used SDT to predict whether students would continue in sport participation. The study's findings revealed that greater autonomous motivations were associated with continued participation in sport. Autonomy-supported coaching styles have been found to positively influence athletes' motivations (Amorose & Anderson-Butcher, 2007; Ntoumanis & Standage, 2009), so as athletes gain a greater level of autonomy, they will be more inclined to give greater effort (Fenton et al., 2016) and continue their participation in training long term (Calvo et al., 2010; Keshtidar & Behzadnia, 2017).

Coaching, and the atmosphere a coach supports, plays a significant role in an athlete's participation in an activity, as the coach has the ability to manipulate the focus or objective in a training session as well as throughout the entire training program (Amorose & Anderson-Butcher, 2007; Spence & Oades, 2011). Fenton et al. (2016)

studied how coach-supported autonomy influences athletes' efforts to work moderately or vigorously in practices and in games. The study found coach-supported autonomy emphasizes the athlete's choice in participation and results from training. Scientifically, the training effect received from the training program is directly related to how far the athlete pushes themselves. When an athlete understands if they give a greater effort, they will receive more benefits, they then understand they have a measure of control over the level of adaptations from training they will receive. The results of the study by Fenton et al. suggest athletes are more likely to engage in sport when coaches provide an atmosphere where athletes are given a sense of choice and supported in self-initiative. Applying this to practical settings, when athletes choose to participate, they show a greater level of effort in their activity than those athletes under more controlling styles of coaching. As a result of this self-determined coaching style, athletes spent more time physically engaged in higher effort bouts of physical activity devoted to their sport.

Ntoumanis and Standage (2009) hypothesized that an autonomy-supported coaching style, which emphasized athlete choice and control in decision-making for participation, would positively affect the psychological needs of relatedness, competence, and self-determination. The study found that autonomy was associated with athlete identity and social behavior through sportsmanship and was negatively associated with antisocial moral attitudes. When an athlete felt greater autonomy in their participation, they were more likely to act with higher morals in sport and stay more connected in their social behaviors. According to the authors, the acquired autonomy leads to more responsible actions, which are favorable characteristics for leaders of the team to possess.

Research has demonstrated that intrinsic motivation, the highest level of motivational autonomy, is associated with greater sport commitment, as the athlete enjoys playing the sport and is more likely to continue participation (Zahariadis et al., 2006). Unsurprisingly, amotivation is associated with lower sport commitment, which is reasonable, as someone who does not see value in an activity will likely yield dropout behaviors (Deci & Ryan, 2000; Zahariadis et al., 2006). Greater self-determination scores are associated with greater sport commitment (Zahariadis et al., 2006), lower dropout rates and continued sport participation (Calvo et al., 2010; Keshtidar & Behzadnia, 2017), more moral behavior (Ntoumanis & Standage, 2009), and higher physical intensity efforts given (Fenton et al., 2016). The current study seeks to discover if these findings are transferrable to the strength and conditioning setting as a part of the sport participation experience.

Vlachopoulos et al. (2000) identified motivation profiles of adult athletes to better understand the difference in athletes' motivations and their impact on positive and negative motivation outcomes such as satisfaction, anxiety, interest, and persistence at a task. Several studies have examined the effect of high self-determined motivations on positive activity participation (Deci & Ryan, 1980; Vallerand, 1997). Vlachopolos and colleagues (2000) frame the relationship well by stating "more self-determined forms of motivation are expected to correspond with more positive outcomes, whereas less self-determined forms correspond with more negative outcomes" (p. 388). Their results provided support for this hypothesis, as participants who had multiple types of motives (both self-determined and non-self-determined) for participation reported significantly

high scores on positive associations with their participation through enjoyment, attitude towards sport participation, and satisfaction.

The study by Vlachopolos and colleagues (2000) highlights the need to understand an athlete's motivation to participate in an activity, as higher self-determined motivations are associated with more positive relations with participation, which may imply a longer intent to participate, with lower dropout rates, and greater commitment to the activity (see Calvo et al., 2010; Keshtidar & Behzadnia, 2017; Zahariadis et al., 2006). With strength and conditioning being effort-based, the higher self-determined an athlete's motives are, the greater effort they are likely to put forth (Fenton et al., 2016). Vlachopoulos et al. (2000) used SDT to establish motivation profiles of adult athletes and to understand the relationship between these profiles and motivation consequences. They found that individuals with a profile greater in both non-self-determined and self-determined motives had higher performance outcome variables than participants with high self-determined motives but low non-self-determined motives. The study also found that individuals with low self-determined and high non-self-determined motives likely do not persist in sport due to the lack in overall motivation required for long-term, high-level sport performance.

SDT acknowledges the different types of motivation someone can have. Motivational sources vary from person to person and by situation, but one's motivation is influenceable and can be manipulated (Amorose & Anderson-Butcher, 2007; Spence & Oades, 2011). The quest to satisfy the psychological needs of autonomy, relatedness, and competence is seen through the varying levels of SDT, but the motivation origin is not identified. Goals are the reasons or purposes someone espouses when participating in an

activity (Ames, 1992; Wolters, 2004). When athletes establish goals, they inherently influence their motivations (Duda et al., 1995). Goals, like motivations, can come from internal or external sources and it is important to take this into consideration when identifying an individual's overall approach to participation (see Duda et al., 1995; Nicholls, 1989).

Achievement Goal Theory

The concept that individuals may have multiple sources and types of motivation is supported by the presence of a range of extrinsic motivations across the self-determination scale. Theorists came to similar conclusions in the development of Achievement Goal Theory (AGT) as they acknowledged different types of motivation can lead to various qualities of learning and well-being (Urdan, & Kaplan, 2020). AGT states that in a setting where achievement is possible, like sport and training, a person's goals influence how they think, feel, and act (Duda et al., 1995). These achievement goals give "meaning to actions and provide a rational coherence to the interpretation to each … event and …behavior" (Duda et al., 1995, p. 41). Duda et al. (1995) refer to similar psychological needs of autonomy, relatedness, and competence as described previously by Deci and Ryan (1999) and Maslow (1943). Goal orientations may influence the way individuals perceive the purpose of involvement in an achievement context (Dweck, 1986; Nicholls, 1989). AGT is centered around the behaviors and beliefs resulting from different quality goals chosen in achievement situations as the separate goal-orientations originate from different desires and motivations for participation (Nicholls, 1984). The two primary goal orientations of AGT (ego-oriented and task-oriented goals) hinge on the concept of competence but adopt separate definitions. When

the individual compares their performance of an activity only to their own performance as they focus more on learning and understanding the task, they possess more task-oriented goals (Duda et al., 1995). For task-oriented goals, the individual is interested in achieving proficiency, high-performance of the task, and a drive for activity competence is the motivating aim for participation (Dweck, 1986; Nicholls, 1989). Someone may wish to attain a high level of task mastery for the enjoyment of the task challenge without reference to how their peers perform a similar task.

Ego-orientation pertains to an athlete's status and their level of standing with regards to task performance (Dweck, 1986; Nicholls, 1989). Ego-orientation relates to social comparison and the task is a means to an end in terms of improving their status; the task is irrelevant if the ego-driven person is the best at the task (Duda et al., 1995). When an individual measures competence by comparing their performance to another's, the understanding of the task takes a backseat. The participant's perception of how well they accomplish an activity is established by performing better than other participants through ego-orientation, regardless of how well (in relation to the ideal task performance) they execute the task (Duda et al., 1995). Two people with opposing goal-orientations may perform an activity identically with opposing concepts of competence and perceive their achievements very differently based on their points of reference. In such situations, the competence of a task is relative to their point of reference. Social comparison and public evaluations of ego-oriented goals are associated with patterns of maladaptive motivations, which "harm initiation and maintenance of achievement activities" (Cervelló & Santos-Rosa, 2001, p. 527). Because of this, ego-orientation is a less sustainable

motivating factor in driving one's behaviors to continue participation in an activity (Duda et al., 1995).

> Dweck (1986) identified achievement goals within two similar classes, [L]*earning goals*, in which individuals seek to increase their competence, to understand or master something new, and *performance goals*, in which individuals seek to gain favorable judgments of their competence or avoid negative judgments of their competence. (p. 1040)

Dweck goes on to label learning goals as *mastery-oriented* and retained *performance-oriented* for social comparison-driven goals. Applying this to Duda et al. 's findings (1995), ego-orientation and task-orientation are likened to performance-orientation and mastery-oriented, respectively. Achievement scenarios such as sport may offer ego-orientation through competitions and task-orientations through skill development; however, more task-oriented athletes possess greater interest in practicing and enjoy sport more than ego-oriented athletes (Duda et al., 1995). When motivated through task-orientation, the athlete will perform the action to their best ability, often searching out how to execute the task more proficiently. Should the athlete set ego-oriented goals, the performance in the task may only be as good as needed to acquire a satisfactory social comparison, rather than them fully reaching their potential (Duda et al., 1995).

It has been suggested that individuals who focus on the task will possess greater persistence when experiencing challenges in achievements, yielding the development of new strategies for performance improvement (Dweck, 1986; Urdan, & Kaplan, 2020). Maladaptive behaviors are challenge avoidance, low persistence, high anxiety, and performance deterioration. It is predicted that those with ego-oriented goals will exhibit

maladaptive behaviors when encountering challenges or difficulties (Dweck, 1986). An alarming but prime example of maladaptive behaviors was observed in research studying disordered eating in aesthetic sport athletes (e.g., artistic gymnastics and dance; de Bruin et al., 2009). The study found a greater emphasis of peer-pressured weight regulations and disordered eating in athletes of ego orientation, while task-oriented groups had significantly fewer dieting issues (de Bruin et al., 2009). Taking this into consideration, it is not surprising to see the social comparisons of ego-oriented goals turn into harmful forms of peer pressure and resulting adverse behaviors, especially in impressionable populations.

The facade of social comparison through ego-oriented goals makes one vulnerable to exposure of their possible fraudulence. This fear of exposure is like that experienced in the imposter phenomenon. Imposter phenomenon is characterized by the feeling of fraudulence experienced in highly achieving persons, often observed in females, but also present in males (Clance & Imes, 1978). Individuals experiencing imposter phenomenon possess doubts whether the achieved performance is related to their abilities or more associated with non-achievement factors (Clance & O'Toole, 1988). Doubts of ability and fear of exposure could eventually alter a person's motivation to engage in an activity (Kumar & Jagacinski, 2005). When comparing goal orientations to imposter fears, females had a lower association of imposter fears with higher task-orientation, however, male participants did show higher imposter fears with greater ego-oriented goals (Kumar & Jagacinski, 2005). Simply stated, females who are less self-referent expressed higher imposter fears than those who compare their competence to their own previous performance on the task without considering how others accomplish the task.

Early work by Nichols (1989) used AGT from a social justice perspective to address deficiencies in educational opportunities among students of varying levels of ability. The author concluded that schools should emphasize a task-orientation, over focusing on competitions and comparison, to provide an opportunity for all students to succeed regardless of current ability level (Ames, 1992). Another education-based study found students in a mastery- (task) focused classroom showed stronger likelihood to ask for help compared to those in a performance (ego) based class (Linnenbrink, 2005). To apply these findings to practical settings, in an environment emphasizing understanding, students could ask questions without the fear of being labeled as one with less inherent knowledge or skill.

Leadership styles have been found to influence the goals their followers adopt. Hamstra et al. (2014) studied the effects that transactional and transformational leadership had on the goals set by followers. The study identified a greater association between transactional leadership and performance/ego goals set by followers as well as transformational leadership's association with task mastery goals. When considering the achievement setting of sport, coaches can employ different leadership styles to influence the environment and manipulate the setting of different goals. In turn, these goals can affect how an athlete approaches their training (Ames, 1992; Duda et al., 1995).

AGT and Sport

If goals can influence how people think, feel, and act, how an athlete approaches training is directly linked to what goals they set for themselves (Ostrow, 1976). Likewise, if a coach manipulates their coaching style to emphasize the difference between task and ego orientation goals, there is a perceptible shift in the athlete's own goal orientation

(Amorose & Anderson-Butcher, 2007; Spence & Oades, 2011). A task-oriented motivational climate can influence athletes to possess greater activity-specific goals (Chin, Khoo, & Low, 2012). Likewise, if a coach were to engage in social comparison (i.e., promote ego-orientation), the focus would transition away from the activity at hand and yield lower overall motivation for participation (Barić & Bucik, 2009).

Gilson et al. (2008) used goal orientation to understand athletes' motivations in the weight room. The authors identified the top motivational orientations as task-orientation, social-approval orientation, and self-enhancing motivation (which is a division of ego-orientation). Task-orientation is the desire to perform a task competently. Social approval is the desire to be acknowledged by important individuals (like coaches) for their efforts. And self-enhancing orientation is the desire to perform tasks better than others. The study highlighted the possibility of increasing task-orientation by focusing on the task itself rather than the athlete who is performing the task, removing social comparison. The authors also noted that the detrimental effects of the work-avoidance goal-orientation may be diminished through the athlete gaining greater competence in their ability to perform the work, increasing their confidence to consistently do so.

Research has identified differences among athlete goal orientations. Gender impacts goal setting, as male athletes have been consistently found to be more ego-oriented than female athletes (Chin et al., 2012; Hanrahan & Cerin, 2009; Krouse et al., 2011). Chin et al. (2012) also found that male athletes have more motivation (intrinsic, extrinsic, and amotivation) than female athletes, which suggests that male athletes have greater provocation to participate. Krouse et al. (2011) researched the motivations behind the training habits of women ultramarathon runners. Significant findings from their study

revealed that health and achievement were primary motivators. Additionally, participants were more task-oriented than ego-oriented, which is consistent with previous findings (see Hanrahan and Cerin, 2009).

Schneider et al., (2017) studied the effect of goal orientation on enjoyment. The authors found that task-orientation was positively related to sport enjoyment among ice hockey players, with players identifying with ego goal-orientation measuring lower on sport enjoyment. As the enjoyment of the game, or participation in any activity diminishes, one's choice to continue to participate will likely drop (Gagné, & Deci, 2005). Hanrahan and Cerin (2009) found trends in terms of gender and sport type according to goal orientations. Athletes participating in team sports (i.e., basketball and soccer) had higher task orientation, while those playing individual sports like tennis, golf, and diving exhibited greater ego-oriented goals. Males displayed greater ego-orientations and females displayed more task-orientations when playing their sport (Hanrahan & Cerin 2009; Krouse et al., 2011).

Van de Pol and Kavussanu (2012) studied team and individual sport athletes during their sport season, focusing on competition and training goal orientations. Greater task-orientations were identified in training, which is reasonable as training focuses on individual efforts versus global comparisons. Not surprisingly, athletes reported greater ego-oriented goals during competition, as competition is a direct comparison of one's (or the team's) performance and abilities against another's. It is important to note that these trends are found in athletes playing their sport, not athletes participating in strength and conditioning. While athletes do acknowledge the benefits to sport performance resulting from strength and conditioning programs (Elder et al.,2014; Poiss et al., 2004), literature

around participation in strength and conditioning is limited, with little understanding regarding an athlete's motivations to participate. Task-orientation is related to intrinsic motivation (Dweck, 1986; Nicholls, 1989). Research states that "intrinsic motivation is a consequence of a need to feel both competent and self-determined" (Chin et al., 2012, p. 152). Coaches can emphasize this learning style by focusing on competency rather than competition while coaching. Task-oriented goals are more sustainable and lead to greater overall motivation (Barić & Bucik, 2009) and longer-term participation (Duda et al., 1995).

If one were to compare goal orientations to the motivations along the SDT spectrum, a comparison could be made between ego/performance goals and the internalization regulation of introjection, as the performance is a means to build self-confidence (Deci & Ryan, 2000), but it is not associated with the task itself. With that said, task/mastery goal orientation is like intrinsic motivations of learning and/or achievement, as partaking in the task serves as the means and the end (Deci & Ryan, 2000). Research supports these comparisons (see Duda et al.1995; Ommundsen & Roberts, 1996; Schneider et al., 2017), however, the combination of the SDT and AGT allows us to examine a larger picture of not just motivational characteristics. The focus of the motivation is driven by the athlete's desire to achieve a particular goal. An ego-oriented goal will likely be fueled by external or introjected motivations, which are not the most sustainable (Dweck, 1986; Gagné, & Deci, 2005). However, a task-oriented goal is more likely achieved by internalized and intrinsic motivations. Task-oriented and intrinsic motivations are associated with greater enjoyment of the activity itself (Schneider et al., 2017).

SDT and AGT in Sport

SDT and AGT demonstrate that motivation is a multidimensional concept. It would be unusual to identify a person with only one form of motivation or one type of goal. Goals driving self-determined motivations can affect participation and activity outcome success depending on the orientation of task or ego (Barić & Bucik, 2009; Duda et al., 1995). Several studies have utilized instruments to measure both SDT and AGT in related fields such as physical activity, exercise, and sport (Biddle et al., 1999; Keshtidar & Behzadnia, 2017; Ryan & Connell, 1989; Zahariadis et al., 2006). While the information uncovered in the following studies yields a greater understanding regarding athlete motivations in sport, strength and conditioning participation motivations are still unclear. Biddle et al. (1999) used their findings to predict intentions for physical activity participation in Hungarian youth through sports. The study used both the Self-Regulation Scale (Ryan & Connell, 1989) and the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Chi & Duda, 1995) to identify the relationship between four external regulations of SDT through the mediating effects of ego and task-orientation. The study found task-oriented goals to be mediated by identified and integrated external regulations. Recalling SDT, identified and integrated regulations are the highest in autonomy of the extrinsic motivations. Ego-oriented goals are mediated by perceived competence and externally and introjected regulations (Deci & Ryan, 2000). Results from Biddle et al. (1999) support of these defining ego-oriented factors, as external and introjected regulation are lowest in autonomy of extrinsic motivations and inherently are either enforced solely be others (coaches/parents wanting you to participate) or by an internal guilt or compulsion not completely associated with positive motivations (Gagné, & Deci,

2005). Joining both theories into their findings, Biddle et al. (1999) found ego-oriented goals were strongly related with lower self-determination, while task-oriented goals were associated with greater levels of self-determination when anticipating future participation in physical activity.

The work of Biddle and colleagues (1999) is supported by the findings of Ntoumanis (2001). In this study, task-orientation goals predicted motivations with high self-determination, while ego-oriented goals predicted lower self-determined variables (Ntoumanis, 2001). Consistent patterns have emerged in the research. Task-orientations are strongly linked to high self-determined motivations and intrinsic motivations, while ego-orientations are associated with lower self-determined motives and higher extrinsic motivations (Biddle et al., 1995; Frederick-Recascino, 2002; Ntoumanis, 2001). Advancing on this knowledge, researchers have used these associations to predict participation in various activities. Cerasoli and Ford (2014) found, through longitudinal data, the relationship between intrinsic motivation and performance is mediated by mastery goals, and the relationship is reciprocal in nature between intrinsic motivation and mastery-oriented goals over an academic semester. According to Cerasoli and Ford (2014), "mastery goals would have reciprocal effects on intrinsic motivation because they encourage the likelihood an individual will find him or herself in opportunities to subsequently engage in intrinsically satisfying tasks" (p. 279). Furthermore, Cerasoli and Ford (2014) identified mastery/task-oriented goals as the compass and lens providing direction and focus, while intrinsic motivations supplied the fuel for the duration and intensity of activity participation. This was the first time the relationship between goals and motivations was identified as a cyclical relationship, which can serve as a self-

sustaining pattern for motivation, with motivation yielding support to meet the goal and the goal providing fuel for further motivation. Mastery goals help drive intrinsic motivations and intrinsic motivations drive the setting of mastery goals, all leading to improved performance (Cerasoli & Ford, 2014).

Much research is available on SDT and AGT both separately and jointly within the context of sport. Intrinsic motivation is associated with task-orientation, which is more sustainable in perpetuating participation in activities (Cerasoli & Ford, 2014; Keshtidar & Behzadnia, 2017; Zahariadis et al., 2006). Ego-orientation is tied to greater extrinsic motivations through social comparison, providing a less supportive motivational environment to encourage long-term participation (Barić & Bucik, 2009; Biddle et al., 1999; Cervelló & Santos-Rosa, 2001; Deci & Vansteenkiste, 2003; Lochbaum et al., 2016; Vlachopoulos et al., 2000). Gender, age, sport type, and sport played have all been found to influence motivations in sport participation (Amorose & Horn, 2000; Baker et al., 2003; Chin et al., 2012; Daly & O'Gara, 1998; De Pero et al., 2009; Hanrahan & Cerin 2009; Kilpatrick et al., 2005; Kirkcaldy, 1982; Krouse et al., 2011; Laborde et al., 2016; Lucas, & Pritchard, 2011; Nia & Besharat, 2010; Peterson et al., 1967). All the previously mentioned research was conducted in sport settings, not within strength and conditioning, which is a related and supportive field for sport performance. The current research seeks to identify motivations and goal-orientations of Division I collegiate athletes to participate in strength and conditioning programs as a part of their sport competition preparation.

Collegiate Athlete Populations and Motivation

Gender

Title IX of the Education Amendments Act of 1972 helped even the playing field between genders by allowing more funding and participation opportunities for female student-athletes (Education Amendments Act of 1972, 2018). As a result, some research hypothesized motivations for sport participation would become more homogenous as opportunities become more equitable (Amorose & Horn, 2000). Amorose and Horn (2000) found that female athletes scored lower on perceived choice for sport motivation, implying a lower level of autonomy and intrinsic motivation. Kilpatrick, Hebert, and Bartholomew (2005) specifically studied motivations for sport and motivations for exercise between male and female athletes. Through ranking motives for sport participation between the two genders, Kilpatrick and colleagues found the top motives for males were competition, enjoyment, and challenge, while top motivations for female athletes were affiliation, enjoyment, and challenge. These findings are interesting as males possessed a greater desire for social comparisons in performance, an ego-oriented motivation, while affiliation with a sport or being an athlete, an integrated regulation, was the females' primary motivation to participate in sport. These findings conflict slightly with that of Amorose and Horn, as the affiliation motivation is in line with relatedness and higher self-determined motivations.

Gender is usually not a stand-alone variable. It is often combined with other factors such as sport played or sport types. Examining gender differences within sport type groups, Kirkcaldy (1982) found that male team sport offensive players exhibited greater levels of tough-mindedness, dominance, aggression, and extraversion than their

defensive counterparts, while female team sport offensive players showed an inverse personality pattern with lower extraversion and higher neuroticism. When studying only women in team or individual sports, individual sport female athletes rated higher on personality traits of dominance, adventurousness, and self-sufficiency compared to their female team sport peers (Peterson et al., 1967).

Sport Played

Each sport demands different types of stress from the body (Triplett & Haff, 2015). Certain sports have a long-standing history with strength and conditioning practices such as track and field and football (Lukacs, 2010; Medvedev, 1986), and as such, participation in strength and conditioning is well-ingrained in the sporting culture of those sports. There are clear differences in contact and non-contact sports in terms of physical and mental demands (Sohrabi et al., 2011). Some sports identified as aesthetic sports, like gymnastics, figure skating, and synchronized swimming, place a greater emphasis on fine motor-skills rather than larger movement patterns seen in other sports like football and rugby (Schaal et al., 2011). An example of these differences could be seen in the skills needed to execute a high-scoring floor routine in gymnastics versus the physical demands and gross-motor movements observed in a scrum of rugby.

Broad differences among sports (e.g., contact and non-contact, violent versus nonviolent sports, etc.) have been studied in varying fields from sport consumer motivations (James & Ross, 2004), to athlete academic motivations (Gaston-Gayles, 2004). Studies have found athletes' perceptions of strength and conditioning are different between sports, with some sports judging training as integral for favorable performance outcomes while others did not perceive it as important (Boyd et al., 2017). Yet

surprisingly, there is no literature on different sports athletes' motivations for participating in strength and conditioning. It is worthy to explore this research void within collegiate sport as researchers and practitioners do not know whether there is a difference in motivations between sports.

Individual versus Team Sports

Sports in which the outcome of the competition relies on only one athlete's performance are considered individual sports (Chelladurai, & Saleh, 1978). These sports include, but are not limited to field events like hammer, javelin, shot put, and discus throwing; the jumping events of long jump, high jump, triple jump, pole vault, decathletes/heptathletes, and other single track/cross country events, as well as other sports such as tennis singles, golf, diving, single swimming events, ice skating, gymnastics, and wrestling. Most of the listed sports are available at the Division I level across the United States. In contrast to individual sport, in a team sport, the outcome relies on combined efforts through the interdependent performances of several athletes working together in competition (Chelladurai, & Saleh, 1978). Sports like football, baseball, softball, lacrosse, field hockey, ice hockey, soccer, basketball, and volleyball are team-based sports commonly offered at the Division I level. Research has identified personality differences between individual and team sport athletes (Laborde et al., 2016; Nia, & Besharat, 2010). Additionally, research has found that position-specific personality traits exist among players on the same team (Kirkcaldy, 1982). When compared to team-sport athletes, individual athletes scored higher on self-efficacy, self-esteem, positivity, resilience, and perseverance (Laborde et al., 2016), as well as autonomy and contentiousness (Nia & Besharat, 2010). Pertaining to coaching and

leadership styles, Baker, Yardley, and Cote (2003) found that sport type moderated preferences in different leadership styles and coaching methods. The preference to leadership styles and the previously identified personality differences support sport type as a variable worth exploring for motivation differences, providing evidence that not all sports are the same.

Athlete Age

As athletes age, they experience a natural pattern of physical and emotional maturation, and their sport motivations also change (Daly & O'Gara, 1998). The findings of Daly and O'Gara (1998) identified a general shift from external factors such as social engagement and parental influence in younger years of motivation, to greater levels of intrinsic factors like skill acquisition in older years of motivation. While youth are highly influenced by nature, intrinsic motivations, expressed as a desire to *learn and improve skills* and *learn to do my best*, have been identified as motivations among adolescent athletes (Stern et al., 1995). De Pero and colleagues (2009) support this shift in age-related motivational changes in athletes, as older athletes identified greater intrinsic motivation when compared to their young adult counterparts' greater extrinsic motivation.

As indicated in existing research, there seems to be an influential shift in motivations accompanied by age, as when an athlete is young, they are influenced more by external regulations for motivation; however, they are also aware of their intrinsic motivation factors like enjoyment of the activity and the pleasure of achieving new skills and abilities (Daly & O'Gara,1998; Stern et al., 1995). In young adulthood, there is a mix of intrinsic and extrinsic motivations (Amorose & Horn, 2000; Kilpatrick et al.,

2005), and in older adult athletes, intrinsic motivation makes up the bulk of motivations, with significantly less extrinsic motivations (De Pero et al., 2009; Inceoglu et al., 2012). When using age as a variable, older athletes are more task-oriented than younger athletes (Chin et al., 2012). While the age difference between college freshman and seniors is not as wide ranging as the age demographics examined in previous research, it is significant to understand if the motivations are similar or different across years in school. Generally, the older students-athletes are team leaders, while freshmen and sophomores are still gaining an understanding of team dynamics and the athletics lifestyle (Loughead et al., 2006). Research found peer leaders within sports teams are characterized by their athletic skills and intrinsic motivations for the sport (Price & Weiss, 2011). Understanding if and how motivations differ among age groups can help target when intra-team leadership roles are assumed, and the pattern of motivation shifts throughout their career.

Athletes Injury

Some athletic injuries are significant enough to require recovery and rehabilitation interventions greater than minor rest and icing. As such, athletes experiencing significant injuries may need to work with the entire sports medicine staff, including their strength and conditioning coach, for effective and sustainable injury recovery (Haff & Triplett, 2015; Nalepa et al., 2017; Shaw, Serpell, & Baar, 2019). During this time of injury, injured tissues must be reintroduced to the physical stress of training gradually as the athlete works with their physical therapists, athletic trainers, and strength and conditioning coaching staff to return to athletic activities (Haff & Triplett, 2015; Shaw et al., 2019). This process is called a return-to-play protocol (Nalepa et al., 2017). Athletes are separated from their typical sport activities of practice and training with the team, and

the only route back to their normal athletic life is through proper recovery and their return-to-play protocol. One could argue the resistance training experienced in the return-to-play protocol can affect an athlete's approach to strength and conditioning, and as such, views can change as athletes have to use strength and conditioning as a route back to athletic participation. No research has formally looked at this link between athletes returning from injury and their motivation to participate in strength and conditioning. The current study aims to fill this void and provide a better understanding of the athlete's shift in approach to resistance training after an injury significant enough to require a return-to-play protocol and the specialized resistance training program accompanying this process.

Summary of Literature Review

In conclusion, motivation is defined as the determinants for initiation and persistence of behaviors (Deci & Ryan, 2000; Sullivan & Strode, 2010) and is commonly thought to drive a satisfaction of biological and psychological needs (Freud, 1957; Maslow, 1943; Rogers, 1967). Deci and Ryan (1980) identified the three primary psychological needs sought by humans including autonomy, competence, and relatedness. SDT organizes motivations across a spectrum according to the level of self-determination expressed through that motivation, primarily the level of autonomy (Deci & Ryan, 2000). Goals provide a focus for motivations as the object or aim of an action (Latham, 2004). Dweck (1986), Duda et al. (1995), and Nicholls (1989) identified how goals can be oriented towards the activity itself or towards satisfying one's ego through participation in an activity. AGT recognizes two different ways goals are orientated (task- and ego-orientations) in activities where achievement is possible through participation (Duda et al., 1995). Both SDT and AGT have been used independently to assess sport

participation as well as in combination to better understand participation and engagement in sport (Cerasoli & Ford, 2014; Keshtidar & Behzadnia, 2017; Zahariadis et al., 2006). However, no study has used both theories together to identify athlete motivations to participate in strength and conditioning programs associated with sport.

CHAPTER III

METHODOLOGY

Purpose of the Study

The purpose of this study was to understand the motivations of Division I collegiate athletes to participate in strength and conditioning programs as a part of their sports performance program. Motivation was defined as the determinants for initiation and persistence of behaviors (Deci & Ryan, 2000; Sullivan & Strode, 2010). Self Determination Theory (SDT) aligns motivations on a scale according to the impetus of self-determination, as motivations with higher levels of autonomy, relatedness, and competence represent higher levels of self-determination. Achievement Goal Theory (AGT) addresses the types of goals one sets for themselves and whether those goals align with the task itself or with social comparisons, through task-orientation or ego-orientation, respectively. This study aimed to identify differences in motivations and goal-orientations among college athlete population subgroups including sport played, gender, athlete's year in school, sport type, and athletes experiencing injury. The significance of identifying motivational trends within Division I collegiate athletes to participate in strength and conditioning fills gaps in the literature and improves practices in the strength and conditioning coaching community. The study was guided by the following research questions.

Research Questions

RQ1: What are the motivations of Division I collegiate student-athletes to participate in strength and conditioning programs?

RQ2: Are there differences in motivations to participate in strength and conditioning programs across athlete gender, sport played, sport type, age, and sport injury, controlling for years of previous strength and conditioning experience?

RQ3: Will sport injury requiring a return-to-play protocol moderate four independent variables (age, gender, sport played, and sport type) of motivation for strength and conditioning participation?

Research Design

A cross-sectional design was used for this study. This study design was chosen as it sought to find a relationship between independent variables (age, gender, sport played, and sport type) and dependent variables (motivation through the Autonomy Index from SMS-II [Pelletier, et al, 2013] and task-orientation and goal-orientation from the TEOSQ) at one point in time. In contrast with other research designs, cross-sectional research does not manipulate variables, as seen in experimental research. In this design, the difference in the groups already exists (Salkind, 2010). Through cross sectional research, correlations may be found and used in both descriptive studies as well as exploratory studies (Salkind, 2010).

One limitation of this design is that data was collected ex post facto, there was no control over the variables, no manipulation of variables was available, and the causal relationship was criticized due to lack of control in the study (Salkind, 2010). Participants

in this study had already been exposed to strength and conditioning in pre-arranged groups of sport teams. Sport teams were inherently divided into a specific sport type, and athletes belonged to different groups within these sports including athlete gender and their year in school. The study sought to identify whether motivations to participate in strength and conditioning varied amongst these groups, and if so, where specifically did they vary and how. Acknowledging differences between groups, the study accounted for previous experience with strength and conditioning by including previous years participating in strength and conditioning as a covariate (Garspon, 2012). The covariate accounted for variance present within the pre-existing groups, to limit error in any statistically significant findings.

Study Participants

The population for the current study was Division I student-athletes in gender-equivalent sports (i.e., sports with both male and female teams represented at the institution) who were required to participate in the strength and conditioning program provided by the university's sports performance department. While the current study's sample population was from a Division I, Power 5, Midwest University with 21 varsity sport programs and 640 student-athletes, the intended population was any Division I collegiate student-athlete using a strength and conditioning program as a part of their sport participation. Sports included in this research were men's and women's tennis, men's and women's soccer, men's and women's track and field, men's and women's swimming and diving, men's and women's golf, men's and women's basketball, baseball, and softball. Each sport consisted of different numbers of participants based on the types of competitions they play. Sports within each sport type are as follows:

individual-based sports (tennis, golf, swimming and diving, and track and field) and team-based sports (baseball, softball, soccer, and basketball). Table 1 shows the potential sample.

Table 1
Sport Team Participants

Sport Type	Men's Teams	N	Women's Teams	N
Team	*Soccer*	22 (13.7%)	*Soccer*	26 (16%)
	Baseball	37 (23.1%)	*Softball*	24 (14.8%)
	Basketball	17 (10.6%)	*Basketball*	13 (8%)
Individual	*Track & Field*	36 (22.5%)	*Track & Field*	51 (31.4%)
	Swim & Dive	29 (18.1%)	*Swim & Dive*	31 (19.1%)
	Tennis	10 (6.2%)	*Tennis*	10 (6.1%)
	Golf	9 (5.6%)	*Golf*	7 (4.3%)
Total		160		162
All athletes total		322		

The current study aimed to understand motivations and identify any trends in motivation between the population subgroups. Independent variables include year in school (underclassmen group: red shirt freshman, true freshman, sophomore; and upperclassmen group: junior, senior, fifth-year senior, graduate student), athlete gender (male versus female), sport played, and sport type (individual versus team-based). Sport injury also served as an independent variable. Specifically, the inclusion of this variable identified whether the participant experienced a sport injury significant enough to require a specialized rehabilitation program, currently referred to as a *return-to-play* protocol (Nalepa et al., 2017). The injury could have occurred anytime from high school to current athletic participation if it required a rehabilitation program. Table 2 shows all the variables included in this study as well as the type and level of measurement.

Table 2

List of Variables

Variable Type	Variable Name	Type of Measurement	Level of Measurement
Dependent Variable	*Autonomy Index Score**	Interval	Continuous
	Ego-Orientation	Interval	Continuous
	Task-Orientation	Interval	Continuous
Independent Variable	*Age Group*	Nominal	0: Lowerclassmen 1: Upperclassmen
	Athlete Gender	Nominal	0: Male 1: Female
	Sport Played	Nominal	0: Soccer 1: Baseball/Softball 2: Basketball 3: Track & Field 4: Swimming & Diving, 5: Tennis 6: Golf
	Sport Type	Nominal	0: Individual-based 1: Team-based
Moderator	*Injury Status*	Nominal	0: Yes 1: No
Covariate	*Years of Strength & Conditioning Experience*	Ratio	Continuous

* Autonomy Index Score is yielded from the SMS-II as a sum of the individual subscales multiplied by their respective constants.

Sampling and Data Collection

Sampling Method

Student-athletes were recruited using purposive sampling through the university's Sports Performance program. The strength of purposive sampling is its focus of intended population by setting inclusion and exclusion criteria (Andrade, 2021). However, a weakness of this sampling method is the limitation of generalization to larger populations as the sample is a selected population of focus (Andrade, 2021). This means the results of this study may not be generalizable to the larger athletic population in general such as professional athletes or school-aged athletes.

Using an online survey design, a digital version of the surveys was available through emailed website links to an online version of questionnaire through Qualtrics (Regmi et al., 2016). This design was used to ensure response rates were satisfactory for data analysis, while also allowing participants time and flexibility to complete the questionnaire. Strength and conditioning staff explained survey participation at the beginning of a resistance training session. Athletes had the opportunity to complete the survey for four weeks to ensure capturing maximal response rate. Athletes were emailed a link to the survey through Qualtrics and informed consent was obtained prior to data collection. Three follow up emails were sent to encourage participation. After all surveys were completed, data was collected and exported into the IMB SPSS version 27 statistical package (IBM, 2020) for analysis.

Data Collection Procedures

Questionnaire data was collected through Qualtrics online surveys via the athlete's smartphone, tablet, or computer. Prior to beginning the survey, athletes read the

consent where they were informed of the anonymity of their answers, their ethical right in participating, and the voluntary nature of their participation. Athletes were informed of their non-obligation to answer any question to which they felt uncomfortable, and they could terminate the survey at any time. An expected response rate of 60% would meet the recommendation of a sample size with the ratio of 5:1 participant to independent variables (Green, 1991). The current study contained five independent variables, therefore a minimum of 100 completed surveys were needed to have a large enough sample size for multiple regression data analysis to address Research Questions 2 and 3 (Green, 1991; Tabachnick & Fidell, 2014).

Instrumentation

Upon accessing the questionnaire, demographic data was collected prior to the SMS-II and TEOSQ instruments. This data included the athlete's student ID number (in anticipation of longitudinal data collection for follow up research), year in school as of Fall 2020, sport, race, transfer status, international student-athlete status, and years of strength and conditioning participation as of Fall 2020. The question "Have you ever experienced an injury requiring additional strength and conditioning/athletic development as part of a return-to-play protocol organized by strength and conditioning coaches in high school or college?" was used to address the athlete's injury status, and measured with a response of *yes* or *no*. For full demographic data collection, see appendix A.

Motivation variables included in the instrument for this study came from both SDT and AGT. The SMS-II yielded the Autonomy Index score and the TEOSQ produced two scores, one for ego-orientation and one for task-orientation. These measures served

as the dependent variables for the study. Each of these variables were either interval or ratio data.

Sport Motivation Scale-II (SMS-II)

The purpose of the *Sport Motivation Scale II* (SMS-II) (Pelletier, et al, 2013) is to measure motivations for sport participation along the spectrum of SDT. The scale included 18 close-ended items across 6 different factors (four extrinsic motivations: externally regulated, introjection regulated, identified regulated, integrated regulated; one intrinsic motivation; and one amotivation), each containing three items (see Appendix B for the SMS-II instrument). Responses to these items were on a 7-point Likert scale anchored by 1 (*Not True at All)* and 7 (*Very True)*, with the neutral *Somewhat True* option available. To properly respond to the items, participants answer the question "Why do you practice your sport?" with the indicated 7-point Likert scale corresponding to the answer item offered. The items within the constructs are averaged and the mean is reported as the athlete's level of motivation on that factor subscale. Examples of each factor's answer items are provided below.

Amotivation: "I used to have good reasons for doing sports, but now I am asking myself if I should continue."

External Regulation: "Because people I care about would be upset with me if I didn't."

Introjection Regulation: "Because I would feel bad about myself if I did not take the time to do it."

Identified Regulation: "Because I found it is a good way to develop aspects of myself that I value."

Integrated Regulation: "Because participating in sport is an integral part of my life."

Intrinsic Motivation: "Because it gives me pleasure to learn more about my sport."

Pelletier and colleagues (2013) tested the validity of the SMS-II through a confirmatory factor analysis and the scale was found to be significant, with item-factor loadings ranging between .47 and .95, indicating that the items within the factors related closely with one another. Each factor's reliability was calculated through Cronbach's Alpha with results ranging from .73 to .85 (Schmitt, 1996). None of the items retained in the SMS-II had cross-loaded scores higher than .3 indicating that the items only related to one factor, showing each item only measured one factor (Costello & Osborne, 2005). Subscales situated closer to one another on the SDT continuum are more strongly correlated to one another and those situated farther apart have weaker correlations.

Autonomy Index Score

SDT is composed of six subscales on a spectrum of self-determination to reflect individuals' respective levels of autonomy (Deci & Ryan, 2000). The subscales from lowest-to-highest in terms of amount of autonomy are: Amotivation (3 items), External Regulation (3 items), Introjected Regulation (3 items), Identified Regulation (3 items), Integrated Regulation (3 items), and Intrinsic Motivation (3 items). The responses were averaged for each subscale and then entered to an algorithm to yield the Autonomy Index Score. Theoretical location of the athlete's motivation along the SDT spectrum yielded an impact on the overall autonomy score. The Autonomy Index was calculated by entering the averages of the independent subscales into an equation multiplied by a constant

according to the subscale's location on the self-determination spectrum (Goudas et al., 1994). The equation is provided below.

Autonomy Index = -3(Amotivation score) + -2(External regulation score) + -1(Introjection Regulation Score) + 1(Identification Regulation Score) + 2(Integrative Regulation Score) + 3(Intrinsic Motivation Score)

Constants for the Autonomy Index were -3X for Amotivation subscale score (indicating a large negative impact on autonomy), -2X for External Regulation subscale score (indicating a moderate negative impact on autonomy), -1X for Introjection Regulation subscale score (indicating a nominal negative impact on autonomy), 1X for Identified Regulation subscale score (indicating a nominal positive impact on autonomy), 2X for Integrated Regulation subscale score (indicating a moderate positive impact on autonomy), and 3X for Intrinsic Motivation subscale score (indicating a large positive impact on autonomy) (Goudas et al., 1994). As a result of the equation, Autonomy index scores can range from -36 points to 36 points.

Task and Ego Orientation in Sport Questionnaire (TEOSQ)

The *Task and Ego Orientation in Sport Questionnaire* (TEOSQ) (Chi & Duda, 1995) measures an athlete's level of ego and task orientations to participate in sport. The 13-item instrument was created in 1995 (Chi & Duda, 1995) and is commonly used for goal orientation assessments (Clancy et al., 2017). Closed-ended answers are reported on a 5-point Likert scale, anchored by 1 *Strongly Disagree* and 5 *Strongly Agree* with a neutral midpoint. To properly answer the items, participants must finish the sentence of "I feel most successful in sport training when…" by indicating their response on the 5-point Likert scale corresponding to the answer item offered. An example of an ego-

oriented answer item is “The others can’t do as well as me.” An example of a task-oriented answer item is “I learn a new skill by trying hard.” Seven of the 13 items measure task-orientation, and six items measure ego-orientation. The average of all answers within the two orientations are gathered and reported as the athlete’s goal orientation score yielding a task-orientation score and an ego-orientation score (See Appendix C for the TEOSQ Instrument). A low task- or ego-orientation score indicates low goal orientation within that factor.

Previous research has examined the validity and reliability of the TEOSQ across multiple languages (Castillo et al., 2010, Li et al., 1998; Tomczak et al.,). Exploratory Factor Analysis and Confirmatory Factor Analysis were performed for validation purposes. A two-factor solution accounted for 49.2% of variance in the EFA and the CFA found that the two-dimensional structure showed good fit (Castillo et al., 2010). Factor loadings for the task subscale was .75 and the ego subscale was .74, indicating factors correspond well to the latent variable. Reliability was measured using Cronbach’s Alpha and the two factors yielded alpha values of .81 for task-orientation and .84 for ego-orientation (Tomczak et al., 2020). The factors of task and ego were correlated to a small degree (.29) (Castillo et al., 2010).

Covariate

Since many of the anticipated participants in this study had different levels of exposure to strength and conditioning, their familiarity and previous exposure to strength and conditioning training could influence motivations to train. As such, the question “As of Fall 2020, how many years have you participated in formally structured strength and conditioning for sport performance?” yielded the continuous-scale covariate measure.

Athletes used a drop-down menu to select their response in whole years of strength and conditioning experience, rounding up or down to the nearest whole year. Athletes with prior exposure to strength and conditioning may model different motivations for training compared to their peers in similar groups and/or with those sharing similar demographic variables.

Pretesting

Pilot testing occurred to ensure construct validity and to limit error resulting from the instrument. The SMS-II and TEOSQ were originally designed to measure sport participation, not strength and conditioning participation. To adapt the surveys to strength and conditioning, a pilot test was conducted. The similarity of activities allowed for subtle changes in items, shifting the focus from an athlete's sport motives and goal-orientations to those they associate with strength and conditioning participation. An example of an instrument adaptation follows: the original item states "Because it gives me pleasure to learn more about my sport." This wording was changed to "Because it gives me pleasure to learn more about strength and conditioning.", altering the phrasing, but not the integrity of what the question is intending to measure.

After initial instrument adaptations, a pilot study included athletes from women's lacrosse (n=37), women's volleyball (n=18), women's rowing (n=52), and women's field hockey (n=27) to test the modified instruments. These teams were not included in the original study data as there were no gender equivalent sports at the institution. The purpose of the pilot study was to ensure the instruments were successfully adapted for use in strength and conditioning participation, while retaining appropriate validity on question content and sufficient reliability in the data. It was paramount to retain the

integrity of the question while modifying the wording of the item as the scale shifted from sport participation to strength and conditioning participation. Using the adapted instruments in a population similar to the one targeted in the study helped identify possible errors in the surveys, and offered appropriate resolutions, while limiting possible foreseeable errors in the data (Collins, 2003).

As scores were derived from Likert-scale responses, item difficulty is polytomous and was measured through item means to ensure answers on questions cover the range of responses, and participants are not solely responding the same way on the items. This ensured variability in the responses and that the item captures a variety of information. Item Discrimination was measured by the discrimination value *D*, and scores equal to or above .4 are considered satisfactory to ensure the item yielded similar responses across the range of motivations (Watson & Clark, 1995). Cronbach's Alpha was used for reliability measures, with a cut-off of .8 for factor items (Watson & Clark, 1995). This cutoff was chosen to ensure items correspond to factors while limiting redundancy with scores higher than .85 (Lance et al., 2006). If an alpha value was higher than .85, it was likely covering similar content in another item, and keeping both items would artificially inflate reliability while not yielding new information. If items did not meet the alpha value, I created new items and completed the process of item generation and reliability and validity testing until appropriate measures were obtained. The use of Item Difficulty and Discrimination enabled the selection of appropriate questions. An appropriate question should capture the range of possible motivations, be easily understood, and limit errors resulting from participants responding to an item they do not fully understand.

Data Analysis

Before analyzing data, internal consistency and reliability were measured. Both were measured using Cronbach's alpha coefficients. Following reliability analysis, RQ1 was answered using descriptive statistics, and RQ2 and RQ3 was answered using Hierarchical Multiple Linear Regression analysis (Ho, 2013).

Descriptive Statistics

Descriptive statistics of demographic data collected included athlete age, year in school, gender, sport team of participation, injury status, and years of strength and conditioning experience. Through this information collected, I identified the independent variables of athlete age group classification, their sport type, sport played, gender, and injury status, as well as the covariate of years of experience in a formal strength and conditioning program for sport performance. An example of demographic data collected is seen in Appendix A.

Descriptive statistics were used to answer RQ1. To prevent type I and type II errors, the data was analyzed to ensure assumptions of normality, homoscedasticity, and multicollinearity were met. The assumption of normality was tested through visually inspecting the frequency histogram (Mishra et al., 2019) to ensure the data followed a normal pattern of distribution. Multicollinearity, or a high correlation between independent variables, was tested through Pearson correlations. Correlations above .8 indicated variables were too correlated and the assumption is not met (Garson, 2012). A p-value of .05 was set for hypothesis testing. In the instance, if analysis yielded a p-value above .05, the results were failure to reject the null.

Multiple Linear Regression

To address RQ2 and RQ3, multiple linear regression was used. Linear regression allows the researcher to analyze the relationship between one dependent variable and multiple nominal independent variables, while identifying the level and direction of impact for each variable (Tabachnick, & Fidell, 2014). On both the SMS-II and TEOSQ, items were answered on Likert-type scales. While Likert-type responses are technically ordinal, the survey instruments report scores as averages of responses, turning the responses into interval-based responses, allowing for their use as a continuous variable, satisfactory for inclusion in Multiple Linear Regression.

Assumptions of Multiple Linear Regression

There are four assumptions of multiple linear regression including independence of responses, normal distribution of dependent variables, homoscedasticity of independent variables, and linearity among dependent variables (Field, 2009; Tabachnick, & Fidell, 2014). Per suggestions of literature, independent variables were checked for multicollinearity and outliers were removed. Multicollinearity occurs when predictor variables are highly correlated, yielding inaccurate variances which could negatively affect results (Midi, Sarkar, & Rana, 2010). Outliers could skew the data, impeding on the interpretation of results, as they do not accurately represent much of the population being tested.

Independence of Responses

The assumption of independence of responses states that each respondent only submits one response and does not influence any other participant's responses (Field, 2009). To address this, the researcher filtered out identical IP addresses to prevent double

submissions of surveys. Survey entries with matching university identification numbers were merged to prevent the double submission.

Normality of Dependent Variables

The assumption of normality of dependent variables states that errors are normally distributed (Field, 2009). The researcher tested this assumption using histograms for continuous variables, which visually showed normal distribution.

Homoscedasticity of Independent Variables

Assuming homoscedasticity of independent variables ensures a limitation of random errors in the relationship between independent and dependent variables (Garson, 2012). Plotting standardized residuals tested for homoscedasticity, noting a conical shape indicated a violation of this assumption.

Linearity Among Dependent Variables

It is assumed a linear relationship exists between independent and dependent variables when using linear regression analysis (Garson, 2012). Using a scatter plot with variables on the y-axis and standardized residuals on the x-axis showed a linear pattern. Should no pattern or a curvilinear pattern appear in the plot, the assumption would be violated.

Multiple Regression Analysis

All independent variables were nominal. These include two levels of gender: male or female; two levels of age: upperclassmen (junior, senior, fifth-year senior/graduate transfer) and lower classmen (red-shirt freshman, true freshman, sophomore); two levels of sport type: individual-based sport and team-based sport; eight levels of sport played: soccer, softball, baseball, tennis, golf, track & field, swim & diving and basketball; and if

they have had an injury requiring a rehabilitation/return-to-play protocol: yes or no. The athlete's total years of strength and conditioning experience, rounded to the closest whole year as of the beginning of the Fall 2020 semester, served as a continuous covariate. This choice was made, as longer exposure to strength and conditioning impacts one's relationship with their training as well as possible motivations (Mullan & Markland, 1997).

When an athlete experiences an injury severe enough to require a rehabilitation program or a return-to-play protocol, the athlete uses strength and conditioning training to get back to a comparable pre-injury playing level (Chu & Rho, 2016). Recovering athletes typically cannot participate in their regular sport practice. Instead, they work with the sport medicine team and the strength and conditioning staff initially (Shaw, Serpell, & Baar, 2019). The purpose of rehabilitation is to highlight the importance and role of strength and conditioning for not just performance, but also for optimal healing from injury and future injury prevention (Shaw et al., 2019). As such, the variable identifying whether a participant has experienced an injury requiring a return-to-play protocol may moderate an athlete's motivation(s).

Hierarchical linear regression is theory-driven, allowing the researcher the freedom to enter variables into the equation and blocks as they practically fit. Hierarchical multiple linear regression was used for the data analysis to answer RQ2 and RQ3. The three continuous variables yielded from the instruments (the Autonomy Index score from the SMS-II; and the ego-orientations and task-orientations from the TEOSQ) were entered into three separate regression equations to assess the independent variables' effects on each dependent variable. Demographic data (transfer status, race) was entered

in block one and used for control variables. The second block contained the independent variables of athlete age, gender, sport type, previous injury, and the continuous covariate of whole years of strength and conditioning program participation, answering RQ2. Sport played was unable to be used as its own independent variable. As seen in Table 12, some of the sport team participation was too low to be entered into the regression as a standalone group. In fact, the Men's Tennis team did not have any responses. By placing demographic variables in block one and the independent variables in block two, results isolated the effects between demographics and independent variables.

The model summary was assessed in the IBM SPSS version 27 (IBM, 2020) statistical data analysis package. In the analysis, the *R* value showed the degree of the relationship between variables on motivations. The *R Squared* value indicated the amount of variance explained by the independent variables on the dependent variable. The *Change in R Square* identified the unique account in variance of individual variables on motivation and was considered significant by a significant *F Change* value. Degrees of freedom, *F Change* value, and *p* value was reported from the model summary. Any *p* value at or below .05 was considered statistically significant (Ho, 2013).

Regression coefficients yielded from the coefficient table identified which variables have the greatest impact on dependent variables of motivation (Ho, 2013). Using the *standardized beta* values examined the relationship between two variables by using standard deviations. Standardized beta was used as it allowed variables of different measurement values to be measured on a similar field. Beta values with a p value less than .05 were seen as significant predictors. Each independent variable received their

own coefficient for significance reported in the table as well as each variable's *p* value. Any *p* value at or below .05 was considered statistically significant.

Previous athlete injury was used as a moderator to answer RQ3. A moderator can affect the relationship, either in strength or direction, of an independent variable on the dependent variable (MacKinnon, 2008). To test the moderation effect, separate interaction variables were created for each independent variable tested. The new interaction variable was a product of two nominal independent variables seen as: Injury status * Age group, Injury status * Gender, Injury status * Sport, and Injury status * Sport Type. Interaction variables were all entered the final block of the regression. A statistically significant *F-Statistic* with a *p* value at or below .05 was considered statistically significant would represent a moderation effect occurred. In the case of a significant *F-Statistic*, the *change in R squared* indicated how much variance the interaction accounted for the motivation style.

Summary of Methodology

The current study sought to identify the relationship between athlete age, gender, sport type, sport played, and injury requiring an organized rehabilitation program on collegiate athletes' motivations to participate in strength and conditioning programs. Motivation was represented by three dependent variables (Autonomy Index from the SMS-II; and Ego-Orientation and Task-Orientation from the TEOSQ). Independent variables were athlete gender, age, sport type, sport played, and presence of injury requiring a return-to-play protocol. The athlete's previous participation in a strength and conditioning program, identified in whole years as of the start of the Fall 2020 semester, served as the covariate.

The SMS-II and the TEOSQ were adapted from sport participation to fit participation in strength and conditioning programs. The modified scales were put through pilot testing, using responses from college athletes not anticipated to participate in the study. Instruments were analyzed for validity and reliability through item difficulty, item discrimination, and Cronbach's alpha values. Once modifications to the instruments were found to be satisfactory, the researcher gained informed consent from participants and links to the instruments were sent out. Data was collected through Qualtrics and analyzed through the IBM SPSS version 27 analysis package (IBM, 2020).

Before analyzing the data through regression analyses, the data was assessed to ensure model assumptions are met. Three hierarchical linear regressions were used to identify relationships between independent variables and reported motivations. The variance in motivations of the independent variables on the dependent variables was measured and identified for their relationship strength. Previous athlete injury was entered in the model as a moderator to assess whether it affected the relationship between independent and dependent variables while accounting for the athlete's previous experience with a strength and conditioning program as a covariate.

CHAPTER IV

RESULTS

The purpose of this study was to identify the motivations of Division I collegiate athletes to participate in strength and conditioning programs as a part of their sports performance program. The study used Self-Determination Theory as well as Achievement Goal Theory to better understand what motivates athletes to train in strength and conditioning. A secondary purpose of the study was to identify whether any patterns occurred within the subpopulations of Division I student-athletes, and whether an injury requiring specialized strength and conditioning programming moderated their approach to strength and conditioning training.

Instrument Pretesting

To determine the content validity of the instrument, pretests were performed. The adaptation of the instruments occurred with the help of a panel of experts, followed by a pilot study of a similar athletic population not included in the final data collection. These steps are in accordance with the suggestions proposed by Dillman et al. (2014). Suggestions by Dillman et al. (2014) included survey content being reviewed by experts of the field and conducting a pilot study among multiple devices and platforms.

Panel of Experts

Both the *Sport Motivation Scale-II* (Pelletier et al., 2013) and the *Task and Ego Orientation in Sport Questionnaire* (Chi & Duda, 1995) were designed to capture a

respondent's motivation for sport participation. While the activities of sport participation and strength and conditioning are related, they are not the same and do not offer identical results or rewards with participation (Bompa & Buzzichelli, 2018; Haff & Triplett, 2015; Hoffman, 2014; Winkleman, 2012). Adjusting the instrument to encompass strength and conditioning participation, a panel of experts was consulted to ensure content validity. The panel consisted of faculty members from a research institution experienced in strength and conditioning as well as industry professionals currently working in the field. Panel experts inspected the items to determine whether modification was required and ensured the integrity of items was unaltered in the editing process. Experts recommended the following definition precede the instruments within the questionnaire: *For the purpose of this survey, 'strength and conditioning' is defined as a physical training program specifically designed to increase athletic abilities for sports performance. This does not include sport practice or injury rehabilitation.*

The entire survey included the aforementioned scales as well as demographic questions, including questions addressing athlete injury status and any associated strength and conditioning programs specifically designed for injury rehabilitation (e.g., a return-to-play protocol). Placing the definition of strength and conditioning prior to the questionnaire items aided in the clarity of the respondent's understanding of strength and conditioning, which allowed for minimal language modifications of individual survey items. An example of this comes from the SMS-II, "Because it gives me pleasure to learn more about my sport," which was converted to "Because it gives me pleasure to learn more about strength and conditioning." In the TEOSQ, an example of item alteration stated, "I learn a new skill and it makes me want to practice more" to "I learn a new

exercise/movement and it makes me want to practice more." After all adaptations were completed, the final questionnaire included 10 demographic items, 18 items from the SMS-II instrument, and 13 items from the TEOSQ, for a total of 41 items administered via online survey administered through Qualtrics. The panel reached a consensus regarding the wording and clarity of all adapted survey items.

Pilot Study

Following the panel of experts, the instrument was administered to 19 Division-I collegiate athletes through Qualtrics for pilot testing. Pilot study respondents were participants of sports not included in the study's final data collection, due to the lack of corresponding gender-equivalent sport programs. Data from the pilot study was used to calculate the reliability of the instruments and the time to complete the questionnaire. Item difficulty was measured through item means, ensuring a range of responses. Item discrimination was measured by the discrimination value *D*, and scores equal to or above .4 were considered satisfactory in ensuring the item received similar responses across a range of motivations. Cronbach's alpha of .7 or higher was deemed sufficient for scale reliability (Clark & Watson, 1995). Table 3 shows the Cronbach's Alpha estimates for internal consistency for each scale. All values exceed .7 and were judged as acceptable.

Table 3
Internal Consistency Reliability Estimates for Pilot Study

Scale	Factor	Number of Items	Cronbach's Alpha
SMS-II	*Autonomy Index*	6	0.72
TEOSQ	*Task*	7	0.91
	Ego	6	0.94

Descriptive Statistics

Sample Statistics

Data collection for this study occurred through purposive sampling of sport teams belonging to a Division-I, Power 5 university in the Midwest. Sports selected corresponded with a gender-equivalent team. Membership to those teams required participation in a strength and conditioning program led by the institution's strength and conditioning program. A Qualtrics survey was emailed to the selected teams. Additionally, team strength coaches encouraged student-athlete participation. The survey links were available for four weeks to ensure sufficient response rates. Three hundred and thirty-six invitations to participate in the study were sent via email. A total of 123 surveys were submitted, yielding a response rate of 36%. After initial inspection of the data, 89 survey responses (70.7% of total submitted questionnaires) were suitable for use in this study. As stated in chapter three, the recommended sample size was indicated by the ratio of 5:1 participant-to-independent variables (Green, 1991). A second recommendation of a 20:1 participant-to-independent variables was suggested, creating an overall goal of 100 responses (Tabachnick & Fidell, 2014). Upon initial inspection of the data, it was evident the independent variable of sport played would not have large enough individual groups for data analysis. Therefore, sport played was not included in the data analysis for RQ2 or RQ3. Four independent variables remained in the study: age group, athlete gender, sport type, and injury status. With 89 usable responses, this more than satisfied the suggested ratio of 5:1 participant-to-independent variables by Green (1991) and satisfied the 20:1

suggestion by Tabachnick and Fidell (2014), meeting the required specifications for the response rates.

Demographic Information

The sample consisted of 55 females (61.8%) and 34 males (38.2%), of which 78.7% identified as white/Caucasian (78.7%). Furthermore, the sample was made up of 32 lower classmen (34%) and 57 upper classmen (64%), representing a slightly older collegiate population. Sport type was represented by 55 individual sport athletes (61.8%) and 34 team sport athletes (38.2%), with track & field (30.3%) and swimming & diving (21.3%) representing the two largest teams in participation. Injury status was indicated by 64% of all participants. This means that these individuals experienced a sport-related injury either in high school or college severe enough to require a specialized return-to-play training protocol. Demographic information of transfer status and international student status were collected as control variables for data analysis purposes to answer RQ2 and RQ3. The sample was comprised of mostly students starting college at the selected university (88.8% "No" to having transferred) and students of American Citizenship (85.5% "No" to being an international student). Table 4 displays demographic data for the sample.

Table 4
Frequency of Distributions for Demographic Variables

Variables		**Percentage**	**N**
Race			
	African American	10.1	9
	White/Caucasian	78.7	70
	Hispanic Latino	7.9	7
	Other	3.4	3
Age Group			
	Lower Classmen	36	32
	Upper Classmen	64	57

Gender			
	Female	61.8	55
	Male	38.2	34
Sport Team			
	Women's Tennis	3.40	3
	Men's Golf	2.2	2
	Women's Golf	4.5	4
	Men's Track & Field	9	8
	Women's Track & Field	21.3	19
	Men's Soccer	6.7	6
	Women's Soccer	5.6	5
	Men's Basketball	3.4	3
	Women's Basketball	1.1	1
	Baseball	12.4	11
	Softball	9	8
	Men's Swimming & Diving	6.7	6
	Women's Swimming & Diving	14.6	13
Sport Type			
	Individual	61.8	55
	Team	38.2	34
Injury Status			
	Yes	64	57
	No	36	32
International Student			
	Yes	14.6	13
	No	85.5	76
Transfer Student			
	Yes	11.2	10
	No	88.8	79

Years of Strength and Conditioning Experience

Table 5 shows average years of strength and conditioning experience reporting within the sample. The average previous experience in strength and conditioning was 6.2 years (*SD* = 2.84).

Table 5
Strength and Conditioning Experience

Variable	M	SD	Median	Minimum	Maximum
Years of Experience	6.2	2.84	6	1	13

Data Analysis

The following section outlines the data analysis methods used to answer the study's research questions. Scale psychometrics were evaluated to ensure instrument performance. Descriptive statistics were used to understand characteristics of the data, whereas hierarchical linear regression was used to answer research questions. All tests used an alpha value of .05 when analyzing data to avoid committing a Type I error and to determine statistical significance of analysis results. IBM SPSS version 27 statistical software (IBM, 2020) was used to perform the data analysis.

Scale Diagnostics

Data analysis for all research questions began with addressing the newly adapted instruments. Internal consistency and reliability were assessed to ensure instrument performance through item means and Cronbach's Alpha values (Clark & Watson, 1995). Item means were used to assess item difficulty. As motivation and goal orientations were measured using Likert-type scales, average scale scores were created by taking the sum of responses of items associated with the factor and dividing it by the number of factor items (Clark & Watson, 1995). Table 6 displays Cronbach's Alpha values for the three dependent variables. As the table shows, Cronbach's alpha values for the dependent variables were acceptable (above .70) by the standards set by Clark and Watson (1995).

Table 6

Internal Consistency Reliability Estimates for Dependent Variables

Scale	Factor	Number of Items	Cronbach's Alpha
SMS-II	*Autonomy Index*	6	0.73
TEOSQ	*Task*	7	0.78
	Ego	6	0.89

RQ1: What are the motivations of Division I Collegiate student-athletes to participate in strength and conditioning programs?

Descriptive statistics were used to answer RQ1. Autonomy Index Scores can range from -36 points to 36 points based off the equation provided by Goudas et al. (1994). The sample's range showed a variability of scores from -5.67 points to 31.33 points. Participants indicated a strong sense of autonomous motivation in their approach to strength and conditioning through positive Autonomy Index scores (M = 14.73, SD = 9.08). When examining the goal-orientations of the sample, scores can range from 1.0 to 5.0 based on factor averages (Chi & Duda, 1995). There was a clear identification of greater task-orientation (M = 4.21, SD = .59) and less ego-orientation (M = 2.94, SD = 1.01) within the population. Descriptive statistics for dependent variables are shown in Table 7.

Table 7

Descriptive Statistics for Dependent Variables

Variables	N		M	SD	Median	Range	Min	Max
	Valid	Missing						
Autonomy Index	74	15	14.73	9.08	16.00	37.00	-5.67	31.33
Task Orientation	80	9	4.21	0.59	4.25	2.67	2.33	5.00
Ego Orientation	77	12	2.94	1.01	3.00	3.83	1.00	4.83

The Autonomy Index is an average of differently weighted variables. Therefore, subscales were inspected to better identify where the Autonomy Index's score originates. Table 8 shows the descriptive statistics for the SMS-II subscales. The SMS-II subscales with the highest means, indicating a high level of that motivation, were Intrinsic Motivation (M = 5.25, SD = 1.22), Identified Regulation (M = 5.10, SD = 1.26), and Integrated Motivation (M = 4.34, SD = 1.53). It is worth noting that the three highest means were of the three motivations with the most self-determination. The results indicated the sample population possesses a high level of self-determined motivation in their participation in strength and conditioning programs. The three previously mentioned motivations, along with Introjected Regulation, all possessed means above the mid-point of the 7-point Likert scale, indicating the population possesses a high level of self-determined motivations to participate in strength and conditioning.

Table 8

Descriptive Statistics for SMS-II Subscales

Variables	**N**		**M**	**SD**	**Median**	**Range**	**Min**	**Max**
	Valid	*Missing*						
Amotivation	76	13	1.93	1.17	1.67	5.00	1	6
External Regulation	87	2	2.35	1.31	2.00	5.67	1	6.67
Introjected Regulation	89	0	4.19	1.28	4.00	6.00	1	7
Identified Regulation	88	1	5.10	1.26	5.33	6.00	1	7
Integrated Regulation	88	1	4.34	1.53	4.67	6.00	1	7
Intrinsic Motivation	88	1	5.26	1.22	5.33	5.67	1.33	7

Motivation by Age Group

The sample was divided into two age groups, upper classmen (n = 57, 64%), consisting of juniors, seniors, fifth-year seniors/graduate students, and lower classmen (n

= 32, 34%) made up of redshirt freshmen, freshmen, and sophomores. Table 9 shows the sample breakdown by year in school before age groups were assigned. The highest response group were seniors (*n*=25), followed by juniors (*n*=18) and sophomores (*n*=18).

Table 9

Year in School

Year	**N**	**%**
Redshirt Freshman	3	3.37%
True Freshman	11	12.36%
Sophomore	18	20.22%
Junior	18	20.22%
Senior	25	28.09%
Fifth-year Senior/Graduate Student	14	15.73%
Total	89	

Table 10 displays motivations by age group. There is very little difference in the motivations by age group. When comparing age groups, lower classmen exhibited an Autonomy Index mean of 14.46 (*SD*=9.31), task-orientation mean of 4.19 (*SD*=0.55), and an ego-orientation mean of 2.81 (*SD*=1.07). Upper classmen yielded an Autonomy Index mean of 14.87 (*SD*=9.05), task-orientation mean of 4.23 (*SD*=0.62), and an ego-orientation mean of 3.03 (*SD*=.98). To further analyze differences between age groups on the scales, t-tests were conducted to determine if there were significant differences between groups on the dependent variables. All t-tests came back non-significant indicating there were no significant differences in motivation scores when compared by age groups (Autonomy Index $t(72) = -.183$, $p > .05$; Task-Orientation $t(78) = -.229$, $p > .05$; and Ego-Orientation $t(75) = -.919$, $p > .05$).

Table 10
Motivation by Age Group

	Lower Classmen		Upper Classmen	
	M	*SD*	*M*	*SD*
Autonomy Index	14.46	9.31	14.87	9.05
Task Orientation	4.19	0.55	4.23	0.62
Ego Orientation	2.81	1.07	3.03	0.98

Motivation by Gender

Athlete gender was designated by sport team membership. It is interesting to note the average Autonomy Index score for the study was 14.73, the task-orientation score was 4.21, and the ego-orientation score was 2.94, as shown in Table 11. When comparing gender group averages to the sample average, male athletes scored higher than the average in Autonomy Index with a score of 16.82 (*SD* = 8.42), while female athletes scored higher on task orientation and ego orientation scores with 4.28 (*SD* = 0.60) and 3.04 (*SD* = 0.97) respectively. These findings indicated males have a higher sense of autonomy, while female athletes possess greater over all task-orientated and ego-oriented goals. To further analyze differences between genders on the scales, t-tests were conducted to determine if there were significant differences between groups on the dependent variables. All t-tests came back non-significant, indicating there were no significant differences in motivation scores when compared by gender (Autonomy Index $t(72) = -1.555$, $p > .05$; Task-Orientation $t(78) = 1.386$, $p > .05$; and Ego-Orientation $t(75) = 1.131$, $p > .05$).

Table 11
Motivation by Gender

	Female		Male	
	M	*SD*	*M*	*SD*
Autonomy Index	13.46	9.31	16.82	8.42
Task Orientation	4.28	0.60	4.10	0.57
Ego Orientation	3.04	0.97	2.77	1.08

Motivation by Sport

Table 12 displays motivational differences across the different sports included in the study. It is important to highlight some sport representation was very low, as Table 13 presents response rates by sport team. The low response rates from some sport teams prevented sport played from being a predictor variable in the regression equations for RQ2 and RQ3. However, the descriptive statistics do yield basic general trends of differences between sport played. To further analyze differences between sport played on the scales, ANOVA tests were conducted to determine if there were significant differences between sports on the dependent variables. The results of the ANOVA tests came back non-significant, indicating there were no significant differences in motivation scores when compared by sport played (Autonomy Index $F(6, 67) = .473$, $p > .05$; Task-Orientation $F(6, 73) = .572$, $p > .05$; and Ego-Orientation $F(6, 70) = .952$, $p > .05$).

Table 12
Motivation by Sport

Sport	Soccer		Baseball/Softball		Basketball		Track & Field	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Autonomy Index	13.86	10.27	14.09	11.03	18.67	8.08	12.73	9.25
Task Orientation	4.05	0.53	4.32	0.58	4.09	0.56	4.14	0.72

Ego Orientation	2.67	1.17	2.68	0.88	2.33	1.12	3.18	1.06

Sport	**Swimming & Diving**		**Tennis**		**Golf**	
	M	*SD*	*M*	*SD*	*M*	*SD*
Autonomy Index	16.47	7.94	15.33	11.26	17.72	3.29
Task Orientation	4.21	0.47	4.51	0.37	4.46	0.60
Ego Orientation	3.00	0.93	2.94	1.49	3.42	0.83

Basketball and golf reported the highest Autonomy Index scores of 18.67 and 17.72 respectively. The team with the lowest Autonomy Index was track and field (*M* =12.73). Track and field is again notable as the sport with the second highest reported ego orientation score of 3.18, just behind golf's 3.42 score.

Table 13
Sport Team Membership

Team	N	%
Women's Tennis	3	3.4%
Men's Golf	2	2.2%
Women's Golf	4	4.5%
Men's Track & Field	8	9.0%
Women's Track & Field	19	21.3%
Men's Soccer	6	6.7%
Women's Soccer	5	5.6%
Men's Basketball	3	3.4%
Women's Basketball	1	1.1%
Baseball	11	12.4%
Softball	8	9.0%
Men's Swimming & Diving	6	6.7%
Women's Swimming & Diving	13	14.6%
Total	89	

Motivation by Sport Type

Individual sport athletes did report higher ego orientation (*M* = 3.13, *SD*=.99), but they also reported slightly higher task orientations as well (M = 4.22, *SD*=.61). Autonomy Index was not greatly different between sport types. Table 14 shows motivations by sport type. To further analyze differences between sport type on the scales, t-tests were conducted to determine if there were significant differences between groups on the dependent variables. All t-tests came back non-significant, indicating there were no significant differences in motivation scores when compared by sport type (Autonomy Index $t(72) = .193$, $p > .05$; Task-Orientation $t(78) = .196$, $p > .05$; and Ego-Orientation $t(75) = 2.158$, $p > .05$).

Table 14
Motivations by Sport Type

Sport Type	**Individual Sport**		**Team Sport**	
	M	*SD*	*M*	*SD*
Autonomy Index Score	14.9	8.34	14.5	10.3
Task Orientation	4.22	0.61	4.2	0.56
Ego Orientation	3.13	0.99	2.63	0.99

Motivation by Injury Status

Injury status was determined by an affirmative response to the question "*Have you ever experienced an injury requiring a return to play protocol in high school or college."* As reported, 64% of the study's population indicated they had experienced such an injury. The return to play protocol is athlete- and injury-specific in design and it requires a specialized strength and conditioning program to return the athletes safely and sustainably to competitive conditions (Chu & Rho, 2016; Nalepa at el., 2017; Shaw et al., 2019). Often during this time, the only exposure to their sport will be through this training (Chu & Rho, 2016; Shaw et al., 2019). Considering this, it was reasoned athletes

may develop different relationships with strength and conditioning training. Table 15 displays athlete motivations by injury status. In the table, athletes not reporting injuries reported higher Autonomy Index and ego orientation scores than athletes reporting previous injuries. Athletes indicating injury experience reported slightly higher task orientation. To further analyze differences between injury status on the scales, t-tests were conducted to determine if there were significant differences between groups on the dependent variables. All t-tests came back non-significant, indicating there were no significant differences in motivation scores when compared by injury status (Autonomy Index $t(72) = -.590$, $p > .05$; Task-Orientation $t(78) = .194$, $p > .05$; and Ego-Orientation $t(75) = -.828$, $p > .05$).

Table 15
Motivation by Injury Status

Injury Status	**Yes**		**No**	
	M	*SD*	*M*	*SD*
Autonomy Index	14.2	9.39	15.5	8.67
Task Orientation	4.22	0.61	4.2	0.56
Ego Orientation	2.87	1.07	3.07	0.91

RQ2: Are there differences in motivations to participate in strength and conditioning programs across age, gender, sport played, sport type, and sport injury controlling for years of previous strength and conditioning experience?

Three hierarchical linear regression analyses were performed to address Research Question 2 and 3. Assumptions and results of each the study's analyses are reported below.

Assumptions of Multiple Linear Regression

There are four assumptions of multiple linear regression: (a) independence of responses, (b) normal distribution of dependent variables, (c) homoscedasticity of

independent variables, and (d) linearity among dependent variables (Field, 2009; Tabachnick, & Fidell, 2014). Per suggestions of previous literature, independent variables were checked for multicollinearity and no outliers were identified. The assumption of independence of responses was addressed by filtering out identical IP addresses to prevent double submissions of surveys. Survey entries with matching university identification numbers were merged to prevent the double submission. There were no double submissions in the data collected.

The researcher tested the assumption of normality of dependent variables by visually inspecting histograms for continuous variables, which visually showed normal distribution. Figure 2 displays frequency histograms for the dependent variables. Plotting standardized residuals tested for homoscedasticity, noting a conical shape indicated a violation of this assumption. Figure32 shows the p-plot of standardized residuals. No conical patterns were found. Finally, linearity among dependent variables was evaluated using a scatter plot, with variables on the y-axis and standardized residuals on the x-axis showing a linear pattern. Figure 4 displays no pattern or a curvilinear pattern in the plots, showing the assumption was met.

Figure 2

Frequency Histograms of Dependent Variables

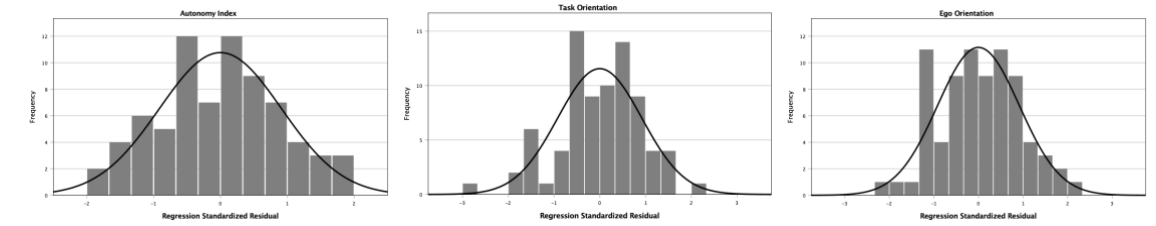


Figure 3

P-Plot of Regression Standardized Residuals of Dependent Variables

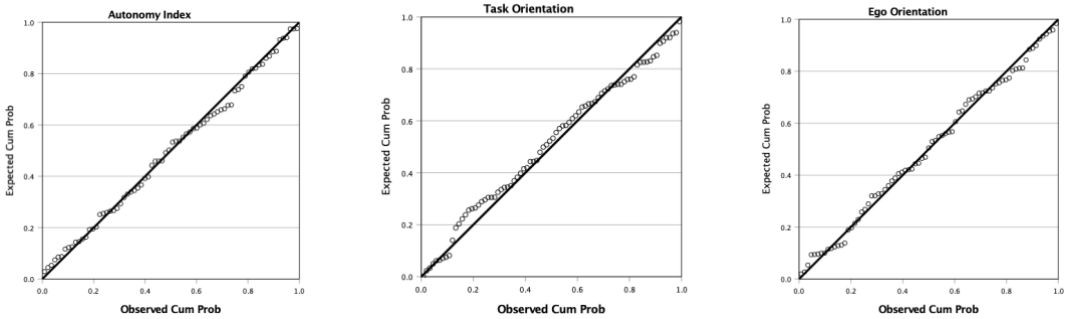
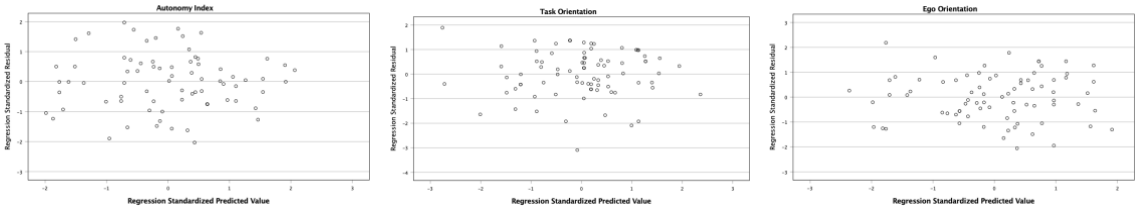


Figure 4

Scatterplot to Check for Homoscedasticity of Variance for Dependent Variables



Multicollinearity was tested to ensure independent variables were not highly correlated to one another, indicating redundant information in the analysis. To test this, variance inflation factors (VIF) were assessed with a cutoff value of 10 (Thompson, Kim, Aloe, & Becker, 2017). Tables 16, 17, and 18 show no VIF exceeding the cutoff value, indicating the absence of multicollinearity among independent variables.

Multiple Regression Analysis

Hierarchical multiple linear regression was used for the data analysis to answer RQ2 and RQ3. Demographic data (transfer status, race, and international student status) were entered in block one and used for control variables. The second block contained the independent variables of athlete age, gender, sport type, previous injury, and the continuous covariate of whole years of strength and conditioning program participation, answering RQ2. By placing demographic variables in block one and the independent

variables in block two, results isolated the effects between demographics and independent variables.

Table 16 reports the hierarchical results for the Autonomy Index. The results of the hierarchical regression were not found to be statistically significant, ($F(8,65) = .734$, $p > .05$), indicating none of the independent variables (age group, gender, sport type, and injury status) were significantly related to the dependent variable of Autonomy Index score.

Table 16
Regression Analysis for Autonomy Index

	Model I				Model II			
	b	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF
(Constant)	23.04*	7.74	0.004		11.35	12.97	0.38	
Control Variables								
Race	0.47	1.01	0.64	1.01	0.42	1.05	0.69	1.05
International Athlete	-4.64	2.90	0.12	1.03	-3.38	3.59	0.35	1.53
Transfer Status	-0.45	3.13	0.89	1.03	0.27	3.29	0.93	1.10
Predictor Variables								
Age Group					1.00	2.45	0.68	1.17
Gender					4.35	2.49	0.09	1.27
Sport Type					2.93	4.58	0.52	4.36
Injury Status					0.82	2.29	0.72	1.09
Years of S&C Experience					0.05	0.40	0.91	1.13
Model Fit								
n	74				74			
F-value	0.96				0.75			
R Square	0.04				0.10			
Change in R Square					0.06			

Note: Unstandardized regression coefficients reported. S.E. = Standard Error. VIF = Variance Inflation Factor. * = significant at .05 level.

Table 17 reports the hierarchical results for Task-Orientation. The results of the hierarchical regression were not found to be statistically significant ($F(8,71) = 1.126$, p

>.057), indicating none of the independent variables (age group, gender, sport type, and injury status) were significantly related to the dependent variable of Task-Orientation.

Table 17
Regression Analysis for Task Orientation

	Model I				Model II			
	b	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF
(Constant)	5.12**	0.51	<.001		5.51**	0.79	<.001	
Control Variables								
Race	-0.03	0.06	0.61	1.02	-0.02	0.07	0.817	1.07
International Athlete	-0.33	0.18	0.07	1.03	-0.41	0.22	0.063	1.471
Transfer Status	-0.12	0.21	0.59	1.05	-0.13	0.22	0.546	1.1
Predictor Variables								
Age Group					-0.03	0.14	0.816	1.09
Gender					-0.26	0.16	0.102	1.294
Sport Type					0.30	0.27	0.272	3.887
Injury Status					-0.12	0.15	0.418	1.106
Years of S&C Experience					-0.03	0.03	0.256	1.151
Model Fit								
n	80				80			
F-value	1.50				1.01			
R Square	0.06				0.12			
Change in R Square					0.06			

Note: Unstandardized regression coefficients reported. S.E. = Standard Error. VIF = Variance Inflation Factor. * = significant at .05 level. **=Significant at .001 level

Table 18 reports the hierarchical results for Ego-Orientation. The results of the hierarchical regression were not found to be statistically significant ($F(8,68) = 1.150$, $p > .05$), indicating none of the independent variables (age group, gender, sport type, and injury status) were significantly related to the dependent variable of Ego-Orientation.

Table 18
Regression Analysis for Ego Orientation

	Model I				Model II			
	b	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF
(Constant)	2.92*	0.91	0.002		1.08	1.43	0.45	
Control Variables	-0.01	0.12	0.94	1.02	-0.05	0.12	0.67	1.08
Race	-0.05	0.33	0.89	1.04	0.49	0.40	0.22	1.57
International Athlete	0.07	0.38	0.86	1.05	0.07	0.38	0.85	1.11

Transfer Status					
Predictor Variables					
Age Group		0.21	0.25	0.39	1.10
Gender		0.04	0.27	0.89	1.27
Sport Type		-0.47	0.48	0.33	4.05
Injury Status		0.21	0.26	0.43	1.13
Years of S&C Experience		0.08	0.05	0.09	1.17
Model Fit					
n	77	77			
F-value	0.02	1.04			
R Square	0.001	0.12			
Change in R Square		0.12			

Note: Unstandardized regression coefficients reported. S.E. = Standard Error. VIF = Variance Inflation Factor. * = significant at .05 level.

RQ3: Will sport injury requiring a return-to-play protocol moderate key independent variables (age, gender, sport played, and sport type) of motivation for strength and conditioning participation?

Previous athlete injury was used as a moderator to answer RQ3. Interaction variables were created and entered into the third block of the regression. A statistically significant *F-Statistic* in the third model was an indication a moderation effect occurred. Table 19 shows the third block of the hierarchical regression for Autonomy Index. Autonomy Index showed no significant interaction affects ($F(11,68) = 1.026$, $p > .05$). Table 20 shows the third block of the hierarchical regression for Task-Orientation. Task-orientation was not statistically significant ($F(11,68) = 1.050$, $p > .05$). Finally, Table 20 shows the third block of the hierarchical regression for Ego-Orientation. Ego-Orientation again displayed no statistical significance ($F(11,65) = .997$, $p > .05$). These findings indicate there was no significant moderating effect of injury status on motivation for participation in strength and conditioning programs. It is important to note VIF scores for the third block assessing moderation effects are higher than the indicated cutoff of 10. As

VIF assess multicollinearity or the degree to which one variable is accounted for by another variable, high VIF scores associated with interaction variables can be ignored, as these variables represent two previously assessed independent variables, in this case injury status X age group, injury status X gender, and injury status X sport type (McClelland et al., 2017).

Table 19

Regression Analysis for Autonomy Index

	Model I				Model II				Model III			
	b	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF
(Constant)	23.04*	7.74	0.004		11.35	12.97	0.38		19.08	13.56	0.16	
Control Variables												
Race	0.47	1.01	0.64	1.01	0.42	1.05	0.69	1.05	0.36	1.05	0.73	1.11
International Athlete	-4.64	2.90	0.12	1.03	-3.38	3.59	0.35	1.53	-2.55	3.64	0.49	1.64
Transfer Status	-0.45	3.13	0.89	1.03	0.27	3.29	0.93	1.10	-0.32	3.45	0.93	1.26
Predictor Variables												
Age Group					1.00	2.45	0.68	1.17	-11.08	7.20	0.13	10.54
Gender					4.35	2.49	0.09	1.27	7.87	7.76	0.31	12.87
Sport Type					2.93	4.58	0.52	4.36	-4.35	8.21	0.60	14.59
Injury Status					0.82	2.29	0.72	1.09	-6.47	4.67	0.17	4.73
Years of S&C Experience					0.05	0.40	0.91	1.13	0.09	0.40	0.82	1.16
Interaction Variables												
Injury * Age Group									8.91	4.80	0.07	12.34
Injury * Gender									-2.30	5.21	0.66	12.84
Injury * Sport Type									6.18	4.86	0.21	11.14
Model Fit												
n	74				74				74			
F-value	0.96				0.75				1.08			
R Square	0.04				0.10				0.18			
Change in R Square					0.06				0.08			

Note: Unstandardized regression coefficients reported. S.E. = Standard Error. VIF = Variance Inflation Factor.
* = significant at .05 level

Table 20

Regression Analysis for Task Orientation

	Model I				Model II				Model III			
	b	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF
(Constant)	5.12**	0.51	<.001		5.51**	0.79	<.001		5.97**	0.85	<.001	
Control Variables	-0.03	0.06	0.61	1.02	-0.02	0.07	0.817	1.07	-0.01	0.07	0.91	1.12
Race	-0.33	0.18	0.07	1.03	-0.41	0.22	0.063	1.471	-0.40	0.22	0.08	1.57
International Athlete	-0.12	0.21	0.59	1.05	-0.13	0.22	0.546	1.1	-0.15	0.23	0.53	1.24
Transfer Status												
Predictor Variables					-0.03	0.14	0.816	1.09	-0.59	0.43	0.18	10.01
Age Group					-0.26	0.16	0.102	1.294	-0.42	0.48	0.38	12.28
Gender					0.03	0.08	0.681	4.502	0.04	0.08	0.60	4.54
Sport Type					-0.12	0.15	0.418	1.106	-0.51	0.28	0.08	4.08
Injury Status					-0.03	0.03	0.256	1.151	-0.03	0.03	0.23	1.17
Years of S&C Experience												
Interaction Variables									0.43	0.31	0.16	11.99
Injury * Age Group									0.12	0.34	0.72	11.93
Injury * Gender									0.26	0.34	0.44	11.08
Injury * Sport Type												
Model Fit												
n	80				80				80			
F-value	1.50				1.01				0.97			
R Square	0.06				0.12				0.15			
Change in R Square					0.06				0.03			

Note: Unstandardized regression coefficients reported. S.E. = Standard Error. VIF = Variance Inflation Factor.
* = significant at .05 level. **=*Significant at .001 level*

Table 21

Regression Analysis for Ego Orientation

	Model I				Model II				Model III			
	b	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF	*b*	S.E.	*p*	VIF
(Constant)	2.92*	0.91	0.002		1.08	1.43	0.45		1.03	1.54	0.51	
Control Variables	-0.01	0.12	0.94	1.02	-0.05	0.12	0.67	1.08	-0.06	0.12	0.62	1.13
Race	-0.05	0.33	0.89	1.04	0.49	0.40	0.22	1.57	0.41	0.41	0.32	1.64
International Athlete	0.07	0.38	0.86	1.05	0.07	0.38	0.85	1.11	0.20	0.41	0.62	1.25
Transfer Status												
Predictor Variables												
Age Group					0.21	0.25	0.39	1.10	0.67	0.76	0.38	9.95
Gender					0.04	0.27	0.89	1.27	0.01	0.83	0.99	12.08
Sport Type					-0.47	0.48	0.33	4.05	-1.32	0.90	0.15	14.13
Injury Status					0.21	0.26	0.43	1.13	0.17	0.49	0.73	4.08
Years of S&C Experience					0.08	0.05	0.09	1.17	0.08	0.05	0.08	1.19
Interaction Variables												
Injury * Age Group									-0.30	0.53	0.57	11.95
Injury * Gender									0.04	0.59	0.95	11.81
Injury * Sport Type									0.63	0.59	0.29	11.04
Model Fit												
n	77				77				77			
F-value	0.02				1.04				0.92			
R Square	0.001				0.12				0.15			
Change in R Square					0.12				0.03			

Note: Unstandardized regression coefficients reported. S.E. = Standard Error. VIF = Variance Inflation Factor.

* = significant at .05 level

CHAPTER V

DISCUSSION

The purpose of this study was to identify the motivations of Division I collegiate athletes to participate in strength and conditioning programs as a part of their sports performance program. Self-Determination and Achievement Goal Theory were used as guiding frameworks for this study. A cross-sectional design using purposive sampling was employed.

Interpretation of Results

When performing the statistical data analysis, no independent variables were found to be significantly related to motivation outcomes and no moderation effects were identified. However, there were non-significant demographic differences when comparing motivations by the independent variable subpopulations. These demographic differences measured for significance using t-tests and were also non-significant. Therefore, these trends in differences can only be discussed as potential avenues for further exploration. The following differences should not be misconstrued as statistically meaningful, but as potentially worthy of further exploration, pending adaptations to the study design.

Collegiate Athlete Subpopulations

Athlete Age

There was no difference between lower classmen and upper classmen when comparing motivation by age groups. This may be due to the limited range of ages represented in the population, earlier exposure to strength and conditioning programs, social media, and the institution's Sports Performance program's emphasis on athlete education in training. These findings are somewhat conflicting with previous research indicating different motivations for strength and conditioning across athletes of different ages (see Daly & O'Gara, 1998; De Pero et al., 2009; Stern et al., 1995). It is important to understand that previous research included an age spread greater than the one seen in the current study (De Pero et al., 2009). Possibly, the age range included within this study was too small of a spread for there to be significant differences in the athletes' motivational approaches to their strength and conditioning programs. This consistent approach to strength and conditioning across age groups may be due to the ever-growing number of high school strength and conditioning programs, as seen in the years of strength and conditioning experience variable (see Table 5). Strength and conditioning introduced earlier in the athletic career means student-athletes are entering college with more experience. In this regard, lower classmen are more similar to upper classmen in their approach to strength and conditioning due to strength and conditioning exposure prior to college training programs.

Athlete Gender

Previous literature established a difference between male and female motivations for sport participation (Amorose & Horn, 2000) and exercise (Kilpatrick et al., 2005).

Specifically, previous research found that females possess lower levels of autonomy and intrinsic motivations for sport participation (Amorose & Horn, 2000), while primary motivations for males were competition, enjoyment, and challenge (Kilpatrick et al., 2005). In the current study, female task-orientation and ego-orientation scores were non-significantly higher than males, while males reported non-significantly higher Autonomy Index scores than females. The trend of males exhibiting higher autonomy supports previous findings (Amorose & Horn, 2000; Chin et al., 2012; Kilpatrick et al., 2005), while the results of females scoring higher on both goal orientation measures adds a new dimension to the literature. It is important to remember these findings being discussed are trends, as these differences were not shown to be statistically significant. Future research should explore these differences to establish further significance.

Sport Played

All sports vary in their historical associations with strength and conditioning. Track and field sports possess a deep history with strength and conditioning, dating back to ancient Greece and the start of the Olympic games (Lukacs, 2010; Medvedev, 1986). The first collegiate strength coach was a football-specific strength coach (Lukacs, 2010). On the other hand, endurance sports have a less rich relationship with strength and conditioning. Cross country was specifically left out of this study as the team does not regularly participate in resistance training at the institution.

Sport played was not used in the regression analysis due to the small group sizes for the individual sports. For example, no men's tennis members chose to participate in the study. Due to the diminished participation of some sports, general trends are observed

by sport played, but trends were not statistically tested. Future research may be able to include sport played as its own variable with large enough representation.

When looking at the current results by sport played, basketball and golf reported the highest Autonomy Index scores. Basketball and golf span different sport types but possessed the highest level of autonomy in the study's population. The team with the lowest Autonomy Index was track and field, which possessed the second highest reported ego-orientation behind golf. Both sports are individual-based sports, which literature has noted as having higher ego-orientations than team-based sports (Laborde et al., 2016). Track and field expressing the lowest Autonomy Index conflicts with prior research, as individual sports have previously displayed higher levels of autonomy compared to team-based sports (Nia & Besharat, 2010).

Sport Type

Research has shown personality differences between team-sport and individual-sport participants (Baker et al., 2003; Laborde et al., 2016; Nia & Besharat, 2010). Individual-based sports rely on the performance of one person for competitive results, while team-based sports demand multiple individuals work together for a successful sport performance (Chelladurai, & Saleh, 1978). Individual athletes have been shown to have higher ego-oriented goals than team sport athletes, while team-based athletes have reported greater task orientation (Nia & Besharat, 2010).

The results of this study support previous findings to a point. When comparing sport types among goal orientations, team and individual sports reported very similar task-orientation scores. Additionally, team-based sports displayed non-significantly lower ego-orientations than individual-based sports. This is supportive of previous findings.

However, when comparing Autonomy Index scores, team and individual-based sports did not vary. These trends were not statistically significant, so we must be cautious in identifying these results as conflicting to previous statistically significant findings. Future research with statistical significance is needed to verify or contradict the current study's identified trends.

Injury Rates

To the researcher's knowledge, this was the first study to assess injury rates as a potential impacting factor for strength and conditioning motivations. The experience of an injury significant enough to require a return-to-play protocol requires isolated time devoted to strength and conditioning specifically tailored by the sports medicine team to ensure proper post-injury recovery (Nalepa et al., 2017). It was argued in this study that the recovery process could alter one's approach to strength and conditioning in general. The current study did not identify any statistically significant differences between participations of different injury statuses, but trends in the data were noted. Athletes without injuries requiring return to play protocols reported higher scores on the Autonomy Index. Athletes indicating injury experience reported slightly higher task orientation. This may be a result of their time devoted to injury recovery; however, these numbers are non-significant and only slightly higher than the non-injured athlete task-orientation score.

Previous Strength and Conditioning Experience

Athletes at different performance levels (i.e., beginner, intermediate, and elite) have been identified to possess different psychological attributes when approaching their training (Jordalen et al., 2020; Mitić et al., 2021). It was reasoned that athletes with

greater experience with strength and conditioning may possess different motivational approaches to participation than those with less experience. Previous years of experience was used as a covariate in the regression equations for data analysis of RQs 2 and 3.

Recalling 64% of participants belonged to the upper classmen age group, the average of 6.2 years for previous years of strength and conditioning experience indicates athletes are exposed to strength and conditioning for sports performance purposes prior to college. An even more informative data point was the range of one to 13 years of previous experience in strength and conditioning. If this highest range was reported by a graduate student in their fifth or sixth year of college sports participation, this experience length implies these individuals started specifically using strength and conditioning during middle school. While it is not a common occurrence for strength and conditioning programs to be present in middle schools, athletic development programs are available to youth athletes, so the finding is not as rare as one may perceive. Chronological age was not collected in this study, but 13 years of strength and conditioning experience may be well over half the participant's lifetime. Someone so familiar with strength and conditioning likely has a different understanding and approach than the individual(s) reporting only one year of prior experience (Jordalen et al., 2020; Mitić et al., 2021).

Athlete Motivations

Self-Determination

The overall sample Autonomy Index indicates a highly autonomously motivated population. The Autonomy Index is a conglomeration of multiple variables. Therefore, subscales were inspected to better identify where the Autonomy Index's score originates. What is notable is the number of missing cases within the subscales associated with the

lowest levels of autonomy (e.g., amotivation and introjection). While there is no way of knowing why participants did not respond to these items, researchers must consider these questions in future research. It is a possibility the instrument alteration to strength and conditioning participation from sport participation was too different in activity, and new item generation was required versus an adaptation of previously used items. Another reason for missing responses could have been a result of the directions within the informed consent in which participants were informed that they could choose not to answer questions. As shown in Table 8, the mean scores for amotivation and external regulation are considerably lower than the other subscale means. A lack of amotivation may have been the driving factor to avoid responding to the questions. During the Questionnaire, the TEOSQ was placed after the SMS-II instrument, which may have served as a reason for missing responses. More athletes participated in the SMS-II than the TEOSQ (see Tables 7 and 8). The TEOSQ being placed after the SMS-II may have been past the point of the athlete's attention and they did not participate in the later instrument after responding to initial items.

The SMS-II subscales with the highest means, indicating a high level of that motivation, were intrinsic motivation, identified regulation, and integrated motivation, which are the three motivations with the most self-determination. The results indicate the sample population possesses a high level of self-determined motivation in their participation in strength and conditioning programs. The three mentioned motivations and introjected regulation all possessed means above the mid-point of the 7-point Likert scale. These trends are encouraging as the study by Fenton et al. (2016) found athletes with more autonomous motivations exerted greater effort than their less autonomously

motivated peers. Alternatively, higher scores at the low end of the self-determination spectrum (Amotivation, External Regulation, and Introjected Regulation) were associated with higher sport dropout rates and lower satisfaction (Calvo et al., 2010). The current study's trend of higher self-determined motivations indicates the population has a high chance of sustained sport participation based off their motivations for participation in strength and conditioning programs.

Achievement Goal Orientation

The TEOSQ instrument measuring goal orientation was placed after the SMS-II instrument in the survey. As such, there were fewer complete TEOSQ responses than complete SMS-II responses. When examining the responses, there were more non-responses to ego-oriented items than to the task-orientation items (see Table 7). It is impossible to say why the responses were left blank and what responses would have been had participants responded to these items. It is interesting to note the overall sample average yielded higher task-oriented scores than ego-oriented scores. One could postulate if the item did not correspond to the participant's goals or if the question was not clear, they may not have responded at all.

The higher task-orientation score trend is promising as research indicates greater task-orientation correlates to higher sport enjoyment (Schneider et al., 2017). The interesting difference in the current trends and previous research is between sport type and athlete gender. Previously, individual sports were associated with higher ego-orientation and team sports reported greater task-orientation (Hanrahan & Cerin, 2009). The current trends indicate team and individual sport athletes reports similarly for task-

orientation, this conflicts with previous literature and should be further explored to discover whether statistically significant differences do exist.

According to previous literature, male athletes generally report higher ego-orientation, while female athletes report greater levels of task-orientation (Hanrahan & Cerin, 2009; Krouse et al., 2011). The current study's results reported the trend of female athletes yielding higher task- and ego-orientation scores than their male counterparts. This is interesting as males still reported higher Autonomy Index scores, which is supported by the literature (Chin et al., 2012). However, the change in females reporting higher levels of both goal-orientation scores is a new finding that should be explored further.

Theoretical Implications

It is difficult to identify theoretical implications of a study with no statistical significance. However, there are some inferences that can be made regarding the potential impacts of trends identified in the results. The current study was the first to adapt two instruments (SMS-II and TEOSQ), from sports participation to strength and conditioning participation. Unfortunately, it appears the adaptations were not sufficient to capture the athletes' motivations accurately in their approach to strength and conditioning training. While the results were not statistically significant, the lack of significance is still a finding itself. One potential for the non-statistically significant findings is the selected instruments were not appropriate for adapting to strength and conditioning. Previous studies have used both SDT and AGT to evaluate motivations for exercise with successful findings (Biddle et al., 1999; Keshtidar & Benzadnia, 2017; Ryan & Connell, 1989; Zahariadis et al., 2006). However, to the researcher's knowledge, this is the first

study to adapt the instruments to strength and conditioning participation for student-athletes. When referencing the theories, it is appropriate to apply SDT and AGT to the strength and conditioning population, but perhaps new instruments should be crafted rather than attempting to revise and edit existing measures.

The current study was the first to identify injury status as a potential predictor variable in the motivations for strength and conditioning. Previous literature has investigated the impact of injuries on sport participation and found psychological stress as a primary influence in the injured athlete (Nippert & Smith, 2008). Also, injuries have been identified as barriers to participate in sports (Finch et al., 2001). The current study identified the trend of athletes who experienced an injury significant enough to require a return-to-play protocol reported lower Autonomy Index scores than their peers without such injury history. No causation could be inferred from these findings, but it is interesting to note the lower autonomous motivations for strength and conditioning training within the population experiencing an injury. More research should be done to further explore these findings. Should they be found to be statistically significant in the future, they may yield some theoretical and practical implications in enhancing the return-to-play protocol or coaching approaches to this population.

Limited research has been published isolating the different sport played as a predictor variable (Boyd et al., 2017; Elder at al., 2014). It is a common practice for strength and conditioning professionals at educational institutions (at the high school and higher education levels) to coach multiple sports within a season or year (Duehring et al., 2009; Hartshorn et al., 2016). Better understanding differences between these sports and their athletes' motivations to train may guide coaches to alter their approach to differently

motivated athletes. Group sizes were too small to enter into the regression analyses, but descriptive trends were identified between sports. The teams with the highest Autonomy Index scores were basketball, golf, and swimming and diving teams. Sports with the lowest Autonomy Indexes were track and field, soccer, and baseball/softball. These trends may yield theoretical implications if future studies find statistical significance. Differences may lead to more effective education or coaching approaches to best reach these athletes.

In terms of goal orientations, tennis, golf, and baseball/softball reported the highest task-orientation scores, and golf, track and field, and swimming and diving reported the highest ego-orientation scores. Only sport types have been studied when using TEOSQ in sport participation (Hanrahan & Cerin, 2009). Studying the difference in sports may help shape future research of these sports and their athletes' motivations. This distinct knowledge broken down by sport rather than a generalized sport type may offer greater insight to the coaching needs and research directions appropriate for specific sports. Research may currently be erroneously lumping sport types together when individual sports may exhibit different motivation styles and needs not visible at the sport type-level. This knowledge may also aide the practitioner's approach in better understanding their athletes' motivations for strength and conditioning training.

Practical Implications

The two most notable trends of this study were the differences in motivations across different sports, and the motivational impacts by significant previous injuries. While sport groups were too small to include as an independent variable in the regression analyses, the trends observed through descriptive statistics indicated there were

differences among sports. Golf and basketball reported the two highest Autonomy Index scores and the sports with the lowest Autonomy Index scores were soccer and track and field. Strength and conditioning coaches may use these findings to change their approaches to these sports to encourage more self-determined motivations. An example of this could be coaches utilizing more autonomous language putting the ownership of performance back on the athletes and/or help athletes set their own goals for their strength and conditioning training.

The experience of an injury requiring a return-to-play protocol yielded a trend of reduced Autonomy Index scores. As a strength and conditioning coach, one may be able to focus on more autonomous ways athletes can use strength and conditioning to improve their performance, while reducing the risk of future injuries and supporting more sustainable motivations for career-long training (Fenton et al, 2016). For example, the progress an athlete has made since the time of injury in strength and conditioning related activities (e.g., weight lifted, range of motion in a particular movement, time in conditioning pieces changing) can be tracked with the athlete to show them how effective they've been in their return-to-play protocol. Emphasizing the athlete's progress since their injury provides concrete evidence of gained competence in reestablishing training abilities. Even simple phrases from coaches emphasizing these changes may create relatedness and a community surrounding the athlete, letting them know they are not alone in their recovery, further emphasizing self-determined characteristics and motivations.

The importance of coaching in athlete participation has been noted in previous research. Amorose and Anderson-Butcher (2007) found perceived coaching behaviors

impacted athletes' intrinsic motivations. Specifically, they found that the more connected, competent, and autonomous the coaching styles, the greater the athlete's intrinsic motivation. By identifying the current population's motivational trends, strength and conditioning professionals may alter their emphases in training to support these areas of motivation. Coaching which increases self-determination is supported in research, as athletes are more likely to engage in activities with higher levels of willingness (autonomy) that build a connection to a social group (relatedness) through which express their competencies (Spence & Oades, 2011). Encouraging the existing trends of higher self-determined motivations may help build a self-fulfilling cycle, where the more self-determined the athletes feel in their training, the more likely they will be to engage in training as that participation satisfies higher psychological needs (Deci & Flaste, 1995).

Limitations

There were 123 initial survey responses recorded, however after inspection of the data, only 87 were suitable for use in the current study. The survey was emailed out and the athletes' strength and conditioning coaches urged the athletes to participate on four separate occasions. Most of the unused responses consisted of the participant's descriptive data, with little to no responses on the instruments. The data analyses and statistical significance of the results may have been significant with a higher response rate. As such, in the future, it may be helpful to explain to potential participants how many screens they will encounter during the full survey. By explaining the entire survey contents, the participant may begin the questionnaire with finite expectations of what to encounter, instead of not responding to questions after the first screen.

Non-responses could also be a factor of the instruments not accurately capturing the athletes' motivations. Both the SMS-II and TEOSQ were adapted from sport participation (Chi & Duda, 1995; Pelletier et al., 2013). It is possible using these instruments was not appropriate in capturing strength and conditioning participation, due to the activities in strength and conditioning training differing from activities in sports. The difference in activities may be large enough to affect the athlete's approach to training, an in such case, an instrument designed to capture sport participation motivation is ill fitted to apply to strength and conditioning participation.

The data was collected in a fully online format, and participation was encouraged through the athletes' strength and conditioning coaches. Both factors could have yielded issues in data collection in terms of athlete participation and/or how they answered survey items. Student-athletes were emailed the invitation to participate in the survey as well as the questionnaire link, yielding a response rate of 31%. Greater responses could have been accomplished had the data collection been introduced in person and alternative questionnaire formats been available. This is a limitation to consider for future research with this population. After questionnaires were emailed, the strength and conditioning staff encouraged and reiterated the purpose of the study and importance of participation. The influence of the strength staff emphasizing survey completion is unknown. Should an athlete not value the coach, they may be less likely to complete the survey. There is also the possibility the student-athlete respected their strength coach and responded to items as how athletes perceived they should answer. This is a form of unintended social desirability bias which yields answers not truly reflecting how participants would answer without this influence (Fisher, 1993). As a result of social desirability bias, athletes may

have reported higher overall motivations, especially task-oriented and autonomous factors. However, the extent of this bias is not known.

The researcher was a previous exercise science faculty member with many student-athletes as former students. Athletes who were students of the researcher may have been influenced one way or another to participate. The exercise science education also focuses on the benefits and meaningfulness of strength and conditioning for sport performance, which may also have altered the athlete's approach to training. It is possible athlete major was an unaccounted-for predictor variable which may need to be included in future research.

Data collection yielded unequal group sizes when comparing sport played. For example, there were no men's tennis participants, resulting in only three responses for the sport of tennis. On the other hand, there were 19 responses from women's track and field, totaling 27 when combined men's track and field responses. It is not appropriate to statistically compare such small and unequal groups within linear regressions and as such, sport played was not a viable predictor variable in the analyses.

It should also be stated there was perhaps an unknown effect that the COVID-19 pandemic had on this population and their relationship with strength and conditioning. Training, sport practice, and competitions were altered to accommodate the developing recommended COVID-19 safety practices. These accommodations may have altered the athlete's approach to their sport and training, resulting in unknown and unmeasured motivational issues.

Future Research

Future research should explore different instruments to measure athletes' motivations for strength and conditioning participation. The current adaptations may not have been sufficient to capture an athlete's true motivations, and new instruments may need to be created to appropriately measure this characteristic. Larger populations and higher response rates are recommended aims for researchers interested in further studying this area. Present trends may prove to be significant with higher response rates. One suggestion for greater responses is to survey through multiple formats and include in-person data collection instead of solely remote, online data collection. The time set aside to collect in-person data may prove more fruitful, yielding more meaningful results in the future. It may be also helpful to capture the participant's perception of how the COVID-19 pandemic may have altered their approach to strength and conditioning in future studies. This may be an important variable affecting the motivational outcome not accounted for in this study.

The sports included in this study were limited to the institution's sports programs, but in no way encompass all the sports offered at the collegiate level. Future studies should include more sports for a greater understanding of the collegiate athletic population as well as approach lower divisions for participation. Division II and III programs are different in their offerings and resources compared to the Division I level, which may represent an entirely different population to test (NCAA, 2020). It is also recommended future studies include multiple institutions across the variety of conferences to better capture student-athletes' motivations, as the current study included only one institution.

Future studies should also further explore the effects of injuries on training. The current study revealed descriptive trends of injuries affecting strength and conditioning, but these trends were not statistically significant. While injuries are common in sports, understanding how they may alter an athlete's approach to training could be helpful in the rehabilitation and post-injury careers of those athletes. More research is needed in this area to fully understand the impacts of injuries on athletes.

Summary of Study

The purpose of the study was to identify motivations of collegiate student-athletes to participate in strength and conditioning programs as a part of their sports program membership. Understanding an athlete's motivation to train may allow coaches the opportunity to cater their approach and encouragement styles to yield the best training results (Amorose, 2007; Amorose & Anderson-Butcher 2007; Baker et al., 2003; Baric & Bucik, 2009; Elder et al., 2014; Fransen et al, 2018; Krouse et al., 2011; Machin, 2010; Roxas & Ridinger, 2016; Spence & Oades, 2011; Zhang & Chelladurai, 2013). Self-Determination Theory (SDT) and Achievement Goal Theory (AGT) were used to guide the instrument selection and approach to measuring motivations.

One's autonomy, competence, and relatedness to others combines to form self-determination. Lacking in any of the three areas will result in a reduced ability to control one's situation and outcome. SDT orders motivations along a spectrum according to the level of self-determination the motivation exhibits. Ranking motivation from lowest self-determination to highest is Amotivation, External Regulation, Introjected Regulation, Identified Regulation, Integrated Regulation, and Intrinsic Motivation. The *Sport Motivation Scale-II* (SMS-II) (Pelletier et al., 2013) was selected to measure the

participants motivations according to SDT. Research has noted higher levels of self-determination is correlated with higher levels of performance and longer athletic careers when compared to the motivators with low self-determination (Calvo et al, 2010; Fenton et al., 2014).

Achievement Goal Theory identifies two primary goals which orient one's motivational focus. Task-orientation focuses a person's intention on mastering the task, regardless of how others around them are accomplishing it, while ego-orientation emphasizes social comparison as a metric for how well someone performs an activity (Duda et al., 1995). The *Task and Ego Orientation in Sport Questionnaire* (TEOSQ) (Chi & Duda, 1995) was selected to measure the goal orientations of participants. Previous research has identified task-orientation with longer and more sustained activity participation (Duda et al., 1995) while ego-orientation was associated with quicker athlete burnout and shorter participation length (Cervello & Santos-Rosa, 2001; Nicholls, 1984; Wilson et al., 2003).

The intended population was Division-I collegiate athletes. Subpopulations within college athletes were defined by age group, gender, sport played, sport type, and athletes with previous injuries significant enough to require a return-to-play protocol (injury status). These variables were used as predictor variables in the data analysis.

Purposive sampling was employed to recruit participants through the institution's strength and conditioning program. Invitations to participate with links to the questionnaire were emailed to student-athletes in selected sports. Specific sport teams were selected if there was a gender-equivalent team represented (i.e., softball and baseball). Sport team membership required involvement in the strength and conditioning

programs associated with the athletic program. As such, women's rowing, women's lacrosse, women's field hockey, women's volleyball, and men's football were not included in the study. Cross-country was also not selected due to the sports diminished strength and conditioning participation requirements. Questionnaire completion was encouraged by the strength and conditioning coaches as well as through follow-up emails that were sent to encourage sufficient responses.

A total of 123 survey responses were submitted, however only 89 were usable due to non-response. The SMS-II and TEOSQ were originally developed to capture athlete motivations to sport participation (Chi & Duda, 1995; Pelletier et al., 2013). Under the guidance of an expert panel, instruments were modified to measure strength and conditioning participation. To date, this is the first study to adapt the SMS-II and TEOSQ to address strength and conditioning participation.

Participants reported higher task-orientations scores (M= 4.21), indicating a high level of task-orientation, with lower ego-orientation scores (M= 2.94). The overall Autonomy Index score (the comprehensive measure from the SMS-II) was 14.73. This score indicated a high level of self-determination. When analyzing the data to understand whether any differences in motivations across subpopulations existed and whether injury status moderated motivation, no statistical significance was found. However, trends in the data were identified. Males reported higher Autonomy Index scores than females, while females reported higher task- and ego-orientation scores than males. Basketball and golf returned the highest Autonomy Index scores while track and field and soccer reported the lowest Autonomy Indices. Track and field and golf reported the highest ego-orientation scores. Interestingly, athletes with previous significant injuries reported lower Autonomy

Index scores when compared to their non-injured peers. Due to the lack of statistical significance, definitive statements about these trends are not appropriate. With that said, these are trends to which attention should be paid in future research.

The study contained many limitations such as high non-responses, small group sizes within sports, remote online data collection, and the unknown overall effect of COVID-19 on the college athlete. Future research should account for these limitations when studying this area.

REFERENCES

Abery, B., & Zajac, R. (1996). Self-determination as a goal of early childhood and elementary education. Self-determination across the life span: Independence and choice for people with disabilities, 169-196.

Abuhamdeh, S., & Csikszentmihalyi, M. (2009). Intrinsic and extrinsic motivational orientations in the competitive context: An examination of person–situation interactions. *Journal of Personality*, 77(5), 1615-1635.

Ames, C. (1992). Achievement goals and the classroom climate. In J. Meece & D. Schunk (Eds.), Student perceptions in the classroom (pp. 327-348). Hillsdale, NJ: Eribaum

Amorose, A. J. (2007). Coaching effectiveness: Exploring the relationship between coaching behavior and self-determined motivation.

Amorose, A. J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of sport and exercise*, *8*(5), 654-670.

Amorose, A. J., & Horn, T. S. (2000). Intrinsic motivation: Relationships with collegiate athletes' gender, scholarship status, and perceptions of their coaches' behavior. *Journal of sport and exercise psychology*, *22*(1), 63-84.

Andrade, C. (2021). The inconvenient truth about convenience and purposive samples. *Indian Journal of Psychological Medicine, 43*(1), 86-88.

Baker, J., Yardley, J., & Cote, J. (2003). Coach behaviors and athlete satisfaction in team and individual sports. *Int. J. Sport Psychol*, *341*, 2264239.

Barić, R., & Bucik, V. (2009). Motivational differences in athletes trained by coaches of different motivational and leadership profiles. *Kinesiology*, *41*(2).

Berkowitz, S., Wynn, M., & Dougherty, S. (2019). College Football Strength Coach Salaries. Retrieved December 09, 2020, from https://sports.usatoday.com/ncaa/salaries/football/strength

Biddle, S., Soos, I., & Chatzisarantis, N. (1999). Predicting physical activity intentions using goal perspectives and self-determination theory approaches. *European Psychologist*, *4*(2), 83.

Boitnott, J. (2018, July 25). Don't Understand Millennials? These 6 Insights Will Help You Work with Them. Retrieved June 22, 2020, from https://www.inc.com/john-boitnott/dont-understand-millennials-these-6-insights-will-help-you-work-with-them.html

Bompa, T. O., & Buzzichelli, C. (2018). *Periodization-: theory and methodology of training*. Human kinetics.

Boyd, J. M., Andrews, A. M., Wojcik, J. R., & Bowers, C. J. (2017). Perceptions of NCAA Division I Athletes on Strength Training. *Sport Journal*.

Brown, C., Glastetter-Fender, C., & Shelton, M. (2000). Psychosocial identity and career control in college student-athletes. *Journal of Vocational Behavior*, *56*(1), 53-62.

Calvo, T. G., Cervelló, E., Jiménez, R., Iglesias, D., & Murcia, J. A. M. (2010). Using self-determination theory to explain sport persistence and dropout in adolescent athletes. *The Spanish journal of psychology*, *13*(2), 677-684.

Cerasoli, C. P., & Ford, M. T. (2014). Intrinsic motivation, performance, and the mediating role of mastery goal orientation: A test of self-determination theory. *The Journal of psychology*, *148*(3), 267-286.

Cervelló, E. M., & Santos-Rosa, F. J. (2001). Motivation in sport: An achievement goal perspective in young Spanish recreational athletes. *Perceptual and motor skills*, *92*(2), 527-534.

Chalabaev, A., Sarrazin, P., Fontayne, P., Boiché, J., & Clément-Guillotin, C. (2013). The influence of sex stereotypes and gender roles on participation and performance in sport and exercise: Review and future directions. *Psychology of sport and exercise*, *14*(2), 136-144.

Chelladurai, P., & Saleh, S. D. (1978). Preferred leadership in sports. *Canadian Journal of Applied Sport Sciences*.

Chi, L., & Duda, J. L. (1995). Multi-sample confirmatory factor analysis of the task and ego orientation in sport questionnaire. *Research Quarterly for Exercise and Sport*, *66*(2), 91-98.

Chin, N. S., Khoo, S., & Low, W. Y. (2012). Self-determination and goal orientation in track and field. *Journal of human kinetics*, *33*, 151-161.

Chu, S. K., & Rho, M. E. (2016). Hamstring injuries in the athlete: diagnosis, treatment, and return to play. Current sports medicine reports, 15(3), 184.

Clancy, R. B., Herring, M. P., & Campbell, M. J. (2017). Motivation measures in sport: A critical review and bibliometric analysis. *Frontiers in psychology*, *8*, 348.

Collins, D. (2003). Pretesting survey instruments: an overview of cognitive methods. Quality of life research, 12(3), 229-238.

Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical assessment, research, and evaluation*, *10*(1), 7.

Croisier, J. L., Ganteaume, S., Binet, J., Genty, M., & Ferret, J. M. (2008). Strength imbalances and prevention of hamstring injury in professional soccer players: a prospective study. *The American journal of sports medicine*, *36*(8), 1469-1475.

de Bruin, A. K., Bakker, F. C., & Oudejans, R. R. (2009). Achievement goal theory and disordered eating: Relationships of disordered eating with goal orientations and motivational climate in female gymnasts and dancers. *Psychology of Sport and Exercise*, *10*(1), 72-79.

De Pero, R., Amici, S., Benvenuti, C., Minganti, C., Capranica, L., & Pesce, C. (2009). Motivation for sport participation in older Italian athletes: the role of age, gender and competition level. *Sport sciences for health*, *5*(2), 61-69.

Deci, E. L., & Flaste, R. (1995). *Why we do what we do: The dynamics of personal autonomy*. GP Putnam's Sons.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, *11*(4), 227-268.

Deci, E. L., & Ryan, R. M. (1980). Self-determination theory: When mind mediates behavior. *The Journal of mind and Behavior*, 33-43.

Deci, E. L., & Ryan, R. M. (Eds.). (2004). *Handbook of self-determination research*. University Rochester Press.

Deci, E. L., & Vansteenkiste, M. (2003). Self-determination theory and basic need satisfaction: Understanding human development in positive psychology.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: the tailored design method*. John Wiley & Sons.

Dorgo, S. (2009). Unfolding the practical knowledge of an expert strength and conditioning coach. *International Journal of Sports Science & Coaching*, *4*(1), 17-30.

Duda, J. L., Chi, L., Newton, M. L., & Walling, M. D. (1995). Task and ego orientation and intrinsic motivation in sport. *International journal of sport psychology*.

Duehring, M. D., Feldmann, C. R., & Ebben, W. P. (2009). Strength and conditioning practices of United States high school strength and conditioning coaches. The Journal of Strength & Conditioning Research, 23(8), 2188-2203.

Dweck, C. S. (1986). Motivational processes affecting learning. *American psychologist*, *41*(10), 1040.

Ebben, W., & Brudzynski, L. (2008). Motivations and barriers to exercise among college students. *Journal of Exercise Physiology Online*, *11*(5).

Ebben, W. P., Carroll, R. M., & Simenz, C. J. (2004). Strength and conditioning practices of National Hockey League strength and conditioning coaches. The Journal of Strength & Conditioning Research, 18(4), 889-897.

Elder, C., Elder, A. S., & Kelly, C. (2014). Collegiate athletes' perceptions on the importance of strength and conditioning coaches and their contribution to increased athletic performance. *J Athl Enhancement 3*, *4*, 2.

Ebel, R. L. (1965). Confidence weighting and test reliability. *Journal of Educational Measurement*, 2(1), 49-57.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational psychologist*, 34(3), 169-189.

English, K. L., Amonette, W. E., Graham, M., & Spiering, B. A. (2012). What is "evidence-based" strength and conditioning?. *Strength & Conditioning Journal*, *34*(3), 19-24.

Fenton, S. A., Duda, J. L., & Barrett, T. (2016). Optimising physical activity engagement during youth sport: a self-determination theory approach. *Journal of sports sciences*, *34*(19), 1874-1884.

Finch, C., Owen, N., & Price, R. (2001). Current injury or disability as a barrier to being more physically active. *Medicine and Science in Sports and Exercise*, *33*(5), 778-782.

Fisher, R. J. (1993). Social desirability bias and the validity of indirect questioning. *Journal of consumer research*, *20*(2), 303-315.

Fleck, S. J., & Falkel, J. E. (1986). Value of resistance training for the reduction of sports injuries. *Sports Medicine*, *3*(1), 61-68.

Flood, S. E., & Hellstedt, J. C. (1991). Gender differences in motivation for intercollegiate athletic participation. *Journal of Sport Behavior*, *14*(3), 159.

Fransen, K., Boen, F., Vansteenkiste, M., Mertens, N., & Vande Broek, G. (2018). The power of competence support: The impact of coaches and athlete leaders on intrinsic motivation and performance. *Scandinavian Journal of Medicine & Science in Sports*, 28(2), 725-745.

Frederick-Recascino, C. M. (2002). Self-determination theory and participation motivation research in the sport and exercise domain. *Handbook of self-determination research*, *277*.

Freud, S. (1957). Thoughts for the times on war and death. *In The Standard Edition of the Complete Psychological Works of Sigmund Freud, Volume XIV (1914-1916): On the History of the Psycho-Analytic Movement, Papers on Metapsychology and Other Works* (pp. 273-300).

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational behavior*, *26*(4), 331-362.

Garson, G. D. (2012). *Testing statistical assumptions.* Asheboro, NC: Statistical Associates Publishing.

Gaston-Gayles, J. L. (2004). Examining academic and athletic motivation among student athletes at a Division I university. *Journal of College Student Development*, *45*(1), 75-83.

Gaston-Gayles, J. L. (2005). The factor structure and reliability of the Student Athletes' Motivation toward Sports and Academics Questionnaire (SAMSAQ). *Journal of College Student Development*, *46*(3), 317-327.

Gilson, T. A., Chow, G. M., & Ewing, M. E. (2008). Using goal orientations to understand motivation in strength training. *The Journal of Strength & Conditioning Research*, *22*(4), 1169-1175.

Gilson, T. A., & Curnock, L. E. (2012). An examination of athletes' self-efficacy and strength training effort during an entire off-season. *The Journal of Strength & Conditioning Research*, *26*(2), 443-451.

Goal. (2021). In *Merriam-Webster.com*. Retrieved January 15, 2021, from https://www.merriam-webster.com/dictionary/goal

Gordey, D (2020). Promoting Self-Determination in Children with Hearing Loss. *Canadian Audiologist,* 7(3).

Goudas, M., Biddle, S., & Fox, K. (1994). Perceived locus of causality, goal orientations, and perceived competence in school physical education classes. *British Journal of Educational Psychology, 64*(3), 453-463.

Gould, D., Greenleaf, C., Guinan, D., & Chung, Y. (2002). A survey of US Olympic coaches: Variables perceived to have influenced athlete performances and coach effectiveness. *The sport psychologist*, *16*(3), 229-250.

Green, S. B. (1991). How many subjects does it take to do a regression analysis. *Multivariate behavioral research*, *26*(3), 499-510.

Haff, G. G., & Triplett, N. T. (Eds.). (2015). *Essentials of strength training and conditioning 4th edition*. Human kinetics.

Hamstra, M. R. W., Van Yperen, N. W., Wisse, B., & Sassenberg, K. (2014). Transformational and transactional leadership and followers' achievement goals. *Journal of Business and Psychology*, *29*(3), 413–425.

Hanrahan, S. J., & Cerin, E. (2009). Gender, level of participation, and type of sport: Differences in achievement goal orientation and attributional style. *Journal of science and medicine in sport*, *12*(4), 508-512.

Hartman, J. L., & McCambridge, J. (2011). Optimizing millennials' communication styles. *Business Communication Quarterly, 74*(1), 22-44.

Hartshorn, M. D., Read, P. J., Bishop, C., & Turner, A. N. (2016). Profile of a strength and conditioning coach: Backgrounds, duties, and perceptions. *Strength & Conditioning Journal*, *38*(6), 89-94.

Ho, R. (2013). *Handbook of univariate and multivariate data analysis with IBM SPSS*. CRC press.

Hoffman, J. (2011). *NSCA's Guide to Program Design*. Human Kinetics.

Hoffman, J. (2014). *Physiological aspects of sport training and performance*. Human Kinetics.

Howard, J., Gagné, M., Morin, A. J., & Van den Broeck, A. (2016). Motivation profiles at work: A self-determination theory approach. *Journal of Vocational Behavior*, *95*, 74-89.

Hoffman, J. R., Tenenbaum, G., Maresh, C. M., & Kraemer, W. J. (1996). Relationship between athletic performance tests and playing time in elite college basketball players. *The Journal of Strength & Conditioning Research*, 10(2), 67-71.

Hu, P., & Zhang, J. (2017). A pathway to learner autonomy: a self-determination theory perspective. *Asia Pacific Education Review*, 18(1), 147–157. https://doi.org/10.1007/s12564-016-9468-z

IBM Corportation, (2020). IBM SPSS Statistics for Windows (Version 27.0 Armonk). *IBM Corp.: Armonk, NY, USA*.

Inceoglu, I., Segers, J., & Bartram, D. (2012). Age-related differences in work motivation. *Journal of Occupational and Organizational Psychology*, *85*(2), 300-329.

Jager, J., Putnick, D. L., & Bornstein, M. H. (2017). II. More than just convenient: The scientific merits of homogeneous convenience samples. *Monographs of the Society for Research in Child Development*, 82(2), 13-30.

Jeffreys, I. (2015). Evidence based practice in strength and conditioning—reality or fantasy. *Prof Strength Cond*, *39*, 7-14.

Jordalen, G., Lemyre, P. N., & Durand-Bush, N. (2020). Interplay of motivation and self-regulation throughout the development of elite athletes. *Qualitative Research in Sport, Exercise and Health*, *12*(3), 377-391.

Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology*. Psychologie Canadienne, 49(3), 194–200.

Kaufman, J. (2020, March 09). Ohio State makes Mickey Marotti college football's highest-paid strength and conditioning coach, for now. Retrieved April 19, 2020, from https://www.usatoday.com/story/sports/ncaaf/bigten/2020/03/09/ohio-state-mickey-marotti-top-paid-college-football-strength-coach/5005582002/

Keshtidar, M., & Behzadnia, B. (2017). Prediction of intention to continue sport in athlete students: A self-determination theory approach. *PloS one*, *12*(2).

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: differentiating men's and women's motives for sport participation and exercise. *Journal of American college health*, *54*(2), 87-94.

Kirkcaldy, B. D. (1982). Personality and sex differences related to positions in team sports. *International Journal of Sport Psychology*.

Kraemer, W. J. (1983). Exercise prescription in weight training: A needs analysis. *Strength & Conditioning Journal*, *5*(1), 64-65.

Kraemer, W., Denegar, C., & Flanagan, S. (2009). Recovery from injury in sport: considerations in the transition from medical care to performance care. *Sports health*, 1(5), 392-395.

Krouse, R. Z., Ransdell, L. B., Lucas, S. M., & Pritchard, M. E. (2011). Motivation, goal orientation, coaching, and training habits of women ultrarunners. *The Journal of Strength & Conditioning Research*, *25*(10), 2835-2842.

Kumar, S., & Jagacinski, C. M. (2006). Imposters have goals too: The imposter phenomenon and its relationship to achievement goal theory. *Personality and Individual Differences*, *40*(1), 147-157.

Laborde, S., Guillén, F., & Mosley, E. (2016). Positive personality-trait-like individual differences in athletes from individual-and team sports and in non-athletes. *Psychology of sport and exercise*, *26*, 9-13.

Latham, G. P. (2004). The motivational benefits of goal-setting. *The Academy of Management Executive*, 18(4), 126-129.

Li, F., Harmer, P., Duncan, T. E., Duncan, S. C., Acock, A., & Yamamoto, T. (1998). Confirmatory factor analysis of the Task and Ego Orientation in Sport Questionnaire with cross-validation. *Research Quarterly for Exercise and Sport*, *69*(3), 276-283.

Linnenbrink, E. A. (2005). The dilemma of performance-approach goals: The use of multiple goal contexts to promote students' motivation and learning. *Journal of Educational Psychology*, *97*, 197–213.

Lochbaum, M., Kazak, C. Z., Graham, K.-A., Wright, T., & Zazo, R. (2016). Task and ego goal orientations in competitive sport: a quantitative review of the literature from 1989 to 2016. *Kinesiology*, *48*(1), 3–29.

Lonsdale, C., Hodge, K., & Rose, E. A. (2008). The Behavioral Regulation in Sport Questionnaire (BRSQ): Instrument development and initial validity evidence. *Journal of sport and exercise psychology*, *30*(3), 323-355.

Loughead, T. M., Hardy, J., & Eys, M. A. (2006). The nature of athlete leadership. *Journal of Sport Behavior*, 29(2).

Machin, S. (2010). The nature of the internal coaching relationship. *International Journal of Evidence Based Coaching & Mentoring*.

MacKinnon, D. P., & Luecken, L. J. (2008). How and for whom? Mediation and moderation in health psychology. *Health psychology*, *27*(2S), S99.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50,* 370-396.

McClelland, G. H., Irwin, J. R., Disatnik, D., & Sivan, L. (2017). Multicollinearity is a red herring in the search for moderator variables: A guide to interpreting moderated multiple regression models and a critique of Iacobucci, Schneider, Popovich, and Bakamitsos (2016). *Behavior research methods*, *49*(1), 394-402.

Medvedev, A. S. (1986). Sistema mnogoletney trenirovki v tyazheloy atletike [The system of multi-year training in weightlifting]. *Moscow, 1986, 272 p.(rus)*.

Meyer, J. P., & Gagne, M. (2008). Employee engagement from a self-determination theory perspective. *Industrial and Organizational Psychology*, *1*(1), 60-62.

Midi, H., Sarkar, S. K., & Rana, S. (2010). Collinearity diagnostics of binary logistic regression model. *Journal of Interdisciplinary Mathematics*, *13*(3), 253-267.

Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of cardiac anaesthesia*, 22(1), 67.

Mitić, P., Nedeljković, J., Bojanić, Ž., Franceško, M., Milovanović, I., Bianco, A., & Drid, P. (2021). Differences in the psychological profiles of elite and non-elite athletes. *Frontiers in Psychology*, *12*, 769.

Mullan, E., & Markland, D. (1997). Variations in self-determination across the stages of change for exercise in adults. *Motivation and emotion*, 21(4), 349-362.

Munn, J., Herbert, R. D., Hancock, M. J., & Gandevia, S. C. (2005). Resistance training for strength: effect of number of sets and contraction speed. *Medicine and science in sports and exercise*, 37(9), 1622.

NAIA. (2016, April 11). ABOUT THE NAIA. Retrieved February 12, 2020, from https://www.naia.org/membership/2015-16/releases/20160411bcnqp

Nalepa, B., Alexander, A., Schodrof, S., Bernick, C., & Pardini, J. (2017). Fighting to keep a sport safe: toward a structured and sport-specific return to play protocol. *The Physician and Sports medicine*, 45(2), 145-150.

National Collegiate Athletic Association. (2016). Examining the student-athlete experience through the NCAA GOALS and SCORE studies.

National Strength and Conditioning Association (NSCA). (2020, January). CSCS® Exam Description. Retrieved December 09, 2020, from

https://www.nsca.com/certification/cscs/certified-strength-and-conditioning-specialist-exam-description/

NCAA. (2020, February 10). Our Three Divisions. Retrieved February 12, 2020, from http://www.ncaa.org/about/resources/media-center/ncaa-101/our-three-divisions

Newton, R. U., Häkkinen, K., Häkkinen, A., McCormick, M., Volek, J., & Kraemer, W. J. (2002). Mixed-methods resistance training increases power and strength of young and older men. *Medicine & Science in Sports & Exercise*, 34(8), 1367-1375.

Ng, J. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-determination theory applied to health contexts: A meta-analysis. *Perspectives on Psychological Science*, 7(4), 325-340.

Nia, M. E., & Besharat, M. A. (2010). Comparison of athletes' personality characteristics in individual and team sports. *Procedia-Social and Behavioral Sciences*, *5*, 808-812.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological review*, *91*(3), 328.

Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Harvard University Press.

Nippert, A. H., & Smith, A. M. (2008). Psychologic stress related to injury and impact on sport performance. *Physical medicine and rehabilitation clinics of North America*, *19*(2), 399-418.

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in health sciences education*, 15(5), 625-632.

NSCA Strength and Conditioning Professional Standards and Guidelines (2017), *Strength & Conditioning Journal,* 39 (6),p 1-24.

Ntoumanis, N. (2001). Empirical links between achievement goal theory and self-determination theory in sport. *Journal of sports sciences*, *19*(6), 397-409.

Ntoumanis, N., & Standage, M. (2009). Morality in sport: A self-determination theory perspective. *Journal of Applied Sport Psychology*, *21*(4), 365-380.

Ommundsen, Y., & Roberts, G. C. (1996). Goal orientations and perceived purposes of training among elite athletes. *Perceptual and Motor Skills*, *83*(2), 463-471.

Ostrow, A. C. (1976). Goal-setting behavior and need achievement in relation to competitive motor activity. *Research Quarterly. American Alliance for Health, Physical Education and Recreation*, *47*(2), 174-183.

Pelletier, L. G., Rocchi, M. A., Vallerand, R. J., Deci, E. L., & Ryan, R. M. (2013). Validation of the revised sport motivation scale (SMS-II). *Psychology of sport and exercise*, *14*(3), 329-341.

Pelletier, L. G., Tuson, K. M., Fortier, M. S., Vallerand, R. J., Briere, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of sport and Exercise Psychology*, *17*(1), 35-53.

Peterson, M. D., Rhea, M. R., & Alvar, B. A. (2004). Maximizing strength development in athletes: a meta-analysis to determine the dose-response relationship. *The Journal of Strength & Conditioning Research,* 18(2), 377-382.

Peterson, S. L., Weber, J. C., & Trousdale, W. W. (1967). Personality traits of women in team sports vs. women in individual sports. *Research Quarterly. American Association for Health, Physical Education and Recreation*, *38*(4), 686-690.

Poiss, C. C., Sullivan, P. A., Paup, D. C., & Westerman, B. J. (2004). Perceived importance of weight training to selected NCAA division III men and women student-athletes. *Journal of Strength and Conditioning Research,* 18(1), 108-114.

Powers, J. (2008). A survey of NCAA division 1 strength and conditioning coaches: characteristics and opinions [dissertation]. *Tampa (FL): University of South Florida, Department of Physical Education and Exercise Science*.

Powers, S. K., & Howley, E. T. (2007). *Exercise physiology: Theory and application to fitness and performance* (pp. 303-308). New York, NY: McGraw-Hill.

Price, M. S., & Weiss, M. R. (2011). Peer leadership in sport: Relationships among personal characteristics, leader behaviors, and team outcomes. *Journal of Applied Sport Psychology,* 23(1), 49-64.

Reeve, J. (2002). *Self-determination theory applied to educational settings.* In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (p. 183–203). University of Rochester Press.

Reifsteck, E. J., Gill, D. L., & Labban, J. D. (2016). "Athletes" and "exercisers": Understanding identity, motivation, and physical activity participation in former college athletes. *Sport, Exercise, and Performance Psychology*, *5*(1), 25.

Regmi, P. R., Waithaka, E., Paudyal, A., Simkhada, P., & Van Teijlingen, E. (2016). Guide to the design and application of online questionnaire surveys. *Nepal journal of epidemiology*, *6*(4), 640.

Rippetoe, M., & Kilgore, L. (2017). Starting Strength. *Wichita Falls, TX: Aasgaard Company 2005*.

Rogers, C. (1967). On Becoming a Person. London: Constable and Company.

Roxas, A. S., & Ridinger, L. L. (2016). Relationships of coaching behaviors to student-athlete well-being. *Higher Education Politics & Economics*, *2*(1), 95-109.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of personality and social psychology*, *57*(5), 749.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 101860.

Šakan, D., Žuljević, D., & Roković, N. (2020). The Role of Basic Psychological Needs in Well-Being During the COVID-19 Outbreak: A Self-Determination Theory Perspective. *Frontiers in Public Health,* 8, 713.

Salkind, N. J. (2010). *Encyclopedia of research design (Vols. 1-0).* Thousand Oaks, CA: SAGE Publications, Inc.

Schaal, K., Tafflet, M., Nassif, H., Thibault, V., Pichard, C., Alcotte, M., ... & Toussaint, J. F. (2011). Psychological balance in high level athletes: gender-based differences and sport-specific patterns. *PloS one*, *6*(5), e19007.

Schmidt, W. D. (1999). Strength and physiological characteristics of NCAA Division III American football players. *Journal of Strength and Conditioning Research*, 13, 210-213.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological assessment*, *8*(4), 350.

Schneider, R., Harrington, M., & Tobar, D. (2017). Goal orientation and how a task or ego mentality can affect the enjoyment for college hockey players. *College Student Journal*, *51*(1), 57-62.

Shaw, G., Serpell, B., & Baar, K. (2019). Rehabilitation and nutrition protocols for optimising return to play from traditional ACL reconstruction in elite rugby union players: A case study. *Journal of sports sciences*, 37(15), 1794-1803.

Simenz, C. J., Dugan, C. A., & Ebben, W. P. (2005). Strength and conditioning practices of National Basketball Association strength and conditioning coaches. *The Journal of Strength & Conditioning Research*, 19(3), 495-504.

Singh, F., Foster, C., Tod, D., & McGuigan, M. R. (2007). Monitoring different types of resistance training using session rating of perceived exertion. *International Journal of Sports Physiology and Performance*, *2*(1), 34-45.

Sohrabi, F., Atashak, S., & Aliloo, M. M. (2011). Psychological profile of athletes in contact and non-contact sports. *Middle-East Journal of Scientific Research*, *9*(5), 638-644.

Solomon, J., & Dodd, D. (2017). The unregulated world of strength coaches and college football's killing season. *CBS Sports*.

Spence, G. B., & Oades, L. G. (2011). Coaching with self-determination theory in mind: Using theory to advance evidence-based coaching practice.

Sports. (2020, January 22). Retrieved September 28, 2020, from https://www.olympic.org/sports

Sullivan, G. S., & Strode, J. P. (2010). Motivation through goal setting: A self-determined perspective. Strategies, 23(6), 18-23.

Sweet, T. W., Foster, C., McGuigan, M. R., & Brice, G. (2004). Quantitation of resistance training using the session rating of perceived exertion method. *The journal of strength & conditioning research*, *18*(4), 796-802.

Tabachnick, B. G., & Fidell, L. S. (2014). Using multivariate statistics. Harlow. Essex: *Pearson Education Limited.*

Tomczak, M., Walczak, M., Kleka, P., Walczak, A., & Bojkowski, Ł. (2020). Psychometric Properties of the Polish Version of Task and Ego Orientation in Sport Questionnaire (TEOSQ). *International Journal of Environmental Research and Public Health*, *17*(10), 3593.

Thompson, C. G., Kim, R. S., Aloe, A. M., & Becker, B. J. (2017). Extracting the variance inflation factor and other multicollinearity diagnostics from typical regression results. *Basic and Applied Social Psychology*, *39*(2), 81-90.

Urdan, T., & Kaplan, A. (2020). The origins, evolution, and future directions of achievement goal theory. *Contemporary Educational Psychology*, 101862.

Urick, M. (2017). Adapting training to meet the preferred learning styles of different generations. *International Journal of Training and Development*, *21*(1), 53-59.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In *Advances in experimental social psychology* (Vol. 29, pp. 271-360). Academic Press.

Vallerand, R. J., & Losier, G. F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of applied sport psychology*, *11*(1), 142-169.

VanVoorhis, C. W., & Morgan, B. L. (2007). Understanding power and rules of thumb for determining sample sizes. *Tutorials in quantitative methods for psychology*, *3*(2), 43-50.

Van de Pol, P. K., & Kavussanu, M. (2011). Achievement goals and motivational responses in tennis: Does the context matter?. *Psychology of Sport and Exercise*, *12*(2), 176-183.

Van de Pol, P. K., & Kavussanu, M. (2012). Achievement motivation across training and competition in individual and team sports. *Sport, Exercise, and Performance Psychology*, *1*(2), 91.

Van de Pol, P. K., Kavussanu, M., & Kompier, M. (2015). Autonomy support and motivational responses across training and competition in individual and team sports. *Journal of Applied Social Psychology*, *45*(12), 697-710.

Van den Broeck, A., Vansteenkiste, M., & De Witte, H. (2008). Self-determination theory: A theoretical and empirical overview in occupational health psychology.

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: the synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of personality and social psychology*, *87*(2), 246.

Vlachopoulos, S. P., Karageorghis, C. I., & Terry, P. C. (2000). Motivation profiles in sport: A self-determination theory perspective. *Research quarterly for exercise and sport*, *71*(4), 387-397.

Weinstein, N., & Ryan, R. M. (2011). A self-determination theory approach to understanding stress incursion and responses. *Stress and Health*, 27(1), 4-17.

Willmott, D., Ryan, S., Sherretts, N., Woodfield, R., & McDermott, D. (2018). Motivation: A critical consideration of Freud and Rogers' seminal conceptualisations. *Polish Psychological Bulletin,* 49(2), 229-234.

Wilson, P. M., Rodgers, W. M., Blanchard, C. M., & Gessell, J. (2003). The Relationship Between Psychological Needs, Self-Determined Motivation, Exercise Attitudes, and Physical Fitness 1. *Journal of Applied Social Psychology*, *33*(11), 2373-2392.

Winkleman, N., (2012, July). Athlete Profiling: Choosing a Periodization System to Maximize Performance. NSCA National Conference and Exhibition. *Conference Conducted at the meeting of the National Strength and Conditioning Association* Providence, RI.

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of educational psychology,* 96(2), 236.

Zach, S., & Adiv, T. (2016). Strength training in males and females–Motives, training habits, knowledge, and stereotypic perceptions. *Sex Roles*, *74*(7-8), 323-334.

Zahariadis, P., Tsorbatzoudis, H., & Alexandris, K. (2006). Self-determination in sport commitment. *Perceptual and motor skills*, *102*(2), 405-420.

Zhang, Z., & Chelladurai, P. (2013). Antecedents and consequences of athlete's trust in the coach. *Journal of sport and health science*, *2*(2), 115-121.

Zirm, J. (2014, June 02). 17 Insanely Expensive College Athletic Training Facilities. Retrieved April 19, 2020, from https://www.stack.com/a/expensive-college-athletic-training-facilities

APPENDIX A

Demographic Data Collection

Enter your Student ID#

What is your major?

Select your sport team of which you are a member

- Men's Tennis
- Women's Tennis
- Men's Golf
- Women's Golf
- Men's Track & Field
- Women's Track & Field
- Men's Soccer
- Women's Soccer
- Men's Basketball
- Women's Basketball
- Baseball
- Softball
- Men's Swimming & Diving
- Women's Swimming & Diving

Which year in school will you be at the beginning of Fall 2020 Semester?

- Redshirt Freshman
- True Freshman
- Sophomore
- Junior
- Senior
- Fifth-year Senior/Graduate Student

Did you transfer to the University of Louisville?

- Yes
- No

If yes, which year did you enter UofL

- True Freshman
- Sophomore

- Junior
- Senior
- Fifth-year Senior/Graduate Student

Prior to start of the Fall 2020 semester, how many years did you participate in a strength and conditioning/athletic development program, including at the high school and college level?

- Select drop down year

Have you ever experienced an injury requiring a return to play protocol in high school or college?

- Yes
- No

APPENDIX B

Sport Motivation Scale-II

Why do you play your sport?

1 2 3 4 5 6 7

(Not at all true) (Somewhat True) (Very true)

- *Because people around me reward me when I do.*
- *Because it gives me pleasure to learn more about my sport.*
- *Because I would feel bad about myself if I did not take the time to do it.*
- *Because practicing sports reflects the essence of whom I am.*
- *Because through sport, I am living in line with my deepest principles.*
- *Because I think others would disapprove of me if I did not.*
- *Because it is very interesting to learn how I can improve.*
- *So that others will praise me for what I do.*
- *Because I have chosen this sport as a way to develop myself.*
- *It is not clear to me anymore; I don't really think my place is in sport.*
- *Because it is one of the best ways I have chosen to develop other aspects of myself.*
- *Because I feel better about myself when I do.*
- *Because I find it enjoyable to discover new performance strategies.*
- *Because I would not feel worthwhile if I did not.*
- *Because participating in sport is an integral part of my life.*
- *Because people I care about would be upset with me if I didn't.*
- *Because I found it is a good way to develop aspects of myself that I value.*
- *I used to have good reasons for doing sports, but now I am asking myself if I should*
- *continue.*

Modified Sport Motivation Scale-II

For the purpose of this survey, 'strength and conditioning' is defined as a physical training program specifically designed to increase athletic abilities for sports performance. This does not include sport practice or injury rehabilitation.

Consider the statement " Why do you participate in strength and conditioning?" and read each of the questions on the questionnaire below and indicate how true each statement is by entering an appropriate score where:

1 2 3 4 5 6 7

(Not at all true) (Somewhat True) (Very true)

- Because people around me reward me when I do.
- Because it gives me pleasure to learn more about my strength and conditioning.
- Because I would feel bad about myself if I did not take the time to do it.
- Because participating in strength and conditioning reflects the essence of whom I am.
- Because through strength and conditioning, I am living in line with my deepest principles.
- Because I think others would disapprove of me if I did not.
- Because it is very interesting to learn how I can improve.
- So that others will praise me for what I do.
- Because I have chosen strength and conditioning as a way to develop myself.
- It is not clear to me anymore; I don't really think strength and conditioning is for me.
- Because it is one of the best ways I have chosen to develop other aspects of myself.
- Because I feel better about myself when I do.
- Because I find it enjoyable to discover new performance strategies.
- Because I would not feel worthwhile if I did not.
- Because participating in strength and conditioning is an integral part of my life.
- Because people I care about would be upset with me if I didn't.
- Because I found it is a good way to develop aspects of myself that I value.
- I used to have good reasons for participating in strength and conditioning, but now I am asking myself if I should continue.

APPENDIX C

Task and Ego Orientation in Sport Questionnaire

I feel most successful in sport when…

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

- I am the only one who can do the play or skill
- I learn a new skill, and it makes me want to practice more
- I can do better than my friends
- The others cannot do as well as me
- I learn something that is fun to do
- Others mess up, but I do not
- I learn a new skill by trying hard
- I work hard
- I score the most points/goals/hits, etc.
- Something I learn makes me want to practice more
- I am the best
- A skill I learn feels right
- I do my very best

Modified Task and Ego Orientation in Sport Questionnaire

For the purpose of this survey, 'strength and conditioning' is defined as a physical training program specifically designed to increase athletic abilities for sports performance. This does not include sport practice or injury rehabilitation.

Consider the statement "I feel most successful in strength and conditioning when…" and read each of the questions on the questionnaire below and indicate how much you agree with each statement by entering an appropriate score where:

1 2 3 4 5

(Strongly Disagree) (Neutral) (Strongly Agree)

- I am the only one who can do the exercise or movement
- I learn a new exercise or movement and it makes me want to train more
- I can do better than my friends
- The others cannot do as well as me
- I learn something that is fun to do
- Others mess up, but I do not
- I learn a new exercise/movement by trying hard
- I work really hard
- I lift the most weight/sprint the fastest, etc.
- Something I learn makes me want to go train more
- I am the best
- An exercise/movement I learn really feels right
- I do my very best

CURRICULUM VITA

Liza Reader

Education

University of Louisville; Louisville, Kentucky May 2022 (Expected)
Doctorate of Philosophy in Educational Leadership and Organizational Development, Concentration in Sport Administration

University of Louisville; Louisville, Kentucky May 2011
Master of Science in Exercise Physiology, Concentration in Strength and Conditioning

Kennesaw State University, Kennesaw, Georgia August 2009
Bachelor of Science in Exercise and Health Science

Teaching Experience

Instructor, Exercise Science Program August 2021 – present
Department of Health and Human Performance, College of Charleston, Charleston, SC
Undergraduate Courses Taught:

- EXSC 201: Introduction to Exercise Science and Physical Education
- EXSC 340L: Exercise Physiology Lab

Instructor, Exercise Physiology Program. August 2011 – July 2021
Department of Health and Sport Sciences, University of Louisville; Louisville, KY
Undergraduate Courses Taught:

- HSS 386: Anatomy and Physiology I
- HSS 388: Principals of Athletic Strength & Conditioning
- HSS 390: Anatomy and Physiology II
- HSS 394: Introduction to Exercise Physiology
- SPAD 561: Special Topics: Study Abroad

Graduate Courses Taught:

- EXP 601: Laboratory Methods in Exercise Physiology
- EXP 604: Advanced Topics in Exercise Physiology
- EXP 607: Neuromuscular Exercise Physiology
- EXP 608: Strength & Conditioning I

- EXP 609: Strength & Conditioning II

Adjunct Faculty, Athletic Training Program January – May 2020
College of Health Professions, Bellarmine University, Louisville, KY
Graduate Course Taught:
- ATH 610: Performance Enhancement in Sport

Graduate Teaching Assistant August 2009 – May 2011
Department of Health and Sport Sciences, University of Louisville; Louisville, KY
Undergraduate Courses:
- HSS 202: Anatomy & Physiology
- HSS 396: Health/Fitness Instructor Lab

Percussion Instructor, Athletic Bands July 2007- August 2009
Department of Music, Georgia Institute of Technology, Atlanta, GA
Undergraduate Courses Taught:
- MUSI 1501: Percussion Ensemble
- MUSI 1008: Marching Band

Service Experience

Exercise Physiology Lab Manager July 2021 – present
Health and Human Performance Department, College of Charleston, Charleston, SC

Ex.Phys. Graduate Program Director. August 2019 – July 2021
Health and Sport Science Department, University of Louisville, Louisville, KY

GA Supervisor, Exercise Physiology Prog. January 2017 – July 2021
Health and Sport Science Department, University of Louisville, Louisville, KY

Graduate Strength and Conditioning Coordinator/Advisor, Exercise Physiology Program January 2016 – July 2021
Health and Sport Science Department, University of Louisville, Louisville, KY

Coordinator of Soldier Athlete in Training July 2014 – June 2015
Department of Health & Sport Sciences, University of Louisville/ Warrior Transition Unit, Fort Knox; Fort Knox, KY

Research

Peer-Reviewed Publications

In Print:
Topp R., **Ledford E.,** Jacks D., Topical menthol, ice, peripheral blood flow, and perceived discomfort.
Journal of Athletic Training. Volume 48(2), 2013 Mar-Apr.

Jones, N; **Ledford, E,** Strength and Conditioning for Brazilian Jiu-jitsu. Strength and Conditioning Journal, Volume 34(2), 2012 April

Carter, K., Roberts, A., Sunderman, S., **Ledford, L.** & Pennington, R., Use of video modeling in teaching weight lifting techniques to adults with Down syndrome. Journal of Sport Science, in revision.

Presentations

Ledford E., Topp R., Jacks D., Topical menthol, ice, peripheral blood flow, and perceived discomfort. *Annual Meeting of the Southeast Chapter of the American College of Sports Medicine.* Greenville, South Carolina, February, 2012.

Clinical Experience

Sports Performance Coach January 2018 – March 2020
Central High School; Louisville, KY

Weightlifting Coach June 2013 - September 2015
Kentuckiana Barbell; Louisville, KY

Sports Performance Coach August 2013- March 2014
Louisville Collegiate School, Louisville, KY

Volunteer Sports Performance Coach Summer 2012
Crown Point High School, Crown Point, IN

Cardiac Rehabilitation Intern (450 hours) May-August 2009
Piedmont Hospital, Atlanta, GA

Professional Awards/Honors

Faculty Favorite – University of Louisville, 2018, 2019, 2020, 2021
Student Advocate – University of Louisville 2021
Red & Black Faculty Mentor to five Student Athletes – University of Louisville; March 2017
USA Powerlifting National Competitor; October 2015

Red & Black Faculty Mentor to two Student Athletes – University of Louisville; March 2014

Professional Certifications

National Strength and Conditioning Association – Certified Strength and Conditioning Specialist - Since 2011
USA Weightlifting – Level 2: Advanced Sport Coach- Since 2014
Functional Movement Screen Certified – Since 2013