

Assessing Student-Athletes' Motivation: The Development and Validation of the MUSIC®

Model of Athletic Motivation Inventory

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ABSTRACT

Motivation is a key ingredient of successful athletic performance over time. Although the concept of maximizing motivation has long been of interest to coaches and practitioners, the vast number of motivational theories, principles, and strategies can seem overwhelming and confusing. Consequently, there is a need for providing more holistic frameworks to coaches and practitioners that not only summarize the essential findings of motivation research but also make the information more understandable and applicable in practical settings. The purpose of this study is to present and test the MUSIC Model of Motivation as a framework that can be applied in performance environments by coaches and practitioners to improve athletes' motivation, engagement, and ultimately, performance. The dissertation includes three related studies. First, I conducted a systematic content analysis to support the application of the MUSIC Model in sports. I analyzed 13 books in the realm of sport psychology and coaching. Results showed strong evidence that the underlying principles and theories of the MUSIC Model are represented in the sports literature, which supports the application of the model as a holistic framework for coaches. For the second study, Brett Jones and I developed a motivation inventory for athletes by modifying an existing motivation inventory for use with athletes. I collected data from student athletes at a large public university and conducted Exploratory Factor Analysis (EFA) with Principal Axis Factoring and Promax Rotation to examine the factor structure of the inventory scales. I used the results of the EFA to make changes to the inventory. Subsequently, I conducted a Confirmatory Factor Analysis (CFA) on a second data set to test for model fit. The fit indices for the CFA demonstrated reasonably good fit to the results, which confirmed the five-factor structure of motivation inventory. Reliability analysis based on Cronbach's alpha showed very good results with alpha ratings ranging between .84 and .94. Overall, the findings provided validity evidence for the produced scores of the MUSIC® Athletic Inventory with student-athletes.

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General Abstract

Three studies were conducted to test the feasibility of using a motivation model, designed initially for educational settings (the MUSIC® Model of Motivation), in athletic settings by coaches. The first study showed that the underlying theories and principles of the MUSIC Model of Motivation are represented in the sport psychology and coaching literature. This is important because it demonstrates that it may be possible to apply the MUSIC Model in athletic settings. The second and third study tested an athletic version of a questionnaire (the MUSIC® Model of Academic Motivation Inventory) that was originally designed to assess students' perceptions of the MUSIC model components in educational settings. Titled the "MUSIC® Model of Athletic Motivation Inventory," this newly developed questionnaire was adapted from the academic version so that it could be administered to student-athletes at a large public university. The results indicated that the athletic version of the inventory can produce valid scores with student-athletes in competitive sports settings. These findings indicate that coaches could consider administering the newly developed questionnaire to assess athletes' perceptions of the athletic setting. Based on the results, they could modify their coaching strategies and/or try new coaching strategies consistent with the MUSIC® Model of Motivation.

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CHAPTER 1

Introduction

Achieving peak performance in athletics has been persuasively linked with high levels of motivation (Garfield & Bennett, 1984; Hagger & Chatzisarantis, 2007; Vallerand, 2004; Weinberg & Gould, 2011). However, what motivates some athletes to strive for the highest levels whilst others fail to achieve their full physical potential? Why is it that some athletes are fully committed to their athletic programs, always give their best, sacrifice, and fight for their teams while others remain unengaged and difficult to motivate—even in the presence of innate talent and opportunity? Although the concept of maximizing motivation has long been of interest to coaches and practitioners (e.g., Huber, 2013; Roberts & Treasure, 2012; Seifriz, Duda, & Chi, 1992), the vast number of motivational theories, principles, and strategies can seem overwhelming and confusing. Consequently, there is a need for providing more holistic frameworks to coaches and practitioners that not only summarize the essential findings of motivation research, but also make the information more understandable and applicable in practical settings. In addition, new holistic models in the field of motivation and education have emerged over the past decade, which include elements not currently included in the coaching and sport psychology literature. I believe that an interdisciplinary approach that applies a new model of motivation from the field of education to the field of performance athletics can help coaches and practitioners design more effective instructions and ultimately increase engagement and performance. The MUSIC[®] Model of Motivation (abbreviated in this paper as the “MUSIC Model”; Jones, 2009, 2018) could provide such a framework to support coaches and practitioners

in the design of more engaging athletic environments and to simplify the evaluation process of athletes' engagement levels.

This dissertation explains how motivation influences the development of peak performance and presents a study that validates a motivation inventory as a new approach to assessing motivation in the realm of sport coaching and athletics, particularly in the field of collegiate athletics. This approach builds on existing motivation theories and research to combine it in a unique manner. To achieve these goals, I conducted three studies. In the first study, I conducted systematic content analysis to assess whether the principles of the MUSIC[®] Model of Motivation (Jones, 2009, 2018) could be applied to sports psychology and coaching. In the second study, Brett Jones and I modified the MUSIC[®] Model of Academic Motivation Inventory (Jones, 2017) to create the MUSIC[®] Model of Athletic Motivation Inventory (hereafter referred to as the MUSIC Athletic Inventory). In the third study, I assessed the psychometric properties of the MUSIC Athletic Inventory for use with student athletes.

Description of the Chapters

This dissertation includes six chapters. In this first chapter, I describe my personal interest and background, as well as the context of the field investigated. Theoretical differences and similarities between coaching and teaching are elaborated and the purpose of developing student-athletes holistically is explained. In addition, variables of achieving peak performance are presented. The chapter ends by illustrating the importance of motivation as a main pillar for a successful athlete's development process. I start Chapter 2, the literature review, by presenting current theories of motivation in the field of coaching and sport psychology. The chapter also describes the shortcomings of these theories and the need for a new motivational model in the realm of sports. I propose the MUSIC[®] Model of Motivation as a possible solution. Validation of

the MUSIC Model in academic setting is provided and the question of whether the MUSIC Model fulfills the criteria of a motivational model in sports is answered. The end of Chapter 2 provides the rationale of the study and justifies the need for a MUSIC inventory for athletes by illustrating the shortcomings of current measures of motivation in sports. The end of the chapter also introduces the purpose and research questions of the proposed studies. Chapter 3 describes the first study. A systematic content analysis of the MUSIC components in the sports literature is presented in this chapter. The contents of 13 books in the coaching and sport psychology literature have been analyzed to show that the underlying principles and theories of the MUSIC model are represented in the sports literature. Inclusion criteria of the analyzed books, the coding process, code frequencies of the underlying theories, as well as reliability issues and coder discrepancies are discussed. The fourth chapter introduces and tests the first version of the MUSIC® Model of Athletic Motivation Inventory. Descriptions of participants, sampling, the instrument, data analysis, and results of the EFA are provided. Chapter 5 illustrates the third study. The chapter explains the modifications to the first version of the MUSIC Athletic Inventory based on the results of Study 2 and also tests the second version of the inventory by collecting more data and conducting a confirmatory analysis (CFA). The last chapter, Chapter 6, includes the discussion and analysis of the results. I describe how issues of reliability and validity have been considered and I explain how the MUSIC Model can be used in practical settings. This chapter closes with the assumptions and limitations of the conducted studies and I provide an outlook of how future studies can buttress the application of the MUSIC Model in athletic settings.

Background and Context

As a German and an “outsider” to American society, I had never before experienced a strong identification with college sports teams. Thus, when I became part of the system as a graduate student, I wanted to better understand the significant role of college athletics in American culture. Due to its high profile on most college campuses and the immense resources allotted to it, the phenomenon of college athletics has sparked increased focus among researchers in a variety of academic disciplines, including sports science, economics, sports medicine, and kinesiology. Another area of importance is the field of sports psychology, which investigates how psychological factors affect the performance of athletes and how participation in sport influences psychological and physical factors. Despite this expanded scrutiny into the complex world of athletics, one area remains scantily investigated and little understood, namely, coaching and the role of coaches as educators (Jones, 2006).

Coaching is fundamentally connected with teaching and learning; thus, analyzing coaching from a pedagogical perspective and applying principles of education can provide further acumen into the field of coaching athletes. Moreover, the axioms of educational psychology—the field of study in which foundations of psychology are applied to the teaching and learning process—can help sharpen the theoretical lens into the multiple roles of coaches (Huber, 2013; Jones, 2006). In short, an analysis of motivational theories viewed through an educational lens will provide further support for coach practitioners to develop peak performances with their athletes.

The Teaching-Coaching Divide

College coaching remains a poorly defined field that lacks sound and well-researched guiding theories and constructs. In fact, one could argue that there is currently a lack of any

holistic conceptual framework that adequately presents the complex reality in which coaches work (Jones, 2006). However, what is well understood among both practitioners and researchers is that coaching is a multifaceted process involving information processing, extensive reflection, communication, and assessments; as such, the profession is likened to teaching. Additionally, coaching routinely entails social interactions between the athlete (student) and the coach (educator) that requires many of the same attributes of a classroom instructor. Other similarities link the teaching and coaching environments; for example, educators change and manipulate the learning environment of students with a variety of means in order to influence and improve learning outcomes (Garforth, 1985). Similarly, coaches are also engaged in fluid teaching opportunities depending on the student-athlete and circumstances.

In terms of theoretical perspectives, however, the two fields are quite different. While education has strong theoretical foundations extending back centuries, the theoretical underpinnings for coaching are far less solid. It appears, however, that most theories and principles of coaching are based on bio-scientific assumptions, resulting in a tendency to view and interpret coaching from a rationalistic perspective. This limited context has resulted in a straightforward establishment of clear goals with outcomes and achievements that can be measured and evaluated quantitatively (Jones & Wallace, 2005). Moreover, the dominance of physiology, biomechanics, and tactics in the coaching literature has reduced the practice to being merely associated with training and performance improvements. Another notable difference is that while education is known to encompass an individual's total development as a human being, coaching is largely viewed as helping an athlete to improve his or her physical skills and evaluating performance in competition. This narrow approach to the realm of coaching is flawed,

because research has confirmed that complex and diverse processes shape the field and its impact on young men and women (Cassidy, Jones, & Potrac, 2004).

The predominant view of college coaching as a series of strategic cause-and-effect decisions intended to alter a sports win-loss column does not explain and embrace the full scope of coaching, inclusive of its complex social, interactional and multidirectional processes.

Because collegiate athletics is a continually changing environment that requires rapid adaptation to imposed constraints and the needs of individual athletes, the actual tasks of a coach cannot be defined through unidirectional principles. Coaches must be seen as educators instead of mere physical trainers; as such, pedagogical concepts should take a more central role in coaching preparation and analysis. Such a perspective could close the teaching-coaching divide and provide an innovative, comprehensive model that would shape coaching pedagogy in the future (Jones, 2006).

The Holistic Development of Student-Athletes

Developing student-athletes is a holistic process. Based on mission statements of college athletic departments, coaching staff are asked to support the developmental process of their athletes in three key areas: athletic performance, personal development, and academic growth. For example, the mission statement of Duke University Athletics (2015) promotes the educational advancement of student-athletes, the development of excellent personal characteristics, and the development of athletic skills. Many other schools promulgate similar mission statements, which is in accordance with the typical experience of most student-athletes. As noted by Miller and Kerr (2002), student-athletes divide their lives among three central spheres: athletic, academic, and social. Figure 1 depicts the interrelationship between the three pillars of holistic student-athlete development.

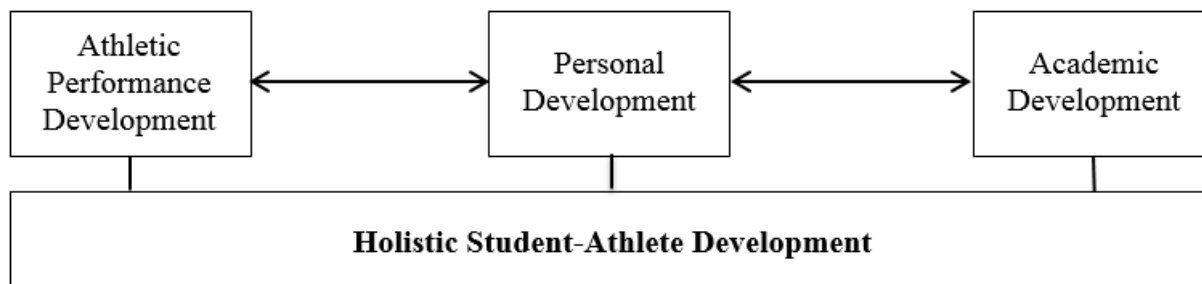


Figure 1. The Athletic, Personal, and Academic Development of Student-Athletes

Athletic departments may believe that the three pillars are interrelated, meaning that the principles and behaviors that make student-athletes successful in one area will nurture the successful development of the other areas. For instance, the National Collegiate Athletics Association argues that the norms and values that are responsible for successful athletic development—such as high levels of dedication, professionalism, sacrifice, and commitment—will also foster academic success. In principle, through their participation in college athletics, student-athletes will develop positive personal characteristics and values, which they then carry into their post-collegiate lives as productive members of society (NCAA, 2017). This idealized picture is supported by a recent report from the NCAA (National Collegiate Athletics Association) on graduation rates among student-athletes. Specifically, the NCAA (2014) indicated that student-athletes who entered Division I colleges/universities in 2007 achieved a graduation rate of 66%, which is actually one percentage point higher than the general student body. Although the goal of developing student-athletes holistically has become increasingly important, the concept has been more of an abstract concept than a structural imperative within the coaching community (Cassidy et al., 2004).

To promulgate a holistic approach to developing athletes, coaches and their staff could use pedagogical theories in all three domains. Kidman (2005) suggested an athlete-centered approach, which enables athletes to become self-aware of cultivating their potential in all three

domains. In fact, such an approach has become ingrained in the slogan “Athletes First, Winning Second,” which is also part of the American Sport Education Program (Martens, 2012).

However, this does not mean that athletic programs should not strive to win and be competitive. Rather, it entails the self-satisfaction of doing one’s best and cultivating and maximizing one’s potential. A practical example of this approach can be seen in John Wooden’s (UCLA basketball coach in the 1960s and 70s) coaching philosophy when he wrote:

I tried to convince my players that they could never be truly successful or attain peace of mind unless they had the self-satisfaction of knowing they had done their best. Although I wanted them to work to win, I tried to convince them they had always won when they had done their best. (Wooden, 1988, p. 95)

Maslow (1970) described human beings as internally motivated people striving to fulfill their full potential and personal capabilities. This view is no doubt idealized (Huber, 2013), because even Maslow (1971) pointed out that there are only a few self-actualized individuals who implement sufficient sacrifice, effort, determination, and self-discipline to fulfill their potential. More often, in fact, Maslow (1971) observed that human beings suffer from the “Jonah complex,” which for myriad reasons can lead them to avoid personal growth and fulfillment. Because sports are known to create an ideal venue for cultivating norms and values that foster self-actualization through hard work and dedication, a closer examination of the educational and motivational principles that foster such growth is warranted. Indeed, most would agree that even the most inherently talented athlete will fall short without high levels of motivation, dedication, and desire. Thus, it is up to athletic departments to help student-athletes fulfill their potential—ideally in all three areas (athletic performance, personal growth, and academic achievement). Although I acknowledge the importance of all three areas, I have limited the scope of my present

study to focus on the development of *athletic performance* among student-athletes and how motivational theories in the field of education and psychology can help coaches to develop athletic excellence and peak performance.

Achieving Athletic Peak Performance

The domain of sports expertise research has provided some valuable insights into the generation of peak athletic performance by analyzing the training and performance patterns of some of the best athletes in the world. In recent years, researchers have paid increasing attention to the specific patterns, characteristics, and behaviors that help athletes become the best they can be (Starkes & Ericsson, 2003). Krane and Williams (2010) defined peak performance as “the ultimate high and the thrilling moment that athletes and coaches work for in their pursuit of excellence” (p. 169). However, Starkes (1993) asserted that superior athletic performance in sports can only occur over an extended period of time. In discussing expert performance in sports, Janelle and Hillman (2003) pointed out that to obtain peak performance and expert status, athletes must excel in the categories of physiological, technical, cognitive, emotional, and psychological development. The following figure illustrates an adapted and extended version of Janelle and Hillman’s (2003) original model.

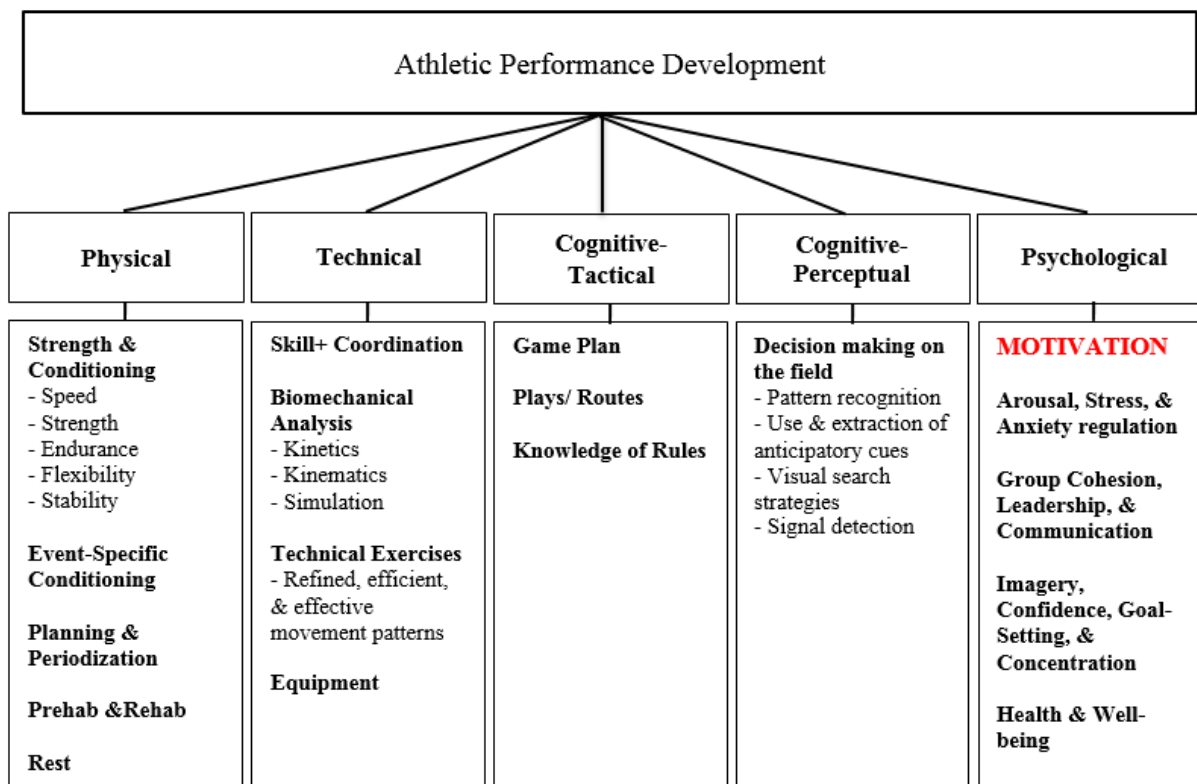


Figure 2. The domains of expertise in sport. Adapted from *Expert Performance in Sports: Advances in Research on Sport Expertise* (p. 25) by J. L. Starkes & K. A. Ericsson, 2003, Champaign, Human Kinetics.

Physical development. The physiological aspects of performance development are unique to the field of athletics. Although athletic potential is heavily dependent on a number of well-researched physical characteristics (e.g., muscle capacity, muscle fiber type, body morphology, body segment size, height, and flexibility), research also indicates that the athletic potential of an individual is malleable through extended practice and systematic training (Willmore & Costill, 1999), a concept well understood in the world of college athletics. Indeed, the foundation of physical development in collegiate athletics lies in strength and conditioning processes. The development of strength, power, endurance, flexibility and stability builds the foundation for proper movement (Verkhoshansky & Verkhoshansky, 2013). In addition to overall

physical conditioning, event-specific conditioning exercises are necessary to prepare the body for competition. For example, a long jumper would include a variety of bounding and plyometric exercises to increase performance output in the long jump; in contrast, a football quarterback would include specific explosive strength exercises targeting the shoulder to improve his throw. Another component of physical development is the planning and periodization process of exercises. Depending on game schedules and seasonal planning, practice sessions must be structured for optimal performance. Specifically, the length, intensity, and number of specific exercises can be defined in macro, meso and micro cycles. In order to improve the health of student-athletes—as well as minimize injury-related absences—“prehab” and rehab exercises should be included in the overall training process to enhance increased mobility and minimize recovery time. College coaches are also employing post-training recovery strategies on a routine basis, such as nutrition, massages, yoga, and sleep patterning. Finally, the physical development of college athletes includes cautions about the risks of participating in too many extracurricular activities outside of the athletic environment that might compromise performance.

Technical development. Technical development is defined by sensorimotor coordination from which refined, efficient, and effective movement structures emerge (Janelle & Hillman, 2003). Fitts and Posner (1967) have analyzed motor learning and suggested that motor skill acquisition occurs in three stages. The first stage is the cognitive stage during which new learners have to cognitively understand what to do. Learners are dependent on the information they receive from their environment about the requirements and parameters of the motor movement. This stage is also characterized by large performance gains (Schmidt & Lee, 2011). In the second stage, the associative stage, learners adjust movements and combine small movement skills into bigger movement patterns. This stage is associated with learning how to execute skills and

motor-skills refinements; thus, small gains in performance occur in this stage (Huber, 2013). The autonomous stage, representing the final stage of motor acquisition, occurs when motor-skills performance becomes largely automatic and learners are capable of focusing more on stimuli in their environment. The execution of movements requires less cognitive actions and attention (Shaffer, 1980) at this point. Unfortunately, this stage opens the door for distracting thoughts to creep in, and it can be hard to eliminate technical errors during the autonomous stage (Huber, 2013).

To further refine technical development, coaches can utilize biomechanical analyses of kinematic and kinetic movement patterns to identify and improve event-specific movement structures in practice and competition. Based on a biomechanical model of optimal movement execution, the individual characteristics of each athlete, and their prior technical mistakes, specific drills and exercise can be developed in order to teach and perfect event-specific movements in a step-by-step process. As such, most college coaches have access to video equipment for analyzing the technical development of athletes. In summary, a significant body of research indicates that coordinated, refined, and efficient features of motion can be achieved through thorough and extended technique training (e.g. Ericsson & Lehman, 1996; Helsen, Starkes, & Hodges, 1998; Starkes 2000; Starkes, Deakin, Allrad, Hodges, & Hayes, 1996).

Cognitive-tactical development. Athletes develop knowledge of strategies, game plans, and tactics as part of their cognitive-tactical development. This can occur at the individual level (e.g., a basketball player learns when it's best to fake a shot and go for the dribble) or at the team level (e.g., a basketball team uses a zone defense instead of man-to-man coverage). A “game plan” is the application of a specific strategy for a particular competition where a set of tactics comes into play based on the opponents’ strength and weaknesses (Martens, 2012). Excellent

tactical knowledge and skills can lead to a good sense for the game, which Launder (2001) described as the ability to apply one's understanding of rules, strategies, and tactics in order to master problems in game situations. Tactical skills also include using specific technical skills in certain situations (McPherson, 1994). In addition, tactics can also include any number of strategic decisions in individual sports, such as running a long-distance race at the head of the pack. In short, while student-athletes need to know the rules of the game or event, they also have to be aware of their own potential and the tactical repertoire they have available. This means that athletes have to become students of the sport.

Cognitive-perceptual development. To identify the correct tactical tool in the proper situation, athletes must be able to filter through the most relevant cues in a given sporting environment by focusing on the essential ones and ignoring irrelevant ones. To do so, athletes have to develop pattern recognition, the use of anticipatory cues, visual search strategies, and signal detection. Decision-making speed and accuracy is dependent on these factors, with research indicating that there can be a discernible difference in how expert and non-expert performers filter cues (Janelle & Hillman, 2003). Making the right tactical decision in the right moment will give athletes an advantage in competition. In some situations, athletes have a lot of time to screen the environment in order to make the right decision; however, in the competitive arena, athletes tend to have to process information very quickly (Martens, 2012).

Psychological development. The acquisition of psychological skills is crucial for peak athletic performance (Janelle & Hillman, 2003). In their book, "Foundations of Sport and Exercise Psychology," Weinberg and Gould (2011) provided a thorough assessment of the key concepts in the field of sport psychology. The authors asserted that athletes can develop psychologically in the areas of (a) motivation; (b) arousal, stress and anxiety regulation; (c)

group cohesion, leadership, and community; (d) imagery, confidence, goal setting, and concentration; and (e) health and well-being. Given the importance of motivation to this investigation, it is discussed in detail in the next paragraph. In terms of the remaining four areas, arousal, stress, and anxiety regulation can include progressive muscle relaxation techniques or other control strategies to reduce state anxiety and improve performance. The field of group cohesion, leadership, and community focuses on how group interactions, leadership and communication can affect athletic performance. For example, student-athletes must understand their position within a group to perform at optimal levels. Roles and responsibilities have to be defined to create a well-organized team that can work together for peak performance. In the area of psychological skills training, the introduction and practice of imagery, confidence development, goal setting, and concentration exercises is associated with enhanced performance in practice and competition. The development of athletes also includes the role of psychology to achieve health and well-being. For instance, the recovery and regeneration processes can be more effective if athletes are in balance and remain in a state of psychological well-being.

As noted above, however, I believe that the overall performance development of athletes can only be achieved if they are able to cultivate high level of psychological development in the form of motivation. And in the milieu of college sports where athletic performance can have such huge implications (i.e., financial outcomes), coaching staff must develop a good understanding of motivation—including factors and methods that enhance motivational states in individuals and groups. Sage (1977) described motivation as the direction and intensity of one's effort. I argue that if a college coach does not take the time to understand the motivational needs of each of his or her student-athletes, it will be extremely difficult to cultivate their holistic potential. For instance, one can assume that in the absence of high levels of motivation, athletes

are unlikely to push themselves in executing prehab and rehab exercises in a rigorous manner. Without high levels of motivation, athletes are less likely to internalize constructive feedback or want to learn and perfect the technical refinements in their event. In addition, cognitive expertise in the areas of tactical and perceptual development is unlikely to flourish if levels of motivation are low.

In short, athletes who are highly motivated are more inclined to direct their efforts to holistically developing their performance parameters. As such, motivation should be considered as the starting point of every performance development journey. Indeed, many scholars of athletic performance believe that motivation should be considered as the foundation of performance and achievement in sport (e.g., Duda & Treasure, 2001). This premise leads to the question of how coaches can impact and influence the motivational needs of student-athletes to maximize performance success.

Motivation in Athletics

Motivation remains a central concern among those engaged in sport and exercise. Due to its complexity, motivation is often vaguely defined and remains poorly understood. Although some believe motivation is directly connected to self-confidence, others credit the power of positive thinking for motivation. There are also practitioners who think that motivation is genetically predetermined: either the athlete is motivated or not and little external impetus will change that to any significant degree. The fact is that each could play a role in motivation; as such, any single approach is unlikely to embrace the complexity and holistic nature of motivation as a construct (Roberts, 2001). Important to this investigation is that vague definitions of motivation can have disadvantages for coaches and athletes. First, misunderstandings and conflicts can occur if one-dimensional interpretations of motivation are applied. For example, if

a coach tells athletes that they are not sufficiently motivated and advises them to set more concrete goals and work harder to reach them, they may be likely to become discouraged and become uninvolved if they have low self-esteem and interpret motivation as a fixed entity that cannot be easily (if at all) altered. Second, if coaches develop only one set of strategies to foster motivation, but do not understand how these strategies interact with individual needs or the environment, such an approach can hinder motivation instead of nurturing it (Weinberg & Gould, 2011). The problem is that even among motivation researchers, motivation can either be defined too broadly (i.e., covering the entire field of sport psychology) or too narrowly by only focusing on specific organizational constructs (Roberts, 2012). Ford (1992) pointed out that there are at least 32 distinct motivational theories, while Reeve (2005) included 24 theories of motivation in his book. As a result, it is understandable that practitioners may feel overwhelmed by the sheer number of motivational theories. There is, however, no denying the positive influence of motivation on athletes' performances. For instance, Theodorakis and Gargalianos (2003) surveyed physical educators/coaches and nearly three-quarters of them (73%) believed that their actions were very influential on their athletes' motivation. Therefore, demystifying motivation theories can be of great benefit for coaches and practitioners.

Approaches to Motivation in Athletics

Coaches tend to coach/educate according to personal views of motivation developed over time—and this is a process that can occur consciously or unconsciously. Additionally, some coaches believe that they have to actively encourage their athletes to achieve higher levels of motivation; in contrast, other coaches may place the motivation onus on the athlete. Despite an abundance of views of motivation, most people either have a trait-centered view, a situation-centered view, or an interactional-centered view of motivation (Weinberg & Gould, 2011). A

trait-centered perspective views motivation as resulting from individual characteristics—i.e., the personality, needs, interests, and personal goals represent the main determinants for motivation. In this paradigm, coaches tend to view athletes as either having what it takes (“a real winner”) or as someone who inherently lacks motivation (the proverbial “loser”). The second approach to motivation, the situation-centered perspective, assumes that the surrounding environment plays the significant role in levels of motivation. For example, while an athlete may be highly motivated during a weight-lifting session due to the support of other students and the encouragement of an inspiring coach, that same individual may be singularly uninspired or lethargic when working out alone or in the presence of a highly critical coach.

The third approach, the interactional-centered view, represents the most widely accepted view of motivation among exercise and sports psychologists. This perspective credits both personal traits (needs, personality, goals, and interests) and situational factors (interactions with teammates and the coach’s style) for motivation. In short, an interactional view considers both the person and the situation and how the two interact in order to explain the motivation and performance levels of athletes (Weinberg & Gould, 2011). As an example, Sorrentino and Sheppard (1978) confirmed that differences in swim performance can result from a combination of the personality traits of a swimmer and a given situation. Specifically, the researchers described how swimmers who thrive in social situations had faster swimming times in the relays. In contrast, more introverted swimmers and/or those with a tendency to fear rejection swam faster in single starts than in a relay race. The role of coaching is particularly important for this approach since a coach can influence both the athlete’s personal motivation as well as the environment in which the individual develops and performs. Figure 3 illustrates the interactional view of motivation.

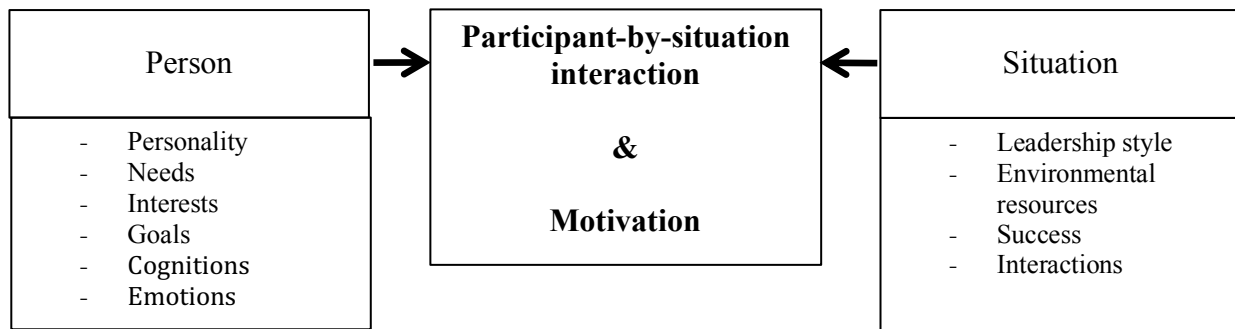


Figure 3. Participant-by-situation interactional model of motivation. Adapted from *Foundations of Sport and Exercise Psychology* (p. 53) by R.S. Weinberg & D.G. Gould, 2011, Champaign, Human Kinetics

To understand the approaches of motivation further, I provide an overview of current theories of sport motivation in the next chapter. Chapter 2, the literature review, presents the underlying theories that explain how personal and situational factors of participants and the environment can impact athletes' motivation. Findings and implications of current theories of sport motivation are provided. The chapter also explains the shortcoming of these theories and introduces the MUSIC model as a possible new framework in the realm of elite level athletics.

CHAPTER 2

Theories of Motivation in Athletics

To grasp motivation in athletics and how it enhances performance, a theoretical framework of motivation can serve as a useful tool. Theories can provide a foundation for understanding why certain behaviors occur and what practitioners can do to influence behavioral change. According to Kurt Lewin, “There is nothing more practical than a good theory” (1952, p. 169). The following sections will introduce current motivational theories that are applicable to the field of athletics. The theories and principles show what motivational needs have to be satisfied in order to foster motivation, as well as how environmental conditions should be arranged to support and flourish these personal needs.

Expectancy-Value Theory

A person’s choice of actions and his or her persistence and performance of those actions are believed to be triggered by expectations of success and the value placed on these actions (Eccles & Wigfield, 2002). This premise forms the basis of the expectancy-value model, which although largely credited to Eccles and her colleagues (Eccles et al., 1983; Wigfield & Eccles, 2000), represents an expansion of Atkinson’s earlier expectancy-value model (Atkinson, 1957). This model suggests that achievement, performance, effort, persistence, cognitive engagement, and task choices are dependent on expectancy-related beliefs, as well as subjective values that students have for achieving specific tasks (Eccles et al., 1983). Figure 4 illustrates the interrelationship between expectancy of success and the value of a goal and their influence on motivation. Expectancy-related beliefs can be viewed as a combination of people’s beliefs about their ability to reach a specific goal and their expectancies for success. Expectancies of success refer to how learners evaluate their likelihood of success in a specific domain. A significant body

of literature has confirmed that expectancy-related beliefs in sports are important in predicting effort, persistence, and performance of athletes and students (Cox & Whaley, 2004; Xiang, Chen, & Bruence, 2005; Xiang, McBride, & Bruene, 2006). In addition, Greenlees, Bradly, Holder, and Thelwell (2005) showed that the behaviors of other athletes could influence expectations. Their study of table tennis players revealed that players who witnessed opponents demonstrating positive body language had lower levels of outcome expectations in comparison to when they competed against players displaying negative body language patterns.

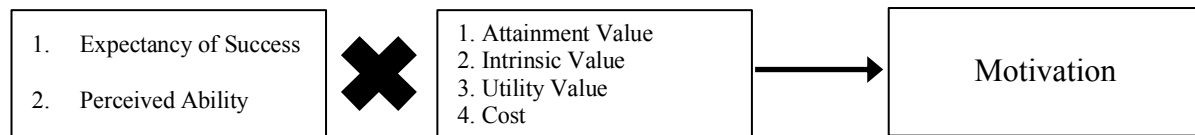


Figure 4. Expectancy- Value Model

Studies in both physical education environments (Martinek, 1988) and competitive sport environments (Chase, Lirgg, & Feltz, 1997; Solomon, Striegel, Eliot, Heon, & Maas, 1996) showed that even the expectations of physical education teachers and coaches can impact the performance levels of students and athletes. This research also pointed out that coaches tend to provide more feedback to certain athletes if they have high expectations of them. Similarly, athletes who receive more feedback tend to view their coaches more positively than athletes who receive less feedback. This association can trigger a self-fulfilling prophecy and ultimately have an impact on the level of performance of individual athletes (Huber, 2013). Horn (1984) indicated that a coach's perception of an athlete can be altered (positively or negatively) over the course of a season as more information about his or her performance becomes known.

Subjective task values represent another component of expectancy-value theory. According to Wigfield and Eccles (1992, 2000), value has four components: attainment value, intrinsic value, utility value, and cost. Attainment value, which is the importance an individual

gives to a task, is influenced by one's self-schema and personal core values. As an example, a basketball player sees herself as highly gifted and her self-image is aligned with the choices and tasks related to becoming a professional athlete (Huber, 2013). Intrinsic value or interest is the enjoyment an individual experiences while doing a specific task—i.e., the subjective value one accords to a given task. Pintrich, Ryan, and Patrick (1998) equated this component with the construct of personal interest, which represents an individual's attraction, general liking, and enjoyment of activities. For example, an athlete just experiences fun and pleasure while practicing and competing. The third component, utility value or usefulness, has to do with how the task or activity relates to the future goals of the athlete. An athlete, for example, may not like interval or circuit training but will do it because she knows that it is essential for reaching required fitness levels to accomplish general athletic or specific event-related goals. Finally, the cost component of value refers to how engaging in one activity can limit access to other activities because of the limited time and energy a person has. An example would be an athlete who could not go out with his friends socially in the evening because he had a competition the next day and needed his sleep. Cost also includes negative consequences such as pain, stress, or fatigue that come with engaging in a specific activity. It must be noted, however, that only recently has cost been included in most empirical studies related to the framework of expectancy-value theory (Gao & Xiang, 2008).

Studies show that, in the field of sports, the value components of the expectancy-value model are important for achievement-related behaviors and outcomes. Cox and Whaley (2004) reported that high school student-athletes' perceptions of interest and usefulness were positively correlated with effort and persistence in basketball. Xiang, McBride, and Bruene (2004) also showed that the intention of future participation in running and physical education was positively

connected to school children's subjective task values. Eccles et al. (1983) also pointed out that the value component and expectancy component are positively related to each other. In other words, individuals are inclined to believe that activities—whether undertaken as personal interests or in organized sport/physical education settings—are more important, interesting, and useful if they perceive high levels of competence in performing them (Xian et al., 2003; Xiang, McBride, & Guan, 2004).

Research also indicates that ability beliefs and expectancies of success are relevant for motivational levels to perform different tasks; similarly, subjective task values play a dominant role in terms of task choice, future participation, and effort in sport activities (Eccles & Harold, 1991; Cox & Whaley, 2004; Xian, McBride, & Bruene, 2006). To illustrate this relationship, Gao and Xiang (2008) conducted a study of 156 students participating in a weight-training class. The researchers examined whether the framework of the expectancy-value model of achievement choice could explain engagement and performance. The study showed that importance and interest were significant predictors of intention and engagement. Expectancy-related beliefs were the only predictors of performance. Although the sport psychology literature does discuss the expectancy-value framework as a possible explanation of motivation (Huber, 2013), there remains a lack of research on how it applies to student-athletes and professional athletes. Further research is necessary to provide empirical evidence that the expectancy-value model can play a role in elucidating peak performance in sport.

Attribution Theory

Attribution theory, which is a cognitive theory of motivation, focuses on the idea that individuals are rational and conscious decision-makers (Weiner, 1992). Attribution theory is based on two general assumptions. First, White (1959) pointed out that individuals have a

general goal of mastering both themselves and their environment; in so doing they want to make the world more predictable and controllable. This makes it possible for people to learn from and adapt to their environment. The second assumption of attribution theory is based on the idea that people try to understand the causal determinants of their own behaviors and the behaviors of others; in short, people want to know why they (or others) succeed or fail (Schunk, Pintrich, & Meece, 2008). And germane to this investigation is that most athletes seek ways to account for their performance in sport settings. Hence the genesis of sport psychology, which focuses how athletes explain performance, and how these explanations influence future emotions, expectations, and performances (Rees, Ingledew, & Hardy, 2005). A majority of researchers focus on attributions for failure—rather than attributions of success—because negative events are more likely to spur a search for the cause(s) (Lau & Russell, 1980).

Building upon the foundational work of Heider (1958) in attribution research, Kelly (1967) developed the Covariation Model that focuses on three types of information linking outcomes to causes. Kelly (1967) suggested that people use information related to consistency, distinctiveness, and consensus to make explanations about behaviors. Later, Försterling (1988) asserted that if one uses information from these factors, one could overcome negative events by making better attributions. Rees, Ingledew, and Hardy (2005) described how sport psychologists use the information of consistency, distinctiveness, and consensus in helping clients. Say, for example, an athlete loses a match or performs badly in a game and wants to give up; by using consistency information the coach or psychologist might refer to other events when the athlete performed well. In addition, using distinctiveness information can further help the psychologist to point out aspects of the performance that were good, although the end result was not satisfying. Lastly, by using consensus information psychologists and coaches can remind athletes

of others who have been in similar situations but succeeded after many having failed before. This information can be used to develop a more adaptive and functional way of interpreting outcomes. However, Rees, Ingledew, and Hardy (2005) described a mismatch between research and practice in sport psychology because the Covariation Model is rarely mentioned in the literature on attribution. In fact, only limited research has focused on the impact of consensus, consistency, and distinctiveness information on attributions. What is available, however, indicates that this type of intervention has shown positive effects in sport settings for changing attributions (e.g., Sinnott & Biddle, 1998).

Overall, however, the concept of attributional retraining in sports settings has been mainly influenced by Weiner's attribution theory of achievement motivation (Weiner, 1979, 1985, 1986). Specifically, Weiner (1985) suggested that locus of control, causality, and stability can help to explain the achievement-driven behavior of individuals. According to Weiner (1985), locus of control represents the extent to which people believe that they can control the events that affect them. The locus of causality can be a factor that is either external or internal to the individual; while the category of stability is the tendency of an individual to attribute success or failure to either permanent or unstable conditions. The following figure shows Weiner's (1985) three-dimensional model of causal attribution.

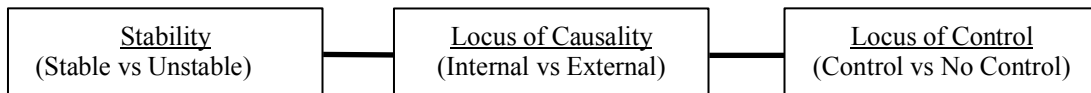


Figure 5. Weiner's (1985) three-dimensional model of causal attribution. Adapted from *Foundations of Sport and Exercise Psychology* (p.64) by R.S. Weinberg & D.G. Gould, 2011, Champaign, Human Kinetics.

As reported by Weiner (1992), motivation is largely unrelated to specific attribution factors; rather, it represents the emotion that comes with the response to the attribution. In other words, an athlete's emotional response to certain attributions can foster future successful

behaviors. There are two types of emotional responses related to athletic outcomes. With attribution-free emotional responses the athlete reacts naturally to an outcome of an event without determining the cause of the outcome. Attribution-dependent responses can occur in reaction to causal attributions that are based on perceived causes of events. For example, athletes with an internal locus of causality probably feel proud if they connect their success to an internal cause such as ability. The same athlete might experience reduced feelings of self-esteem if he or she fails, and then attributes the failure to internal causes. However, if the athlete thinks that external causes are responsible for success or failure, no emotional response is likely to occur. In terms of the controllability dimension, emotional responses are mainly influenced by the athletes' perception of whether they are in control of the outcome. If athletes perceive to be in control but failure occurs, feelings of shame and guilt can occur. In contrast, increased confidence and pride are likely to result if athletes succeed while being in control over their actions. If, however, athletes are not in control of outcomes and failure occurs, they may experience feelings of surprise and anger; experiencing success while not being in control can create feelings of gratitude or pity for opponents. Lastly, the stability dimension can create feelings of either hope or hopelessness. If success occurs, stable attributions can lead to satisfaction and hope, whereas experiences of failure are followed by hopelessness. On the other hand, unstable attributions can lead to uncertainty and fear—but it can also trigger hopefulness if failure occurred (Huber, 2013).

It should also be noted that more than a decade earlier Abramson et al. (1978) had introduced two other dimensions associated with attribution research via the reformulation of the learned helplessness hypothesis. Their findings demonstrated that people tend to question why certain events happened to them over which they had no control. In other words, learned

helplessness describes people who perceive their actions to have no effect on the desired outcome (Diener & Dweck, 1980). In a sport setting, if athletes suffer from learned helplessness they seldom try new skills, or they give up after the first failed attempt because they think they are not good enough. They are likely to become embarrassed, decrease their effort, or simply exit the learning environment altogether (Weinberg & Gould, 2011). This can be seen as a dimension of globality. A dimension of globality exists when uncontrollable events become generalized to all other situations the person is exposed to. For instance, specific uncontrollable events might only occur in a narrow range of situations, but be magnified to include others. In addition, Abramson et al. (1978) also pointed out a difference between personal and universal helplessness: (a) a person perceives helplessness in certain situations to be unique to him/herself, or (b) he or she thinks that others would struggle in that situation the same way.

Based on the findings of Abramson et al. (1978), five attributional dimensions have been proposed: locus of causality, controllability, stability, globality, and universality. The last three dimensions focus on the generalizability of the cause of the event. That is, are causes of events stable across time (stability), only occur in specific situations (globality), and can be applicable to others (universality). Rees, Ingledew, & Hardy (2005) argued that these three generalizability dimensions can be linked to Kelley's (1967) and Försterling's (1988) concepts of consistency, distinctiveness, and consensus.

In terms of dealing with causes of failure, sport psychologists typically attribute failure to a lack of effort (i.e., something that can ultimately be controlled) rather than to something that cannot be easily changed (if at all). Biddle et al. (2001), however, challenged the focus on lack of effort; the researchers argued that if people already try hard and still do not succeed, attributions are likely to shift to an inherent lack of ability. Thus, an increased level of effort may be for

naught. For instance, an athlete might already train with high effort and dedication; encouraging him to attribute failure to a lack of effort could further demoralize the person. In contrast, researchers have suggested that an emphasis on strategies could be more beneficial (e.g., Hardy, Jones, & Gould, 1996; Holschuh, Nist, & Olejnik, 2001). This focus also implies that it would be more productive to change goals and target one's efforts in other areas. The best method to alter an athlete's dysfunctional attributions is to test the attributions against reality (Rees, Ingledew, & Hardy, 2005).

Researchers have also described the critical importance of the dimension of controllability (e.g., Anderson & Deuser, 1993). In attributional retraining, sport psychologists encourage athletes to focus their attention on factors that are controllable and changeable (Anderson, 1983); indeed, controllability is an area that has become widely supported in attribution research (Biddle et al., 2001; Hardy et al., 1996). The sports literature has also determined that attributions are important for self-efficacy (Bond, Biddle, & Ntoumanis, 2001; Coffee & Rees, 2009; Gernigon & Dolloye, 2003), persistence (Le Foll, Rasclé, & Higgins, 2008; Rudisill & Singer, 1988), and performance (Coffee, Rees, & Haslam, 2009; Gordon, 2008).

Self-Confidence

Tiger Woods once said: "The biggest thing is to have the belief that you can win every tournament going in. A lot of guys do not have that." Self-confidence and motivation are closely connected. Athletes who are highly motivated tend to be very confident about their skills and abilities (Cox, 2012), leading them to perform better. Athletes and coaches universally refer to the critical role of self-confidence (Weinberg & Gould, 2011). Extraordinary athletes also seem to maintain their confidence even during periods of poor performances. For instance, New York

Yankee, Derek Jeter, reported during a performance crisis: “ I never lose my confidence. It does not mean I’m going to get hits, but I have my confidence all the time” (McCallum & Verducci, 2004). Research shows that confidence is one of the main factors that distinguish successful athletes from their less successful counterparts (Vealey, 2005). After investigating performance factors of athletes taking part in the Nagano (Japan) Olympic Games, Gould, Greenleaf, Lauer, and Chung (1999) showed that 90% of the highest achievers reported that they had very high levels of confidence. Although elite athletes tend to retain strong beliefs that they can perform at high levels, they can also have self-doubts; in fact, having doubts and experiencing failure can be motivating and a source of new confidence. Basketball legend, Michael Jordan, encapsulated this belief:

I have missed more than 9000 shots in my career, I have lost almost 300 games.

Twenty-six times I have been trusted to take the game winning shot and missed. I have failed over and over and over again in my life—and that is why I succeed.

-- Michael Jordan (cited in Weinberg & Gould, 2011, p. 320)

In the absence of self-doubt, athletes can become falsely confident, meaning that their confidence to perform probably exceeds their abilities. This imbalance can lead to a performance drop because athletes believe that decreased levels of effort in preparation and execution get the job done. In short, confidence cannot overcome low levels of competence. An optimal level of self-confidence is required to achieve goals and is essential to achieving one’s potential. Confidence helps to deal with errors and keeps athletes striving for success (Weinberg & Gould, 2011).

Although many coaches and athletes use the term “confidence,” it is not an easy concept to define. Sport psychologists define it as the belief that athletes can successfully perform a

desired behavior. Confidence can be seen as a social cognitive construct and, depending on the situation, it can be either a trait-like or state-like concept. For instance, confidence levels about a current situation can differ from general confidence levels concerning an entire season (Vealey, 2001). Confidence can also be affected by the organizational culture, as well as by sociocultural influences within an athletic environment (Weinberg & Gould, 2011). There are a number of models that explain the concept of confidence in sport settings and its implications on motivation, behavior, and performance. The following section will focus on Bandura's Theory of Self-Efficacy, Harter's Competence Motivation Theory, and Vealey's Multidimensional Model of Sport-Confidence.

Bandura's theory of self-efficacy. Bandura (1977, 1997, 2001) developed his theory of self-efficacy within a social cognitive framework, which implies that people are proactive in the regulation of their cognitions, motivation, actions, and emotions, instead of passive recipients of environmental influences. People use forethought, reflection, and self-regulation to guide their actions. Within this framework, self-efficacy theory focuses on the role of self-referent beliefs that determine goal-directed behavioral patterns (Feltz, Short, & Sullivan, 2008). Self-efficacy can be seen as cognitive mechanisms that connect self-appraisal information with people's thought patterns, emotions, motivations, and behaviors (Bandura, 1986, 1997). Although, self-efficacy theory was originally developed for clinical psychologists, it has since become an important concept for explaining motivation and performance in sports. Indeed, in the sport and motor learning fields alone, over 200 papers have been published on self-efficacy (Moritz, Feltz, Fahrback, & Mack, 2000), with many more added since the early 2000s.

Bandura (1997) defined self-efficacy as the "beliefs of one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). This concept can be

seen as a form of situation-specific self-confidence (Feltz & Chase, 1998). Perceptions of self-efficacy vary along three dimensions: level, strength, and generality. The level of self-efficacy is defined by the degree of difficulty of the activity and the expected performance attainment of the athlete. For instance, a professional tennis player is probably pretty certain that she can serve one ace in ten attempts. However, she is probably less certain she can serve ten aces in a row. Strength is based on the level of certainty that an athlete can perform a specific task. A tennis player may believe that she can perform 4 out of 10 aces; however, the #1 ranked player will be more certain of this than an unranked amateur. Lastly, generality is defined by the athlete's transferability of her efficacy across different tasks or activities. The generality concept, however, is rarely used in studies (Maddux, 1995; Feltz, Short & Sullivan, 2008).

Self-efficacy beliefs often focus on distinct domains of functioning; the degree of specificity at which self-efficacy is measured depends on the situation and the task at hand. Simply put, it is about what one thinks one can do with one's skills. There is a difference between having required skills to perform a specific task and having the confidence to use those skills to perform under a variety of circumstances (Bandura, 1997). As a result, an athlete might have the skills to return a tennis serve but she may not have the perceived efficacy to execute that skill in a high-pressure situation. There are several factors that influence the formation of efficacy beliefs.

Performance accomplishments. Clear successes and failures provide the most dependable foundation for the development of self-efficacy beliefs. If an athlete experiences success on a regular basis, the level of his perception of self-efficacy will be higher. Repeated failures, on the other hand, result in lower levels of self-efficacy. For instance, if athletes rehabilitating from an injury experience success in the rehab process, they will be more likely to

persist and put more effort into the rehab process (Weinberg & Gould, 2011). Research points out that performance accomplishments have a positive effect on self-efficacy, as well as increase subsequent performances (McAuley & Blissmer, 2002) and exercise adherence (McAuley, 1992, 1993). Therefore, it is important for coaches and practitioners to ensure that athletes experience some level of success in their learning environment, depending on their skill levels and prior experiences.

Vicarious experiences. If athletes lack experience with a specific task, vicarious experiences can be valuable to foster self-efficacy beliefs. With the aid of demonstrations or modeling, coaches can help athletes to build confidence to learn new skills. Vicarious experiences also include observing teammates; seeing a teammate executing a difficult skill can reduce anxiety and induce the athlete to attempt to master the new skill (Weinberg & Gould 2011). Research shows that people who observe skilled role models can increase their own self-efficacy beliefs and performance (e.g., Lirgg & Feltz, 1991). In an early study, Weinberg, Gold, & Jackson (1979) found out that efficacy beliefs also depend on social comparisons. Their study's subjects had to perform a muscular leg endurance task against other people. Results indicated that observing a competent or incompetent opponent affected the participant's self-efficacy and performance. Participants showed higher levels of self-efficacy and performance when competing against an injured or more incompetent athlete. In addition, the confidence of coaches can also be a source of self-efficacy for their own athletes (Weinberg, Grove, & Jackson, 1992).

Verbal persuasion. Persuasive techniques can include verbal persuasion, evaluative feedback, expectations of others, and positive self-talk. Such techniques are widely used by coaches, managers, parents, and peers in order to positively influence the efficacy perceptions of

athletes (Feltz, Short & Sullivan, 2008). Vargas-Tonsing, Meyers, & Feltz (2004) also showed that coaches ranked verbal persuasion techniques among the most effective for increasing efficacy. It must be noted, however, the persuasive influence also depends on the prestige, credibility, expertise, and trustworthiness of the persuader (Feltz, Short & Sullivan, 2008). Furthermore, Vargas-Tonsing (2004) reported that pregame speeches can increase the self-efficacy of athletes during games. It should be mentioned that verbal persuasion is closely connected to attribution theory. As indicated earlier, if a coach convinces an athlete that her success is a result of innate ability, her future efficacy beliefs will be enhanced. Equally important, a coach who can convince an athlete that a certain ability is an acquirable skill is likely to be able to trigger a higher perception of efficacy (Feltz, Short & Sullivan, 2008).

In addition to the ability of coaches to use verbal persuasion to increase self-efficacy, persuasion at the larger societal level can also influence self-efficacy beliefs. In particular, negative stereotypes can be harmful for high levels of self-efficacy by negatively impacting task performance (Steele, 1997). For instance, the stereotype that women are inherently unable to develop good techniques for weight lifting because they are too weak could have negative consequences for a female's efficacy in a competitive strength and conditioning environment.

Lastly, verbal persuasion can also take place internally as "self-talk." While athletes can persuade themselves that they can perform or execute specific tasks via positive self-talk and short self-affirmations, negative self-talk can undermine athletes' self-efficacy beliefs (Feltz et al., 2008).

Physiological information. Physiological information can include an athlete's perception of his or her strength levels, fitness, fatigue, and pain. People tend to focus on psychological responses when it comes to their efficacy beliefs. Physiological information has been shown to

be more important in sport and physical activity settings compared to nonphysical settings (Chase, Feltz, & Lirgg, 2003). The impact of physiological states on efficacy beliefs also depends on situational factors, as well as the meaning that people give them (Bandura, 1997). For instance, some athletes may perceive increases in their physiological states as a performance threat, whereas others might interpret such increases as a sign that they are ready to attack and give their all (Weinberg & Gould, 2011).

Emotional states. Emotions or moods can also influence self-efficacy perceptions. For example, an injured athlete who feels sad, anxious, and depressed about his current state probably has lowered feelings of efficacy in terms of his rehabilitation process (Weinberg & Gould, 2011). Maddux & Meier (1995) found out that positive emotional feelings such as happiness or exhilaration are more likely to enhance efficacy beliefs than negative states such as depression or anxiety.

Imaginal experiences. Athletes can increase their levels of efficacy by imagining themselves or others executing specific tasks successfully in simulated performance situation (Feltz, Short & Sullivan, 2008). Feltz and Reissinger (1990) showed that imagining oneself winning against an opponent raises efficacy levels and endurance performance. Other mental rehearsal strategies have also been shown to have a positive influence on efficacy beliefs and performance in competitions (e.g., Short et al., 2002). Research shows that the key to using imagery as a source of self-efficacy is to focus on mastering technical aspects of an activity (Moritz et al., 1996).

Bandura's (1977, 1997, 2001) model is a well-documented entity in sport settings, and perceived efficacy is well documented as a strong predictor of athletic performance (e.g., Feltz, Chow, & Hepler, 2008; Gao, Kosmo, & Harrison, 2009; Gao, Xiang, Lee, & Harrison, 2008).

Compared to athletes who doubt their capabilities, athletes with high levels of self-efficacy work harder and persist in tasks longer if they are aware of their current state of performance (e.g., Halper & Vancouver, 2015). Additional research also confirms that situation-specific confidence can extend beyond improving specific scenarios and foster global self-confidence (Zinsser, Bunker, & Williams, 2010). The benefits of perceived self-efficacy are not only limited to the individual. Groups that collectively perceive high levels of self-efficacy also show higher levels of performance (Magyar, Feltz, & Simpson, 2004). These findings show that self-efficacy theory plays a pivotal role in explaining the development of athletes' motivational perceptions in a variety of sport settings.

Harter's competence motivation theory. A more holistic approach to competence and motivation can be found in Harter's (1978) Competence Motivation Theory, which is based on an individual's feelings of personal competence. Simply put, Harter (1978) asserted that motivation will increase with task mastery. When a person masters one task, he or she is encouraged or motivated to master other tasks. A successful attempt to achieve mastery can develop self-efficacy and feelings of personal competence, which will foster high competence motivation. Conversely, if an athlete's initial attempts to achieve mastery result in perceived failure or rejection, low competence motivation and negative outcomes can develop, possibly resulting in giving up (Cox, 2012; Harter, 1978).

Harter's model suggests that high competence motivation leads to successful task performance—similar to high perceptions of self-efficacy, which can lead to successful performance. Research shows that competence motivation in sports is influenced by a variety of factors, such as intrinsic motivation, years of experience, perceived control, praise and technical information, friendship, and peer group acceptance (Allen & Howe, 1998; Smith, 1999; Weigand

& Broadhurst, 1998). It should be noted that the factors influencing competence motivation are closely connected with the motivational needs components of Jones's MUSIC Model of Academic Motivation (Jones, 2009). Perceived control is connected to the component of empowerment; intrinsic motivation is connected to the interest component; and friendship and peer group acceptance can be connected to the caring component of the MUSIC Model. The MUSIC Model will be introduced and discussed in a later section as a holistic approach to foster athletes' motivation.

Vealey's multidimensional model of sport-confidence. Vealey and colleagues (2002) investigated the ways that self-confidence and self-efficacy had been operationalized in various sport situations and was dissatisfied that existing predictive models. The outcome was her Multidimensional Model of Sport Confidence (MMSC), which operationalizes self-confidence across different sports situations. The central piece of her model is the sport-confidence rectangle consisting of the sources and the types of sport confidence.

Sources of confidence include previous achievements (mastery and demonstration of skills), self-regulation processes (physical/mental preparation), and social climate (social support, coaches' leadership, environmental comfort). The three types of sport confidence are SC-cognitive efficiency (decision making, thought management, maintaining focus), SC-physical skills and training (skill execution, practice), and SC-resilience (overcoming obstacles, overcoming setbacks, overcoming doubts, refocusing after errors). It should be noted that within the rectangle sources and types of sport confidence are interdependent. The athlete's demographics (age, sex, ethnicity, culture) and personality characteristics (personality traits, attitudes, values) are coupled with organizational culture (competitive level, motivational climate, program goals) to form the starting point for the development of SC. Personality

characteristics and the organizational culture, as well as the sport-confidence rectangle consisting of sources and types of sport-confidence, then influence affect, behavior, and cognition. These three components can in turn influence the performance levels of athletes, which are also influenced by external factors and the individual skills and personal characteristics of athletes. The usefulness and elegance of this model are that it illustrates how different types of sport-confidence can impact behavior and how the sport-confidence types can be influenced by multidimensional sources (Vealey, Knight, & Pappas, 2002; Cox, 2012).

In addition to the multidimensional model, Vealey et al. (2002) also created a self-confidence inventory to test various aspects of the sport-confidence model. A number of later studies supported the model and showed a consistent relationship between self-confidence and athletic performance (e.g. Beattie, Hardy, & Woodman, 2004; Marsh & Perry, 2005; Sheldon & Eccles, 2005).

Goal Setting and Goal Orientation

Studies of motivation enhancement among athletes indicate that goal setting is a highly-utilized technique. Nearly all of the applied sport psychology textbooks have a chapter devoted to how goals can enhance motivation and confidence levels of athletes (e.g., Cox, 2012; Huber, 2013, Weinberg & Gould, 2011). Moreover, goal setting is now one of the most active research areas in sport psychology (Roberts & Kristiansen, 2012). Many reviews have shown that goal setting has a positive effect on performance in a variety of events and sport settings (e.g., Burton & Weiss, 2008; Gould, 2010). According to Roberts and Kristiansen (2012), goal setting can be viewed as a mental training technique that is both effective and easily employable in most training settings. As such, goal setting has become a well-respected mental training technique

among Olympic athletes for over 25 years (Gould, Tammen, Murphy, & May, 1989; Gould, 2010).

In terms of its operationalization, goals are assumed to enhance motivation, which then results in higher performance levels. Locke and Latham (1990) suggested that goals affect performance by focusing more attention on the task, encouraging persistence, increasing effort, and promoting new performance strategies. The content of the goal, as well as the intensity with which the goal is pursued, determine the impact on performance levels (Hall & Kerr, 2001). Although a significant number of studies have focused on goal-setting and related techniques to foster performance, a conceptual and theoretical basis for goal setting has not been well established. As a result, while athletes may know that goal setting is important, they may have difficulty in operationalizing the process in ways that maximize their performance. For example, athletes and coaches often forget that many factors influence goal-setting processes (Roberts & Kristiansen, 2012). In addition, many basic findings in goal-setting research within organizational psychology have yet to be convincingly replicated within sport psychology, leading to research inconsistencies (e.g., Weinberg & Weigand, 1993; Gould, 2010; Hall & Kerr, 2001). Nonetheless, a growing number of researchers are focusing on the underlying principles to answer the question of why certain goal-setting techniques work while others do not. This focus has resulted in two specialized areas: goal orientation (the different ways that athletes think about their abilities) and goal setting (the mechanics of how athletes set goals and how these goals can be energizing and motivating) (Cox, 2012).

Achievement goal orientation. Psychologists in a variety of fields have investigated achievement goals as a way to understand motivation and achievement behavior. A closer look at achievement goal theory (Nicholls, 1984, 1989) shows that two principal factors will determine a

person's achievement behaviors, which consist of performance, effort, persistence, and task choice. The first is achievement goals (task involvement/ ego involvement) and the second is perceived ability (high or low perceived ability or competence). In other words, researchers and practitioners must understand what success and failure mean to an athlete and how these achievement goals interact with that individual's perceptions of competence (Weinberg & Gould, 2011). Athletes assign meaning to their achievement behaviors through the goals that they internalize. It is assumed that athletes wish to display competence and avoid demonstrating failure (Roberts & Kristiansen, 2012). Nicholls (1984, 1989) pointed out that an athlete's state of involvement ranges on a continuum between task involvement and ego involvement. This means that if a person is task-involved, the goal is to develop mastery, improvement, or learning. Demonstration of ability is self-referenced and success is perceived by achieving mastery or improvement. On the other hand, an ego-involved individual wants to demonstrate ability in relation to others or outperform them. In this instance, ability is other-referenced and success is accomplished by surpassing others, especially if less effort is required (Nicholls, 1984, 1989; Roberts & Kristiansen, 2012).

It is important to note that the state of involvement can be dynamic and may change from situation-to-situation. For example, athletes can switch from one goal state to another depending on their ongoing evaluation of circumstances (Gernigon et al., 2004). In other words, achievement goal orientations are orthogonal, meaning that task or ego involvements are independent. An athlete can be high or low in each orientation at the same time (Lemyre, Ommundsen, & Roberts, 2000; Pensgaard & Roberts, 2000). Research in the context of physical activity, however, shows that differences in goal orientation are responsible for different motivational processes and achievement behaviors (Roberts & Kristiansen, 2012).

Motivational climate. Motivational climate refers to the situational determinants and achievement cues in the environment capable of influencing the goal orientation of athletes. Research on motivational climate has shown that the environment created by coaches, teachers, or parents can influence the involvement of ego or task states in individuals. A performance climate is established if success and failure is other-referenced and ego-involving, whereas a mastery climate comes into play when the criteria of success and failure are based on the self and task involvement (Ames, 1992a). The climate is assumed to influence an individual's perception of the criteria of success and failure, which in the end affects achievement behavior. An individual will adopt specific achievement strategies based on the environment. For most people—and especially children—positive behavioral patterns such as working hard, seeking challenges, and persisting in the face of obstacles occur in a mastery climate setting (e.g., Roberts et al., 2007; Treasure, 2001). However, positive effects can also be seen in performance climates, especially if people have high levels of perceived competence (Roberts & Kristiansen, 2012).

It also should be noted that based on Achievement Goal Theory, there is a clear distinction between dispositional goal orientation and perceptions of the motivational climate. Both dimensions can affect the state of involvement of a person and ultimately their motivational engagement (Nicholls, 1989).

Why does goal setting work? Applying goal achievement theory to goal-setting strategies can help researchers and practitioners to understand and apply goals in the most effective way in sport contexts (Hall & Kerr, 2001). Having said that, one can consider motivational goal setting from two perspectives. First, how one can help athletes to manage their

goal-setting processes, and secondly, how can research inform practitioners, coaches, and even parents to set effective goals that support motivational processes (Roberts & Kristiansen, 2012).

Individual goal setting. Burton and his colleagues (2010) also showed that elite athletes are highly committed to goal-setting procedures. Highly successful athletes set clear daily practice goals (Burton et al., 2010; Gould & Maynard, 2009), but also use these goals to establish structured training opportunities that will help them accomplish their long-term goals (Roberts & Kristiansen, 2012). In other words, short-term goals function as guidelines and structural guidelines on a day-to-day basis, whereas long-term goals function as an inspirational source of motivation that can sustain them through difficult times (Jones & Hardy, 1990). Research also indicates that goals focusing on working with details and staying task-focused are factors of success (Kristiansen et al., 2008), which are characteristic of a mastery-focused environment. It should be taken into account that focusing on a mastery approach does not mean that the athletes do not want to win; it is, however, a good way to set productive practice goals that can increase the achievement levels in the long run. Elite athletes have also indicated that they prefer their coaches to set mental skill exercises within a mastery framework (Pensgaard & Roberts, 2002). Athletes also mentioned important support persons such as coaches, team leaders, or family members when it comes to their individual goal-setting processes (Roberts & Kristiansen, 2012). As a result, focusing on research that informs coaches and support members of the athletes to facilitate the goal setting process can be seen as an important approach.

Facilitating goal setting of others. In order for the goal-setting process to be effective, coaches and practitioners should implement guidelines that facilitate the implementation of goal-setting techniques. For instance, Gould (2010) used a goal staircase as a structural model of how coaches can support the implementation of goals. The innate ability of the athlete is the starting

point of the model. The staircase consists of long-term goals, which the athlete can achieve by following short-term mastery goals. Whereas long-term goals give meaning to the athletes, short term-goals focus on improvement and feedback, which help the athlete to stay focused and motivated. Performance goals are part of the staircase and can be viewed as means by which the athlete can observe his/her progress relative to others. Coaches should make clear that performance goals are necessary steps in the process. In addition, goal setting should be implemented as a common project. Goals and strategies based on a system of routines need to be worked out as a team (Locke et al., 1981). Even extremely difficult goals can be applied as long as the athlete internalizes them. Enhanced ownership, together with empowerment in the goal setting-process, are crucial for the successful implementation of difficult goals (O'Brien et al., 2009). In other words, athletes who feel empowered by being actively engaged in the goal-setting process are more intrinsically motivated and engaged in the training process. In addition to the importance of ownership, Hall and Kerr (2001) identified feedback and commitment as the most important moderators for goal setting. It does not matter how well goals are implemented if coaches and athletes are not fully committed to the goals, the planning process, and especially the execution of the plan. Secondly, the role of feedback is crucial in order to cultivate mastery in a step-by-step process. Burton & Weiss (2008) pointed out that feedback should help the athletes to stay task focused.

Last but not least, goal setting can be a helpful motivational strategy for athletes who suffer from injuries and must go through a rehabilitation process (Roberts & Kristiansen, 2012). Prior studies (e.g., Wiese & Weiss, 1987) have confirmed that goal setting, combined with imagery, relaxation, and communication skills, will help athletes recover from injuries. While interesting, the topic of goal setting and rehabilitation exceeds the scope of this review.

Passion

Passion has intrigued philosophers and scholars for as long as written accounts have existed—and no doubt before. The concept of passion has also entered the realm of sport science research (Weinberg & Gould, 2012). As a general definition, passion can be seen as a strong desire and inclination toward an activity one likes, finds important, and deems worthy of investing time and energy. Researchers in the field of passion have argued that when people engage in a certain activity on a regular basis, they will internalize the activity and it will become a part of their identity (Vallerand et al., 2006). Researchers also credit passion for keeping people engaged in a given sport or exercise activity. For athletes, passion can be essential in remaining in a sport in the face of injury or failure; it can also account for peak performance and sustained engagement. On the flip side, the concept of passion can also explain why athletes become negatively obsessed with their sport, which can lead to ill-advised decisions such as continued participation despite injury and unsuccessful attempts to come out of retirement (Vallerand, 2012). The following sections will introduce the dualistic model of passion, the intrapersonal outcomes of the concept, as well as its development.

The dualistic model of passion. Vallerand and colleagues developed a dualistic model of passion, which distinguishes between obsessive and harmonious passion according to how the passionate activity has been internalized into a person's identity (Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houlfort, 2003). Obsessive passion can be seen as a controlled internalization of an activity into a person's identity. In this instance, control means that passion is in control of the internalization process. The values and regulations of the activity also become internalized, which can lead to a lack of control if the values of the activity take over one's identity. A controlled internalization is often a result of intra- or interpersonal

pressure linked to the activity, such as feelings of social pressure or low self-esteem. In other words, people with obsessive passion can experience an uncontrolled urge to participate in an activity because of the feelings and values that are connected to the activity. In short, the passion must be acted upon because it is in control of the person. Due to its obsessive nature, conflicts and other negative affective, cognitive, and behavioral consequences can occur (Vallerand, 2012). For example, a student-athlete with an obsessive passion for soccer might not be able to resist an invitation from his friends to play soccer, even though he knows that he has to study for an exam. During the game, the player might feel guilty for not studying and it might lead to difficulties focusing on the task at hand (playing soccer). As a result, he does not experience much satisfaction, affect, and flow while playing. Hodgings & Knee (2002) argued that in such instances the activity becomes internally controlling instead of a healthy integrated part of the self. Dependencies based on self-esteem and social recognition can also lead to a negative obsession with an activity. Depending on the situation, obsessive passion can lead to emotional suffering due to failure, lack of flexibility, and reduced performance (Vallerand, 2012).

Conversely, harmonious passion is a result of an autonomous internalization process of the activity into the identity of a person. There is no pressure attached to the internalization and the person can freely accept the activity. The motivational force to engage in the activity is produced by intrinsic and integrative tendencies and people are willingly in control of the engagement (Ryan & Deci, 2003). In contrast to those in the thrall of obsessive passion, people with harmonious passion are in harmony with other aspects of their lives and do not allow the activity to consume them. People who experience harmonious passion have a secure sense of self-esteem as well as openness to new experiences (Hodgings & Knee, 2002). Researchers believe that a person with harmonious passion will be able to focus fully on a task, and

ultimately experience positive emotion during and after task engagement (Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houliort, 2003). In other words, people can fully engage in the activity without having conflicts with other aspects of their lives. In addition, when prevented from engaging in the activity, people will still be able to focus on other aspects of their lives without distraction or angst (Vallerand, 2012). For instance, with harmonious passion the soccer player in the previous example can evaluate the situation and take the night off because of the importance of the exam. The player is fully in control of when and how to engage in the activity and how to manage the activity in relation to other aspects of his life.

Passion and intrapersonal outcomes. Passion includes a number of outcomes at the intrapersonal level, such as cognitive and affective processes, psychological well-being, physical health, and performance. At the cognitive level, the dual model of passion assumes that harmonious passion facilitates adaptive cognitive processes, whereas obsessive passion includes more destructive cognitive process based on the ego-investment and defensive orientation that only allows for partial investment in the activity (Hodgins & Knee, 2002; Vallerand, 2012). As a result, individuals characterized by obsessive passion are at risk for decreased attention, concentration, and flow during games. In their study of soccer referees, Phillippe and his colleagues (2009) revealed that harmonious passion for refereeing was positively correlated with higher levels of concentration, fewer mistakes, and more positive emotions in comparison to those displaying an obsession passion for refereeing. Based on the assumption that task valuation increases affect (Brown & Weiner, 1984), research has shown that affect—experienced as function of engagement in a passionate activity—can also influence a person’s life in a positive way. For instance, Vallerand et al. (2003) followed collegiate football players over an entire season to assess their passion and positive or negative affect during the season. Results imply

that players with harmonious passion showed an increase in positive affect towards their lives. Obsessive passion, on the other hand, predicted an increase in general negative affect in players' lives.

If the concept of passion influences positive or negative affect over time, it can also be argued that passion has an impact on the overall psychological well-being of athletes. And indeed, the literature does support this correlation. For example, Vallerand, Mageau, et al. (2008) revealed that harmonious passion has a positive impact on athletes' well-being, whereas obsessive passion does not. In addition to having an impact on the psychological well-being of athletes, passion can also influence the physical health of athletes since a person with obsessive passion is more likely to put themselves at risk when it comes to overtraining or ignoring injuries. A study of competitive long-distance runners showed that harmonious passion was negatively correlated to susceptibility to injuries, while obsessive passion positively predicted perceived susceptibility to injury. The study controlled for variables such as number of weekly training sessions and years of experience (Stephen et al., 2009). This finding is significant because it shows that athletes with obsessive passion do not appear to be able to listen to their body in order to make positive and smart adjustments in their training plan.

Given that passion influences many intrapersonal factors, it is assumed that passion can also affect the performance levels of athletes. Although natural talent plays an important role in the performance development of athletes, most researchers would agree that sport-specific knowledge, expertise, will, passion, motivation, and resistance—rather than innate physical talent—can make the difference between a successful or unsuccessful performance development (e.g., Moran, 2009; Starkes & Ericsson, 2003). Athletes must love an activity dearly if they want to cultivate their talents, devote long hours over many years to it, and remain in the sport despite

failure and injuries. Without love and passion for the sport, peak performance is all but impossible to achieve (Vallerand, 2012). In terms of performance outcomes, Vallerand and colleagues (2008) illustrated that both types of passion can lead to engagement in practice and to objective performance increases. In their study, basketball players completed a questionnaire in order to assess their passion and engagement in deliberate practice; coaches also evaluated their performance development over the length of a season. Results showed that harmonious passion positively predicted mastery goals, which lead to deliberate practice and better performance in the long run.

The development of passion. Research points to three processes that influence the development of passion toward a specific activity: activity selection, activity valuation, and the internalization of the activity (Vallerand, 2012). Whereas activity selection defines a person's preference for a specific activity based on personal interest, activity valuation can be seen as the subjective importance given to the activity by the person. Both aspects play an important role in the internalization process of the activity into one's identity (Vallerand, 2012). Similarly, prior research indicated that if an activity is highly valued and meaningful it is more likely that the value object becomes part of oneself (Aron, Aron, & Smollan, 1992). The more a person values an activity, the more likely it will become part of the person's identity, which in the end leads to a higher level of passion (Vallerand, 2012).

The dual model of passion also suggests that the internalization process can happen as either an autonomous or controlled internalization process. As stated earlier, it is assumed that an autonomous internalization process of an activity is expected to foster the development of harmonious passion. Controlled internalization, on the other hand, is assumed to lead to more obsessive passion tendencies. This process is connected Deci and Ryan's (2000) self-

determination theory and the importance of how the social environment promotes a person's autonomy during the internalization process. A study conducted with music students showed that those who ended up being passionate for music reported higher levels of activity selection, activity valuation, and identity processes. Moreover, the researchers indicated that autonomy support from teachers and parents played an important role for harmonious passion development, while external pressure and lack of autonomy predicted the development of obsessive passion (Mageau et al., 2009, Study 3). Future research using longitudinal designs is needed to replicate these findings with student-athletes.

Self-Determination Theory

Motivation in sports has been the focus of many social psychological theories. In the last three decades, self-determination theory became one of the most influential theories in human motivation. Self-determination theory is a dialectic and organismic theory of human motivation that is based on the previous work of several humanist researchers in motivation. It can therefore be interpreted as a meta-theory and as a more holistic approach to motivation.

Self-determination theory is based on the sub-theories of cognitive evaluation theory, organismic integration theory, causality orientations theory, and basic needs theory (Hagger & Chatzisarantis, 2007). Scholars indicate that self-determination should be distinguished from will, which is defined as the capacity to choose specific actions in order to satisfy specific needs; in contrast, self-determination is viewed as the process of utilizing one's will (Reeve, Deci, & Ryan, 2004). In other words, self-determination requires that people reflect on their strengths and weaknesses, make choices, and determine ways to satisfy their needs (Schunk, Pintrich, & Meece, 2008).

Self-determination theory suggests that perceptions of competence, autonomy, and relatedness are necessary conditions for the development of intrinsic motivation, which refers to executing activities for their own sake (Ryan & Deci, 2000, 2007). Intrinsic motivation also consists of the tendency to actively develop skills, engage in challenges, and become interested in new activities even if external rewards are absent (Ryan & Deci, 2007). When applied to self-determination theory, it suggests that if environmental conditions support an individual's feelings of competence, autonomy and relatedness, he or she is likely to experience higher levels of intrinsic motivation. In contrast, any factor that undermines those feelings is likely to undermine intrinsic motivation. When applied to the underpinnings of intrinsic motivation, the multidimensionality of self-determination theory provides advantages in comparison to other theories. For instance, self-efficacy theory (Bandura, 1997) does not take into account the importance of autonomy. A highly competent and confident, but extrinsically controlled, performer might not necessarily show the behavioral features of being intrinsically motivated (Ryan & Deci, 2007).

Intrinsic motivation in sport. For many years, intrinsic motivation was identified as a unidimensional construct (e.g. Csikszentmihalyi & Nakamura, 1989). However, Vallerand and colleagues (Vallerand, 1997; Vallerand, Blais, Brière, & Pelletier, 1989; Vallerand et al., 1993) proposed an expansion of that perspective by differentiating between three levels of intrinsic motivation: intrinsic motivation to know, intrinsic motivation toward accomplishment, and intrinsic motivation to experience stimulation. Intrinsic motivation toward accomplishment covers the pleasure of engaging in an activity due to the creation or accomplishment of something that is personally valuable. This type of intrinsic motivation would explain why a swimmer would train every day for multiple hours to improve his time by one tenth of a sec.

Intrinsic motivation to experience motivation, on the other hand, focuses on the engagement of activities due to the experience of pleasant feelings or sensations in that moment. A bungee jumper who wants to feel the kick of that moment would display that form of intrinsic motivation. Finally, intrinsic motivation to know takes place when one experiences pleasure while learning, exploring, or trying to understand something new. This form of motivation would represent a weight lifter who lifts more often because she discovered new exercises (Vallerand, Donahue, & Lafrenière, 2012).

Various forms of enjoyment play a critical role in sports engagement (Ryan & Deci, 2007). However, scholars point to a number of factors that can reduce intrinsic motivation and sports participation, including the negative influence of controlling coaches, extrinsic reward motivators, and performance pressure from the outside (e.g., Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003). Intrinsic motivation may also be one of the most important factors in maintaining exercise persistence. Even if people exercise due to extrinsic reasons (e.g., to improve their fitness), they also need to enjoy the activity or derive inherent satisfaction in order to stay with it over time (Ryan, Frederick, Leps, Rubio, & Sheldon, 1997).

The impact of competitive environments on intrinsic motivation is somewhat controversial. Based on cognitive evaluation theory, competitive environments can feature both informational and controlling aspects (Deci & Ryan, 1985), which can either foster or inhibit intrinsic motivation. For instance, if a competitive environment supports optimal challenge and competence feedback, higher levels of efficacy and enhanced intrinsic motivation can result. However, competition also includes controlling components that may cause people feel pressure to win based on their own expectations or expectations from others. As a result, competitive situations with pressure to win are expected to hinder intrinsic motivation; conversely,

competition experiences based on task involvement and mastery can maintain or enhance intrinsic motivation (Ryan & Deci, 2007). Reeve and Deci (1996) demonstrated that if participants are pressured to win, it is more likely that they will lose intrinsic motivation even while winning.

The sports performance literature is replete with studies on how to reduce stress in high pressure and competitive situations—e.g., via relaxation exercises—since it has long been known that stress and an unfocused mind can reduce the efficiency and execution of automated movement patterns (Garfield & Bennett, 1984). In addition, scholars studying peak performance have indicated that regardless of talent and genetic advantages, sports excellence can only be developed through adhering to a strict regimen of practice (Starkes & Ericsson, 2003). However, researchers caution that regular practice regimens do not necessarily lead to immediate success or other extrinsic rewards, which points out the importance of a solid foundation of intrinsic motivation based on intrinsic regulation (Starkes & Ericsson, 2003; Starkes, Helsen, & Jack, 2001). Furthermore, if an athlete derives satisfaction from something other than winning, they will be more likely to maintain intrinsic motivation in the face of loss or setbacks. For example, Vansteenkiste and Deci (2003) showed that people who do not win are able to maintain motivation if they receive supportive positive competence feedback. Other studies indicate that sustained exercise and participation are more likely if intrinsic motivation and well-internalized extrinsic motivation are facilitated (Matsumoto & Takenaka, 2004; Ryan & Deci, 2007). The next section will focus on extrinsic forms of motivation and its internalization process based on self-determination theory.

Internalization and extrinsic forms of motivation. There is more to a holistic picture of motivation than focusing solely on intrinsic motivation. Athletes engage in sports for extrinsic

reasons as well. Although athletes can and do experience moments of flow and intrinsic motivation in the face of hard work and repetitive practice, research shows that it's often an uphill battle to keep them intrinsically motivated (Ryan & Deci, 2007). Nonetheless, while the practice and skills-building process can be repetitive, frustrating, and exhausting, athletes do understand that repetitive routines are necessary in order to develop peak performance (Starkes & Ericsson, 2003). Furthermore, athletes might be intrinsically motivated to perfect one specific training activity, but are disengaged in the face of routine drills and conditioning. For instance, a pole-vaulter might be intrinsically motivated during a vault session, but finds it difficult to fully engage in weight-lifting sessions. Finally, even if athletes are intrinsically motivated, the social context of sport is full of extrinsic incentives that can shape athletes motivation and experiences (Ryan & Deci, 2007).

Thirty-five years ago, Harter (1981) described intrinsic versus extrinsic motivation as somewhat of an either-or dichotomy. Research has evolved significantly since then. Indeed, based on self-determination theory, people are viewed as experiencing intrinsic and extrinsic motivation simultaneously (Ryan & Connell, 1989; Ryan & Deci, 2007). Self-determination theory also integrates different levels of extrinsic motives in terms of how much they are integrated into one's self. Extrinsic motives can vary in their autonomy levels, ranging from being highly volitional to being completely external to the self (Ryan & Deci, 2007). Based on organismic integration theory (Deci & Ryan, 1985), which is a sub-theory of self-determination theory, various forms of extrinsic motivation and their consequences can be explained. Figure 7 illustrates the different extrinsic stages, the basic psychological needs, and the cognitive and environmental features that lead to an adoption of intrinsic of extrinsic motivation.

The various types of extrinsic motivation can range from being externally controlled to those that are personally valued, volitional, and autonomous. On the right end of the self-determination continuum is the concept of *amotivation*. Athletes experiencing amotivation have no sense of personal control concerning their sport engagement; moreover, they have no extrinsic or intrinsic reasons for participating in sports activities (Duda & Treasure, 2010).

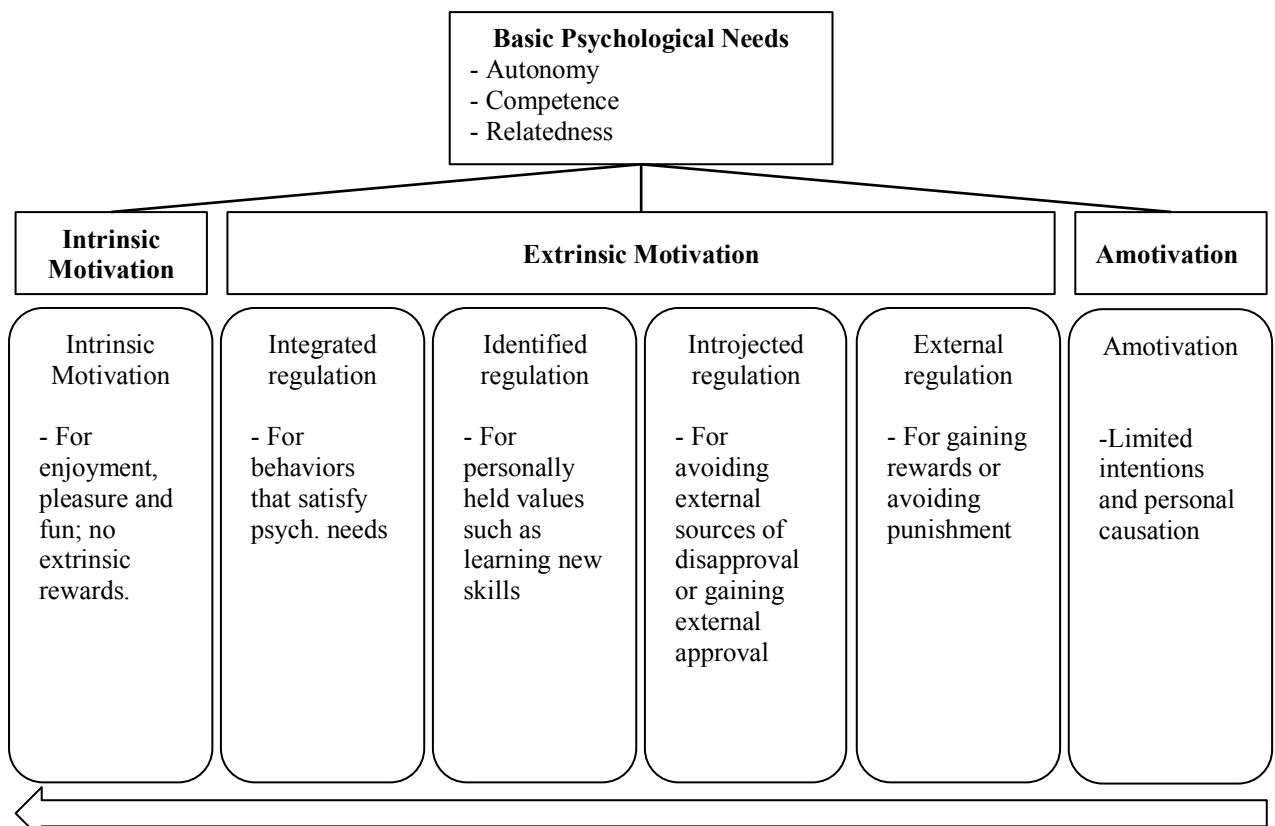


Figure 7. Schematic representation of self-determination theory. Adapted from *Intrinsic Motivation and Self-Determination in Exercise and Sport* (p. 8) by Martin Hagger and Nikos Chatzisarantis, 2007, Champaign, Human Kinetics.

Next on the continuum are the four forms of extrinsic motivation. *External regulation* is the least autonomous among the three stages. In this stage, athletes act for extrinsic reasons. External demands or rewards fuel the engagement in activities. For example, an athlete may admit that the sole reason for practicing is to maintain his or her scholarship status (Duda & Treasure, 2010). Another example would be the athlete who plays really hard in practice because

she expects to be rewarded or praised from her coach for her effort. In essence, the source of motivation is separate from the self; rather it is dependent on external factors (Ryan & Deci, 2007).

The second stage on the continuum is *introjected regulation*. In this stage athletes engage in activities because they feel they have to. In this model, other people do not control the actor's behavior with rewards or punishment; instead, the actor controls him/herself with sources of reward or punishment (Ryan, 1982). An athlete with introjected extrinsic motivation experiences pride if specific external goals are accomplished. The athlete might also punish himself and experience shame and anxiety if external demands are not met. Introjected extrinsic motivation is also influenced by self-esteem and ego involvement (Ryan, 1982; Ryan, Koestner, & Deci, 1991), and the self is controlled by extrinsic pressure and contingencies (Ryan & Deci, 2007).

Extrinsic motivation can also be relatively autonomous if an athlete takes action through *identified regulation*. Within identified regulation an athlete can identify with the purpose and value of an activity (Ryan & Deci, 2007). However, even though the athlete is engaged out of free choice, he or she may not actually enjoy the activity (Duda & Treasure, 2010). For instance, an athlete goes to every voluntary off-season conditioning session, although the sessions are demanding and unpleasant. Nonetheless, the athlete is convinced that the effort and work will pay off in the future.

Integrated regulation takes it a step further. Here the value of engaging in a specific activity is congruent with other values and needs. As a result, motivation becomes not only volitional, but also stable and integrated within the personality (Ryan & Deci, 2007). For instance, an athlete decides to climb a challenging mountain because she thinks the challenge and completion are valued outcomes (Huber, 2013).

It should be noted, however, that the presented model in Figure 7 does not represent stages or a developmental continuum. According to Ryan and Deci (2007), it should be seen as a conceptual continuum illustrating degrees of self-determination and volition. Another key element of self-determination theory is that athletes who engage in an activity by choice will be more engaged and experience better consequences than athletes whose participation is less autonomous. And indeed, researchers have identified a positive relationship between more self-determined motivation and higher levels of task perseverance and psychological well-being. Autonomous motivation is also negatively related to stress, anxiety, self-criticism in sport, and burnout (e.g., Gagne, Ryan, & Bargmann, 2003; Krane, Greenleaf, & Snow, 1997; Lemyre, Treasure, & Roberts, 2006). In addition, if athletes can satisfy the three basic needs of autonomy, relatedness, and competence in their learning environment, they are likely to experience greater levels of self-determination and personal investment (Reinboth, Duda, & Ntoumanis, 2004).

Self-determination and peak performance. If one is interested in peak performance in sports, it is essential that research be conducted with specific athletic populations in order to test the validity and variability of certain motivational concepts. However, this can be difficult because elite-level performers (both college and professional) represent a small segment of the general athletic population. Due to the many challenges that student-athletes and elite athletes face—such as rigorous training schedules involving personal sacrifices and the ever-present threat of injury—one must assume that their behavioral choices are not exclusively intrinsically motivated. Instead, it is likely that multiple motives exist (Treasure et al., 2007). Twenty years ago, researchers examined motivational perceptions of elite Bulgarian athletes in a variety of sports (Chantal, Guay, Dobрева-Martinova, & Vallerand, 1996). Their analysis indicated that less self-determined types of motivation (i.e., introjected regulation and external regulation)

fostered higher performance levels. However, it must be noted that the highly controlled culture of post-Communist Bulgaria as a social context—which we now know employed a variety of extrinsic rewards (e.g., money and privilege)—no doubt played a powerful role in the motivation levels of athletes (Treasure et al, 2007). In a qualitative study by Mallett and Hanrahan (2004), elite Australian level athletes were investigated in a less controlling social context. Results indicated that elite athletes have multiple motives for engaging in peak performance sports. Specifically, they identified excitement, enjoyment, and love of competition at the highest level, as well as a sense of relatedness with fellow athletes, as being important motives. However, the athletes also identified money and social recognition as important aspects of their motivation.

Due to the professionalization and increased training loads in elite-level sports, burnout has become an important area of study (Treasure et al., 2007). In competitive sports, it has been reported that maladaptive training outcomes such as burnout and overtraining can be offset by extrinsic sources of motivation (Lemyre et al, 2006). Moreover, a study by Cresswell and Eklund (2005) pointed out that burnout among top amateur rugby players is less likely to occur if the players are driven by intrinsic sources of motivation. Similarly, Lemyre et al., (2005) compared thriving swimmers to burned-out swimmers and showed that thriving athletes reported that their involvement in the sport was mainly motivated by self-determined reasons. The thriving swimmers also experienced more joy and they felt they had more control over their involvement.

The Need for a New Model

So far in this chapter, I introduced current theories of motivation that are applied and used in the field of athletics. The theories and principles showed how motivational needs have to be satisfied in order to foster engagement. Thereby, Expectancy-Value Theory, Attribution Theory, Models and Theories of Self- Confidence, Goal Setting and Goal Orientation Theory, as

well as Passion offer valuable insights in order to understand athletes' motivation. However, the above-mentioned models and theories focus on specific scenarios and a variety of populations, which can make it difficult for coaches who want to look at holistic strategies to motivate their athletes in peak performance settings. Coaches only have limited time to expose themselves to theories of motivation. More comprehensive approaches that tackle a variety of motivational needs are preferred in the coaching world and receive much attention. Therefore, it comes as no surprise that Self-Determination Theory is the most utilized theory of motivation in the field of coaching (see Hagger & Chatzisarantis 2007). As mentioned earlier, Self-Determination Theory can be interpreted as a macro theory of human motivation (Standage & Ryan, 2012). In my opinion, one of the success factors associated with the theory is the fact that self-determination theory focuses on the motivational needs of learners. Self-determination theory specifies that perceptions of competence, autonomy, and relatedness are fundamental for motivation and engagement (Deci & Ryan, 1985). As such, the focus on motivational needs can serve as a foundation for coaches and practitioners in establishing athletic environments in which their athletes can thrive. The concepts of competence, autonomy, and relatedness are straightforward and do not require coaches to develop a deep understanding of research theories in psychology and motivation research.

However, new research findings have emerged over the past decade that go beyond self-determination theory and the aforementioned theories and models of motivation. Core aspects of self-termination theory can be expanded beyond the needs of autonomy, success, and relatedness. I believe that a new holistic approach from the realm of education can be used in sports, in order to help coaches and practitioners design more effective instructions and practice sessions. Therefore, I will introduce the MUSIC[®] Model of Motivation (Jones, 2009, 2018) as a

holistic approach in the coaching and sports psychology literature. It is my belief that the MUSIC Model has the potential to help instructors and coaches to better understand how current motivational theories can be applied in a peak performance sport environment.

The MUSIC® Model of Motivation

The MUSIC Model was developed by Jones (2009, 2018) and consists of five components that instructors and educators should consider when designing instructional strategies in academic settings: empowerment, usefulness, success, interest, and caring. The name of the model is an acronym based on the second letter of "eMpowerment" and the first letter of the other four components. The MUSIC Model was designed by analyzing, synthesizing, and evaluating motivation research and theory into a cohesive model (Jones, 2009) that would be useful for instructors. The MUSIC Model maintains that instructors who foster all of these components are more likely to motivate and engage students in their learning (e.g., Simons, Vansteenkiste, Lens & Lacante, 2004). Figure 8 shows how specific needs can influence the motivation of the learner, which results in increased student learning.

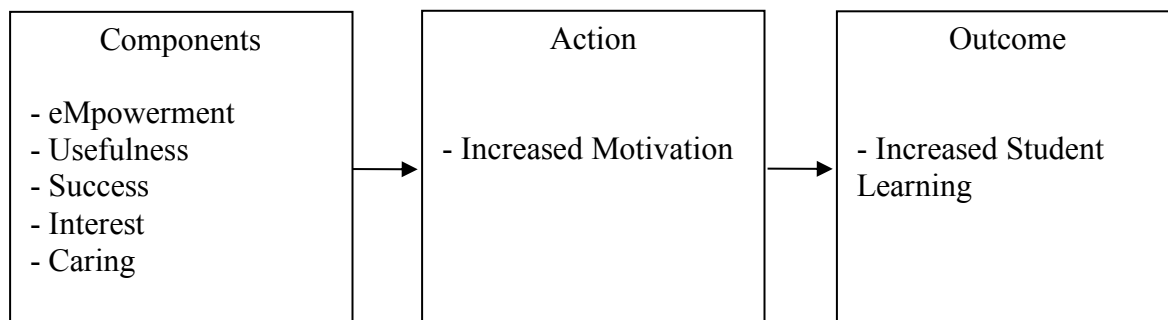


Figure 8. Part of the MUSIC® Model of Motivation and its consequences on motivation, attention, learning, and satisfaction. Adapted from "Motivating Students to Engage in Learning: The MUSIC® Model of Academic Motivation," by Brett Jones, 2009, *International Journal of teaching and Learning in Higher Education*, 21(2), p. 272-285.

As a result, the MUSIC Model has been used to design instruction (e.g., Chittum & Jones, 2015; Hall, Jones, Amelink, & Hu, 2013; McGinley & Jones, 2014; Tu & Jones, 2017)

and to diagnose strengths and weaknesses related to motivation factors in the curriculum and instruction (Jones, Chittum, et al., 2015; Jones, Epler, Mokri, Bryant, & Paretti, 2013; Jones, Ruff, Snyder, Petrich, & Koonce, 2012; Jones, Watson, Rakes, & Akalin, 2012; Lee, Kajfez, & Matusovich, 2013).

The empowerment component of the model suggests that instructors should empower their students, which refers to the amount of perceived control that students have over their own learning. The previously described Theory of Self-Determination (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000) serves as one of the foundations for this component. Learners who are more autonomous have the opportunity to make choices and manage interactions between themselves and the environment. In proposing his MUSIC Model, Jones (2009) presented a significant body of research in which learners in more autonomy-supportive environments showed enhanced levels of conceptual learning, greater perceived academic and social competence, greater creativity, a preference for challenging tasks, a more positive emotional tone, increased school attendance, and higher grades (Amabile, 1985; Boggiano, Main, & Katz, 1988; Csikszentmihalyi, 1985; deCharms, 1976; Deci, Schwartz, Sheinman, & Ryan, 1981; Filak & Sheldon, 2008; Flink, Boggiano, & Barrett, 1990; Grolnick & Ryan, 1987; Harter, 1982; Ryan & Connell, 1989; Ryan & Grolnick, 1986; Shapira, 1976; Vallerand & Bissonnette, 1992).

Another component of the MUSIC Model is usefulness (Jones, 2009). In short, students will want to engage in activities that they perceive as being useful for attaining their short- and long-term goals. Future time perspective theorists have also indicated that students are more motivated if they perceive that what they learn will be useful for their future (e.g., Kauffman & Husman, 2004; Tabachnick, Miller, & Relyea, 2008). In addition, research also shows that college students who believe that a course is useful are more likely to be internally regulated,

motivated, and have more positive learning outcomes (Simons et al., 2004). Jones (2009) pointed out that utility value serves as one of the constructs related to the usefulness component (Eccles et al., 1983; Eccles & Wigfield, 1995; Wigfield & Eccles, 1992, 2000). The utility value of expectancy-value theory (Wigfield & Eccles, 2000) refers to how a task fits into an individual's future plans and goals. The utility value plays a pivotal role in terms of investigating the relationship between activities and effort on tests (Cole, Bergin, & Whittaker, 2008) and persistence (e.g., Meece, Wigfield, & Eccles, 1990; Wigfield & Eccles, 2000). This means that useful activities lead to increased motivation and engagement, especially if the amount of effort is perceived to be beneficial for long-term goals (Simons, Vansteenkiste, Lens, & Lacante, 2004).

A third component of the MUSIC Model is success. Jones (2009) indicated that students are more likely to engage in a learning environment if they believe that they can succeed when they put forth the required effort to obtain required knowledge and skills. Success measures (or lack thereof) serve as important sources of feedback whereby students can enhance their motivation or make adjustments. Moreover, if students believe that they can be successful, they are more likely to engage in an activity, put forth more effort, and persist for longer periods of time. It can also be assumed that they experience more joy, set more challenging goals, and perform at a higher level (Jones, 2009; Schunk & Pajares, 2005). The success component is based on the motivational theories and concepts of self-efficacy (Bandura, 1986, 1997), expectancy-value theory (Eccles et al., 1983; Eccles & Wigfield 1995; Wigfield & Eccles, 1992, 2000), the need of competence in self-determination theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000), self-concept (Marsh, 1990; Marsh & Yeung, 1997; Schavelson & Bolus, 1982), self-worth (Covington, 1992, 1998; Harter 1985, 1990), Goal Orientation Theory (Ames, 1992b;

Pintrich, 2000a, 2000b, 2000c), Attribution Theory (Weiner, 1985, 1986, 2005), and Anxiety (Lazarus, 1991; Spielberger, 1966).

Fourthly, the MUSIC Model asserts that instructional activities should be interesting for learners. Schraw and Lehman (2001) defined interest as the “liking and willful engagement in a cognitive activity” (p. 23). Inherent in the concept of interest is an affective component of positive emotion, as well as a cognitive component of concentration (Hidi & Renninger, 2006). A distinction between temporary situational interest and enduring individual interest has also been suggested (Schraw & Lehman, 2001). Engaging tasks attract the attention of learners, which is a prerequisite condition for learning. Moreover, a learner will be more attentive if the motivational need of interest is met. Recent research suggests that the concept of interest is related to memory comprehension, deeper cognitive engagement, thinking, goal setting, learning strategies, and achievement (Hidi & Renninger, 2006; Schunk et al., 2008). Jones (2009) also illustrated the importance of fostering more enduring interest in instruction content—while avoiding the implementation of entertainment features that do not foster sustained interest. The underlying theories and concepts of the interest component include situational and personal interest (Hidi & Renninger, 2006), the need for arousal (Berlyne 1960, 1963; Hebb, 1966), and flow theory (Csikszentmihalyi, 1990).

Finally, I will discuss the caring component of the MUSIC Model. The MUSIC Model maintains that students will be more motivated and engaged in class when they have sustaining and caring interpersonal relationships with their instructor and/or other students (Jones, 2009). As such, instructors should show concern for the well-being of learners, their learning development, and the trajectory of their success (Jones, 2009). Relationships between learners and instructors that are based on caring interactions are linked to intrinsic motivation, positive

coping, relative autonomy, engagement, expectancy values, effort, cognitive engagement, self-efficacy, persistence and performance (Freeman, Anderman, & Jenson, 2007; Furrer & Skinner, 2003; Goodenow, 1993; Hyde & Gess-Newsome, 1999/2000; Murdock, 1999; Osterman, 2000; Ryan, Stiller, & Lynch, 1994; Walker & Greene, 2009). The need of relatedness within self-determination theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000) can be seen as a theoretical foundation of the caring components.

The following table provides an overview of the MUSIC components and its related concepts and theories. On the left side of the table the five MUSIC components are presented. The right side shows the underlying concepts and theories with the references of the foundational authors of the concepts and theories. The related constructs and theories will be the foundation of the following studies and serve as coding dictionary for the systematic content analysis in study one, which analyses the existence of the underlying MUSIC constructs and theories in the sports psychology and coaching literature.

Table 1
The MUSIC components and its related theories and constructs

MUSIC Component	Related Theories and Constructs
eMpowerment	<p>Need for Autonomy (Self-Determination)</p> <ul style="list-style-type: none"> • (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000)
Usefulness	<p>Utility Value (Expectancy-Value Theory)</p> <ul style="list-style-type: none"> • (Eccles et al., 1983; Eccles & Wigfield 1995; Wigfield & Eccles, 1992, 2000) <p>Goal Setting</p> <ul style="list-style-type: none"> • (Locke & Latham (1990, 2002); Simons et al., 2004)
Success	<p>Self- Efficacy</p> <ul style="list-style-type: none"> • (Bandura, 1986, 1997) <p>Expectancy of Success (Expectancy-Value)</p> <ul style="list-style-type: none"> • (Eccles et al., 1983; Eccles & Wigfield 1995; Wigfield & Eccles, 1992, 2000) <p>Need for competence (Self-Determination)</p> <ul style="list-style-type: none"> • (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000; Schunk, 1987) <p>Self-concept</p> <ul style="list-style-type: none"> • (Marsh, 1990; Marsh & Yeung, 1997; Schavelson & Bolus, 1982) <p>Self-worth</p> <ul style="list-style-type: none"> • (Covington, 1992, 1998; Harter 1985, 1990) <p>Goal Orientation Theory</p> <ul style="list-style-type: none"> • (Ames, 1992; Pintrich, 2000a, 2000b, 2000c) <p>Attribution Theory</p> <ul style="list-style-type: none"> • (Weiner, 1985, 1986, 2005) <p>Anxiety</p> <ul style="list-style-type: none"> • (Lazarus, 1991; Spielberger, 1966)
Interest	<p>Situational Interest</p> <ul style="list-style-type: none"> • (Hidi & Renninger, 2006) <p>Need for Arousal</p> <ul style="list-style-type: none"> • (Berlyne 1960, 1963; Hebb, 1966) <p>Flow</p> <ul style="list-style-type: none"> • (Csikszentmihalyi, 1990)
Caring	<p>Need for Relatedness (Self-Determination)</p> <ul style="list-style-type: none"> • (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000)

Note. Adapted from “Teaching motivation strategies using the MUSIC[®] Model of Motivation as a conceptual framework” (p.128) by Brett Jones, 2016. In M.C. Smith, & N. DeFrates-Densch (Eds.), *Challenges and innovations in educational psychology teaching and learning*. Charlotte, NC: Information Age Publishing.

Validation of the MUSIC® Model of Motivation in Educational Settings

Validity evidence for the use of the MUSIC Model in education has been provided in many different studies. Some studies have used the MUSIC® Model of Motivation Inventory (Jones, 2012) to assess students' MUSIC perceptions in various educational settings. These studies have provided convergent and discriminant validity evidence that the five MUSIC model components are distinct, yet correlated, in samples of elementary students (Jones & Sigmon, 2016), middle and high school students (Parkes, Jones, & Wilkins, 2015), and college students (Jones & Skaggs, 2016; Jones & Wilkins, 2013) in several different cultures, including students in China (Jones, Li, & Cruz, 2017), Colombia (Jones, Li, & Cruz, 2017), Egypt (Mohamed, Soliman, & Jones, 2013), Iceland (Schram & Jones, 2016). Furthermore, the MUSIC model components predict several important outcomes, including domain identification, course effort, course ratings, and career goals (Jones, 2010; Jones, Osborne, Paretti, & Matusovich, 2014; Jones, Tendhar, & Paretti, 2016). Taken as a whole, these findings provide strong validity evidence for the use of the MUSIC Model and MUSIC Inventory in a variety of educational settings.

Does the MUSIC Model satisfy the requirements of a motivational model in sports?

Before I can propose a possible study, which tries to justify and validate the MUSIC Model in sport settings, I first have to determine whether the framework of the MUSIC Model satisfies the quality standards of a motivational models in sports. According to Roberts (2012), the sport psychology and coaching literature argues that the attributes of parsimony, elegance, and conceptual coherence are valuable and crucial for every motivational theory in sports. In terms of parsimony, Roberts (2012) referred to an adage attributed to Einstein stating that in science we should make everything as simple as possible, but not too simple. Roberts further

argued that theories in the field of sport psychology have become more complex than they need to be. As mentioned earlier, coaches only have limited time available to educate themselves about issues such as the implementation process of motivational and educational strategies in their practice sessions. In addition, they are typically not experts in the field of motivation. The parsimony of the MUSIC components in combination with its terminology emphasizes the importance of five motivational needs with its related instructional implications, instead of providing complex and confusing motivation jargon (e.g., self-concept, self-efficacy, utility value) that does not necessarily have specific meaning to coaches and practitioners (Jones, 2009). In response to this assertion, I believe that the MUSIC Model fulfills the criterion of parsimony. Although the foundation of the model is rich and deeply integrated in other theories, the model itself is easily applicable and understandable by focusing on the motivational needs of the learner.

The second attribute is elegance. I argue that the MUSIC Model creates an elegant way to combine complex components of motivation, while at the same time recognizing that most educators are not experts in the field of motivational psychology. Based on its acronym, the model is easy to remember. More importantly, it is a simple but elegant construct that promotes increased motivation and increased student learning through the satisfaction of the five components of the model.

In addition to parsimony and elegance, Robert (2012) views conceptual coherence as a third essential attribute for motivational theories in sports. The fact that the MUSIC Model is based on established, coherent, and well-accepted theories in motivation strengthens its conceptual foundation. But more importantly, the test of any motivation theory is its applicability and usefulness in informing practitioners who are tasked to empower, encourage, and motivate

people (Kaplan & Maehr, 2002). I believe that the MUSIC Model can give coaches a powerful framework and the means to enhance motivation in the field of competitive sports.

Rationale of the Study

The study I describe in Chapters 3, 4, and 5 revolve around two main questions. First, can the application of the MUSIC Model in sport settings be justified? And second, is it possible to produce valid scores for student-athletes with an athletic version of the MUSIC Model Inventory? A first cursory examination of the literature revealed that all the MUSIC Model components, with the exception of situational and individual interest, are represented in the sport and exercise psychology literature. A more thorough analysis in form of a systematic content review is needed, however, to clearly justify the application of the MUSIC Model in sport settings. In addition to providing a systematic content analysis to justify the application of the MUSIC Model, it is crucial to consider and analyze already existing measures in the sport psychology and coaching literature that could possibly cover the assessment and testing procedures of the MUSIC components in the realm of athletics. The second question can only be seen as valid if no other current measures in sports can assess the MUSIC components as a whole. As a result, current measures of motivation in sport and exercises research have to be analyzed before a possible validation study of a specific MUSIC inventory for athletes can be proposed.

The Need for a MUSIC Inventory for Athletes

As mentioned earlier, most of the studies regarding motivation in athletics are based on Self-Determination Theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000) and its main outcomes of amotivation, extrinsic motivation, and intrinsic motivation. In sport settings, Vallerand (2007) proposed a hierarchical model of intrinsic and extrinsic motivation, as well as

amotivation, which proposes that the three forms of motivation are represented at a global, contextual, and situational level. The contextual and situational levels of extrinsic and intrinsic motivation are of particular interest for this discussion because several measures of intrinsic and extrinsic motivation in sport and exercise research utilize these levels. For instance, the Sport Motivation Scale (SMS; Pelletier et al., 1995) utilizes the level of context, whereas the Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000) utilizes the situational level of intrinsic motivation. The contextual level focuses on distinct spheres such as education, work, or interpersonal relationships. In these contexts, athletes develop motivational tendencies that are moderately stable but still responsive. The situational level, on the other hand, involves the intrinsic motivation an athlete experiences while engaging in an activity (Vallerand, 1997).

Table 2
Types of Intrinsic and Extrinsic Motivation in Sport Research

Type	Measures in Sport Settings
Contextual Measures	Sport Motivation Scale (SMS; Pelletier et al., 1995)
	Sport Motivation Scale-6 (SMS-6; Mallet, Kawabata, Newcombe, et al., 2007)
	Behavioral regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008)
Situational Measure	Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000)

Note. Adapted from *Intrinsic and Extrinsic Motivation in Sport and Exercise* (p.283) by Robert Vallerand, Eric Donahue, & Marc-André Lafrenière, 2012, Champaign, Human Kinetics.

It appears to be obvious, that the level of generality impacts the scale construction. The situational measures ask about the engagement in current activity, whereas contextual measures show more temporal stability and analyze participation and engagement in a more general sense (Vallerand, Donahue, & Lafrenière, 2012). Table 2 shows the most popular measures that assess

intrinsic and extrinsic motivation in sport and exercise research. All of these measures are grounded in Self-Determination Theory, are fully developed, and have gone through some validation processes.

The Sport Motivation Scale (Pelletier et al., 1995) measures contextual intrinsic and extrinsic motivation, as well as amotivation from a multidimensional perspective. It is the most often used motivation measure in sport. The measure consists of seven subscales and assesses stages of amotivation; external, introjected, and identified regulation; identified regulation; and intrinsic motivation. Motivation is assessed by the perceived reasons of sport participation, or the why of specific behavior pattern (Vallerand, Donahue, & Lafrenière, 2012). Although the measure is based on a solid foundation and has been supported repeatedly (e.g., Doganis, 2000) some of the used items do not align with the purpose of high performance settings for the later proposed study. For instance, question nine in the SMS asks for the necessity to do sports if one wants to be in shape. I believe that such a mindset is not applicable in high performance collegiate athletics. I argue that the desire to be in shape is not a deciding factor of why one athlete is more dedicated or invested and ultimately performs better compared to an opponent. The literature also showed discrepancies in the results with different populations and argues that some of the items may reflect participation rather than an elite orientation. (Vallerand, Donahue, & Lafrenière, 2012).

The Sport Motivation Scale-6 has been developed by Mallett, Kawabata, Newcombe, and Otero-Rorero (2007). It is a related measure to the original SMS and is based on the same underlying rationale. The measure tries to improve the SMS by adding an integrated regulation subscale. The SMS-6 consists of 24 items. Although the results of a CFA provided support for the factor structure, construct validity of the SMS-6 was not fully supported because clear

distinctions between integrated regulation, identified regulation, and intrinsic regulation could not always be made (Vallerand, Donahue, & Lafrenière, 2012). It can be argued that the addition of four new specific items makes the SMS-6 more acceptable for older and more experienced athletes, however, a clear distinction and separation for high performance settings cannot be made.

The Behavioral Regulation in Sport Questionnaire was developed by Lonsdale and colleagues (2008) to create a measure for elite sport motivation. SDT experts and competitive athletes developed a complete new pool of items. Although some of the constructs are in line with predictions of the theory (e.g., amotivation was negatively correlated to intrinsic motivation) other subscales such as identified regulation and integrated regulations could not be separated (Vallerand, Donahue, & Lafrenière, 2012).

Lastly, the Situational Motivation Scale assesses intrinsic and extrinsic motivation, as well as amotivation at the situational level (Guay et al., 2000). The multidimensional tool is made up of 16 items and assesses the situational motivation with questions such as: “Why are you currently engaged in this activity?” All questions represent potential reasons for task engagement. The SIMS shows evidence that the Hierarchical Model of Intrinsic and Extrinsic Motivation (Vallerand, 2007) shows a top down effect, in which sport motivation on the contextual level was found to predict sport motivation on the situational level (e.g., Blanchard et al., 2007; Jaakkola et al., 2008). In other words, the more self-determined athletes’ perceived their motivation in specific contexts, the more likely it was that the motivation in given situations was self-determined. Blanchard et al. (2007) also found that situational motivation has recursive effects, meaning that more self-determined situational motivation creates more self-determined contextual motivation. SIMS can be a useful measure to assess motivation on the situational

level, however the measure has not been assessed and validated with high performance athletes. As a result, it is not suitable for my proposed study.

Overall, the above-presented measures are valuable tools to assess intrinsic and extrinsic motivation in sport settings. However, it is questionable whether these measures can serve as a replacement to adequately assess all the MUSIC components. As mentioned earlier, all of the above listed measures are grounded in SDT (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000). This means that the measures are assessing levels of intrinsic and extrinsic motivation on the foundation of the psychological needs of autonomy, competence, and relatedness. The MUSIC[®] Model of Motivation expands the variety of psychological needs by adding the components of “Situational and Individual Interest” as well as “Usefulness.” Subsequently, measures based on the foundation of SDT would not address all components of the MUSIC Model sufficiently. Furthermore, the components of the MUSIC Model are not limited to conceptions that fit within SDT. For example, although need for competence relates to the success component of the model, the success component includes other concepts of success-related beliefs beyond those of need for competence.

This raises the question of whether a variety of individual measures could be used to cover and supplement all five motivational components of the MUSIC Model. For instance, Vallerand’s (2003) questionnaire on harmonious and obsessive passion could be used to substitute the intrinsic interest component of the MUSIC Model that is not covered in the Self-Determination questionnaires. In addition, the flow scales (FSS-2, DFS-2) of Jackson, Marin, & Eklund (2008) could be utilized to supplement the success component of the MUSIC Model and the Exercise-Induced Feeling Inventory (EFI) by Gauvin & Rejeski (1993) could help measure the situational interest component of practice environments. Although this approach may seem

promising, I believe that there are several problems that may occur with this strategy. First, the measures address different levels of generality. Whereas some measures focus on situational perceptions regarding one component, other measures analyze the perceptions of motivation from a more contextual or global perspective. This could lead to inconsistencies and ultimately reliability and validity issues. Furthermore, the scaling and language on most scales is different. For example, the Exercise-induced Feeling Inventory (EFI) is measured by open-ended items, whereas the SMS is using items that are measured on a Likert scale. This would lead to further validity issues. Another problem is related to the applied context of the measures. For instance, the Sport Motivation Scale and the Situational Motivation Scale have been mainly tested with a younger, nonelite athlete population. A specific measure for elite level performance settings in collegiate athletics is missing.

As a result, I believe that the development of a specific MUSIC inventory for competitive athletics is a necessary step to validate the MUSIC Model in collegiate athletics. Developing a new measure would not only provide more reliable and valid data but could also offer coaches an assessment tool to evaluate their practice sessions, instructions, and in-and out of season outcomes. This can be seen as an advantage because coaches are in need of fast and easily available assessment tools. As of right now, coaches would need a variety of instruments in order to cover all components of the MUSIC Model. As of my knowledge, there is currently no inventory that measures all five MUSIC Model components at once. Therefore, it would be useful for researchers and coaches in peak performance settings to have one inventory that measures all MUSIC components simultaneously.

Purpose and Research Questions

The purposes of this study are (a) to assess the possibility of applying the MUSIC Model in the field of sport coaching and (b) to provide validation evidence for the MUSIC Model and the associated inventory in elite-level athletic environments with student-athletes. The following research question guided the presented studies.

1. To what extent does the MUSIC[®] Model of Athletic Motivation Inventory produce valid scores for student-athletes at a large Division I university?

To answer this research question, I conducted a series of three studies that examined the use of the MUSIC Model in athletic settings and the extent to which an athletic version of the MUSIC Inventory produced valid scores for Division I student-athletes. This dissertation consists of three studies. Figure 9 illustrates the structure of the conducted studies.

1. Study 1: I conducted a systematic content analysis that examined the use of the MUSIC Model in sports. The results of the study provide evidence of content validity of the MUSIC Inventory with student-athletes and supports the application of the model in competitive sport settings.
2. Study 2: I collaborated with Brett Jones (the creator of the MUSIC[®] Model of Academic Motivation Inventory) and created the first version of the MUSIC Model of Athletic Motivation Inventory. An exploratory factor analysis (EFA) was performed with the first sample to provide evidence of construct validity for the new instrument. The results of the EFA guided changes of problematic items and led the foundation for the second data collection.
3. Study 3: The first version of the MUSIC[®] Model of Athletic Motivation Inventory was adjusted and a confirmatory factor analysis (CFA) was conducted on a second

data set. The CFA tested for the factor structure and model fit of the updated inventory. The results of the CFA based on the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA) provided further validity evidence for the use of the MUSIC[®] Model of Athletic Motivation Inventory in competitive athletic setting.

<u>Study I- Content Analysis</u>	<u>Study II- EFA</u>	<u>Study III- CFA</u>
<p>Question: Are the underlying MUSIC[®] components & theories represented in the sport psychology and coaching literature?</p>	<p>Question: Do the items of the MUSIC[®] Model of Athletic Motivation Inventory load on the anticipated factors of the MUSIC[®] constructs?</p>	<p>Question: Do fit statistics of the CFA confirm the five- factor structure of the MUSIC[®] Model of Athletic Motivation Inventory?</p>
<p>Study Type: Qualitative</p>	<p>Study Type: Quantitative</p>	<p>Study Type: Quantitative</p>
<p>Validity: Content Validity</p>	<p>Validity: Construct, Divergent, Convergent</p>	<p>Validity: Construct, Divergent, Convergent</p>
<p>Reliability: Intercoder Agreement</p>	<p>Reliability: Cronbach's alpha</p>	<p>Reliability: Cronbach's alpha</p>

Figure 9. Overview, purpose, and structure of Study 1, 2, and 3.

CHAPTER 3

Study 1: Systematic Content Analysis of the MUSIC components in the sport literature

I conducted a content analysis to determine whether it is justifiable to apply the MUSIC model to athletic environments. Content analysis can be described as a methodology that can be used to determine the content of written, recorded, or published communications via an objective and systematic procedure (Drisko & Maschi, 2016). It is defined as “a research technique for making replicable and valid inferences from texts or other meaningful matter to the context of their use” (Krippendorff, 2013, p. 25). In the present study, I view the content analysis as a basic content analysis or contingency analysis using word counts and frequency statistics as the major analytic technique (Neuendorf, 2017; Roberts, 2000). Furthermore, I will interpret the results of the analysis as exploratory (Anastas, 1999) in nature due to the novelty of the MUSIC components in sports. The aim of this content analysis includes two sub-goals: (1) to identify the main motivation theories and constructs in the text of books within the realm of sport psychology and coaching and (2) to examine whether the majority of the identified text in sport psychology and coaching are consistent with the underlying theories and constructs in the MUSIC model.

Sampling

The identification and selection of the analyzed books was based on a quality and selection rubric. Inclusion criteria of analyzed text are a necessary part of any systematic review or content analysis. If there is no consideration of inclusion criteria or quality assessment, the results of the review can be biased (Whiting et al., 2003). The scope of inclusion criteria can be broad or narrow (Counsell, 1997). Due to the novelty of using the MUSIC model in the domain of sports, the inclusion criteria for the identified books were defined broadly based on the guidelines in Table 3. The included books had to fulfill all of the predefined inclusion criteria in

order to meet the quality standards of the content analysis. To meet these criteria, every book needed to be rated with a score of four in order to be included in the analysis.

Table 3
Quality Rubric and Inclusion Criteria for Content Analysis

Criteria	No (0)/ Yes (1)
Athletes' motivation is a distinct topic of the book.	
The book cites peer-reviewed studies and addresses validity, trustworthiness, or quality issues of the presented studies.	
The book was not published more than 15 years ago.	
Motivation is covered in the realm of competitive sport settings.	

The platforms Google Books, Amazon, and Human Kinetics were used as search engines to help identify the main works in the field of sport coaching and sport psychology. Search terms such as “coaching”, “sport psychology”, “athletics”, “peak performance”, and “sport(s)” were utilized to identify relevant literature in the field. After the initial search on the three platforms, the above-mentioned selection criteria were applied. In the end, 13 books were identified, which were analyzed further in the content analysis. The following list shows the books included in the analysis:

1. *Advances in Motivation in Sport and Exercise* by G. Roberts & D. Treasure (2012)
2. *Advances in Sport Psychology (3rd Edition)* by T. Horn (2008)
3. *Applied Sport Psychology* by J. M. Williams (2010)
4. *Applying Educational Psychology in Coaching Athletes* by J. Huber (2013)
5. *Applying Sport Psychology - Four Perspectives* by J. Taylor & G. Wilson (2005)
6. *Coaching for the Inner Edge* by R. Vealey (2005)

7. *Essential Readings in Sport and Exercise Psychology* by D. Smith & M. Bar-Eli (2007)
8. *Foundations of Sport and Exercise Psychology* (5th Edition) by R. Weinberg & D. Gould (2011)
9. *Handbook of Sport Psychology* (3rd Edition) by G. Tenenbaum & R. Eklund (2007)
10. *Inside Sport Psychology* by C. Karageorghis & P. Terry (2011)
11. *Intrinsic Motivation and Self-Determination in Exercise and Sport* by M. Hagger & N. Chatzisarantis (2007)
12. *Social Psychology in Sport* by S. Jowett & D. Lavallee (2007)
13. *Sport Psychology: Concepts and Applications* by R. H. Cox (2012)

Coding and Data Analysis

Following the framework of Weber (1990), I developed an a-priori coding dictionary of the underlying MUSIC principles. The coding dictionary was based on the foundational theories previously presented in Table 1, which were founded on the findings of Jones (2009) and Jones (2016). Table 4 shows the components of the MUSIC model, some of its grounded theories, and the proposed coding dictionary that was used for this analysis. Counting occurrences and percentages of the codes within the sampled books were analyzed.

During the analysis, the content of all book chapters and indices of the selected books was investigated by two coders who analyzed the data. I was the main investigator along with another independent coder. The second coder was not an expert in the field of psychology or coaching. Any prior knowledge of the second coder could limit the validity of the coding scheme, especially with regard to external validity and also limit the replicability of the study (Neuendorf, 2017).

Table 4
Components of MUSIC Model and Coding Dictionary

Components of MUSIC Model	Coding Dictionary
1. Empowerment: - Need for Autonomy 2. Usefulness: - Utility value - Goal Setting 3. Success: - Self-efficacy - Expectancy for Success - Self-concept - Self-worth - Need for competence - Goal Orientation - Attributions - Anxiety 4. Interest: - Situational Interest - Need for Arousal - Flow 5. Caring: - Need for Relatedness	- Need for Autonomy - Utility value - Goal Setting - Self-efficacy - Expectancy for Success - Self-concept - Self-worth - Need for competence - Goal Orientation - Attributions - Anxiety - Situational Interest - Need for Arousal - Flow - Need for Relatedness

Note. Adapted from “Teaching motivation strategies using the MUSIC model of motivation as a conceptual framework” (p.128) by Brett Jones, 2016. In M.C. Smith, & N. DeFrates-Densch (Eds.), *Challenges and innovations in educational psychology teaching and learning*. Charlotte, NC: Information Age Publishing.

Coder training took place prior to the analysis. Two books, which were not included in the analysis, were analyzed simultaneously with the main investigator in order to familiarize the second coder with the coding procedure and terminologies of the underlying theories. The two coders discussed coding decisions and discrepancies during and after the coding process. As suggested by Ward (2012), a pilot test was also conducted to check initial reliability and coder agreement. The pilot test was conducted after initial coder training and before the study began. To do so, a third book in the field, which was also not included in the analysis, served as data for a test run for the main investigator and the second coder. The book was analyzed independently by both coders. Pilot reliability assessment showed 100% percentage agreement between the two

coders. Therefore, I concluded that there were no serious problems with coder training or the coding scheme itself.

This content analysis focused on manifest content; that is, messages that are objective, systematic, and quantitative (Berelson, 1952; Ward, 2012). Analyzed codes were present, easily observable, and countable. Either the code appeared and was discussed in the analyzed book, or it did not and, therefore, could not be counted. In the codebook, codes (e.g., self-efficacy) that were present in the book were coded as (O), whereas codes that were not covered were coded as (X). The coding criterion was concerned with whether coders agree on the precise values assigned to books on a given variable. Each pair of coded values was either a hit or a miss. Simple frequencies of the occurrences in the books have been conducted as an analysis technique (Neuendorf, 2017). In case of coder disagreement, the two coders re-evaluated the discrepancies post hoc and made a joint decision to whether to identify the code as present (O) or not (X).

To satisfy intercoder reliability standards, Holsti's method (1969) was used as a criterion. Intercoder reliability is the amount of agreement or correspondence on measured variables among two or more coders. Achieving acceptable levels of intercoder reliability is important to provide validation of the coding scheme, meaning that more than one coder can use the coding scheme as a measurement tool with similar results. High interrater reliability shows that the obtained ratings are not just based on the results of one rater's subjective judgement (Carletta, 1996; Tinsley & Weiss, 1975). The following formula was used to calculate the percentage agreement of the coders.

$$PA_O = 2A/(n_A + n_B)$$

In this formula PA_O represents the "observed proportion agreement" and A is the number of agreements between the two coders. The number of the cases coded by coders A and B is

represented by the symbols n_A and n_B . The values range from 0.00 (no agreement) to 1.00 (perfect agreement) (Holsti, 1969). The observed percentage agreement for each code (underlying theory) was calculated, as well as the overall averaged percentage agreement of all codes combined. In other words, intercoder reliability for each code and the overall reliability were analyzed.

Results

Representation of the MUSIC constructs. Overall, the analysis showed a strong overlap between the underlying MUSIC theories and the content covered in the sport psychology and coaching literature. This supports my proposal to test the MUSIC model as a holistic approach to motivate athletes. Thirteen out of 15 codes showed a representation of 52 % or more. Eight of the 15 codes even showed an overlap of 85% or more and four codes had perfect representations in the sports literature. The average representation was 84.61 %. Table 5 summarizes the analyzed codes and the overlap frequencies.

Need for autonomy, goal setting, need for competence, and need for relatedness. The codes “need for autonomy”, “goal setting”, “need for competence”, and “need for relatedness” had a perfect overlap, meaning that all of the analyzed books covered and discussed each of these underlying constructs. The perfect representation of the three codes “need for autonomy”, “need for competence”, and “need for relatedness”, which together comprise part of the theory of self-determination, comes as no surprise. As mentioned during the literature review, comprehensive approaches that tackle a variety of motivational needs are preferred in the coaching world and receive much attention. According to Hagger and Chatziantonis (2007), self-determination theory is the most utilized theory of motivation in athletics. As an identified macro theory (Standage & Ryan, 2012), self-determination theory focuses on the motivational needs of

learners and can serve as a foundation for coaches and practitioners to establish athletic environments in which athletes can cultivate their talent.

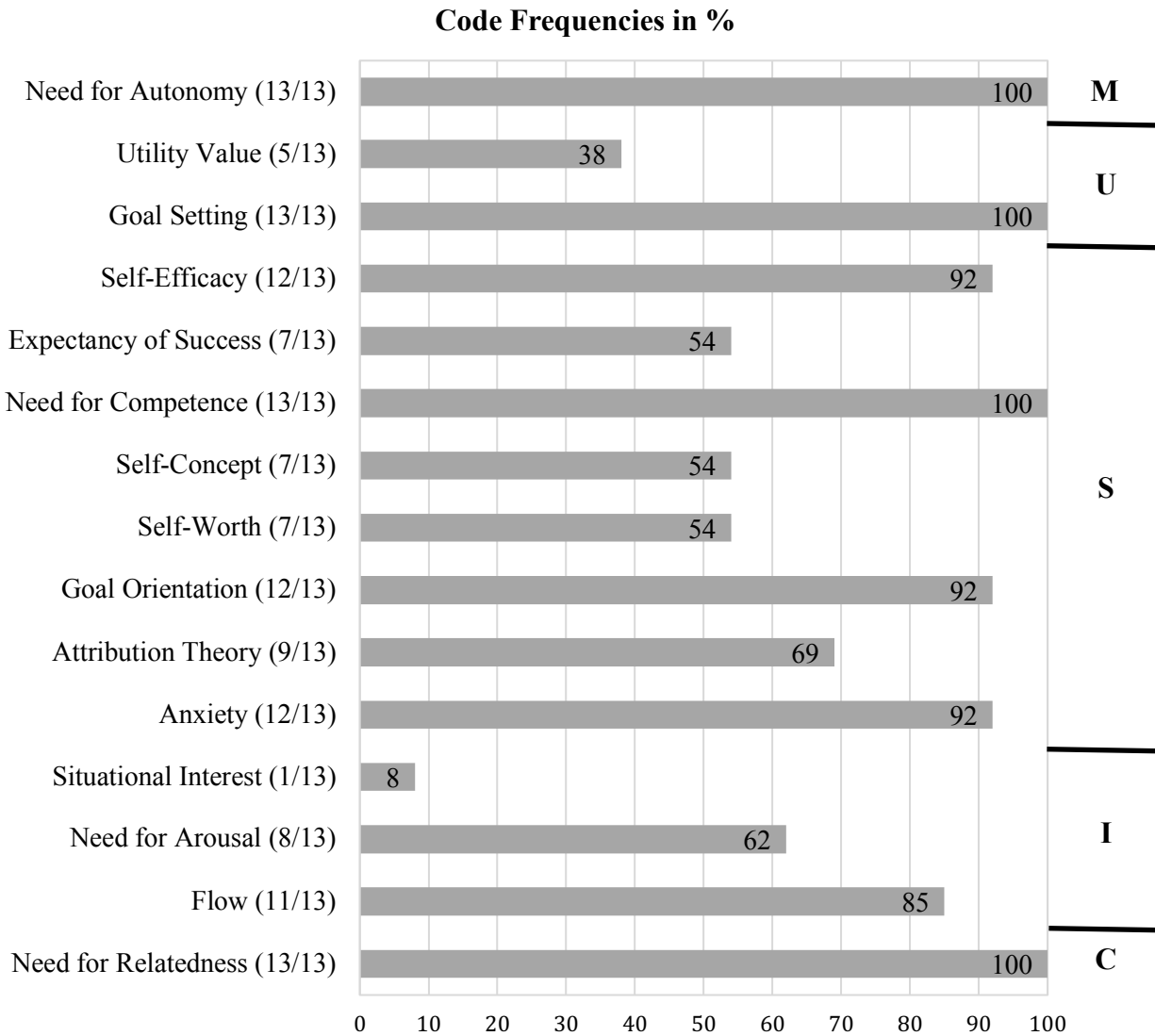


Figure 10. Code Frequencies of underlying MUSIC constructs

Goal setting is a mental technique that has been used since the end of the 19th century (Latham & Locke, 2007). The literature surrounding goal setting is impressive and extensive. Roberts and Kristiansen (2012) argue that every applied sport psychology textbook has a chapter about goal setting, explaining that goal setting is a powerful practical tool to enhance athletes’

motivation and self-confidence. The statement of Roberts and Kristiansen is supported by this content analysis. All of the thirteen textbooks in coaching and sport psychology I analyzed contained goal setting as a motivational enhancement technique. Goal setting is now one of the most active research areas in applied sport psychology and recent analyses have clearly supported the premise that goal setting consistently enhances performance in sport across athletic events and disciplines (see Burton & Weiss, 2008; Gould 2010).

Self-Efficacy, goal orientation, and anxiety. The codes “self-efficacy”, “goal orientation”, and “anxiety” showed 92% overlap, with 12 out of the 13 analyzed books covering the constructs and theories as part of their content. Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p.3). In sports, efficacy belief influences the amount of effort athletes will put forth when faced with difficulties. Efficacy belief can also have implications on absolute performance levels (Feltz, Chow, & Hepler, 2008; Gao, Kosmo, & Harrison, 2009; Gao, Xiang, Lee, & Harrison, 2008). As a result, sport psychologists and coaches have long been interested in researching the effects and impact factors of self-efficacy (Huber, 2013). A representation of 92% in this content analysis supports the importance of self-efficacy as a highly utilized theory in sports.

Goal orientation also deals with the perception of success. It is about how athletes think about their own competence and how they conceptualize their own ability. The word “goal” can be confusing because goal orientation is not about setting goals; it is about how athletes perceive and approach achievement situations (Cox, 2012). Over the years, research has shown the benefits of a mastery-focused motivational climate for athletes. Benefits associated with a mastery approach include increased satisfaction, perceived ability, heightened effort, greater

enjoyment, and enhanced perception of competence. (e.g. Abrahamsen, Roberts, & Pensgaard, 2008; Boixados, Cruz, Torregrosa, & Valiente, 2004). Therefore, I expected a high representation of goal orientation in the sports literature.

The third underlying theory with 92% representation in the sports literature was anxiety. Lazarus (2000) defines anxiety as an emotion based on facing uncertain and existential threats. It is a negative emotional state characterized by nervousness, worry, and apprehension. It is also associated with activation or arousal of the body (Spielberger, 1966). Anxiety is the emotion that has been investigated the most in the sports psychology research and is believed to have the most impact on athletic performance (Cox, 2012). Based on these findings, I conclude that anxiety, as a related construct of the MUSIC model, is well represented in the sports and coaching literature.

Attribution theory, need for arousal, and flow. The next most commonly identified theories were attribution theory with a representation of 69%, need for arousal with 62%, and flow with 85%. Attributions focus on how people explain and process their failures and successes. This can affect their expectations and emotional reactions, which in turn impact future achievement motivation and performance (Biddle, Hanrahan & Sellars, 2001; Weiner, 1986). As mentioned in the preceding literature review, attributions are important for self-efficacy (Bond, Biddle, & Ntoumanis, 2001; Coffee & Rees, 2009; Gernigon & Dolloye, 2003), persistence (Le Foll, Rascle, & Higgins, 2008; Rudisill & Singer, 1988), and performance (Coffee, Rees, & Haslam, 2009; Gordon, 2008) in competitive sport settings. However, research of attribution theory in competitive sport settings has been limited in recent years. In addition, attribution retraining, attributions in team environments, or the impact on coach attributions have been ignored. Although the representation of attribution theory is high (nine out of 13 books), the

limited research in competitive sport settings could be a reason why the representation is not higher.

The code “need for arousal” shows a slightly lower representation with eight books. In sports, arousal deals with the psychological and physiological activation of the athlete. From a cognitive perspective, the right level of arousal is necessary in order for athletes to process incoming stimuli. Stimuli include coaching feedback, positions of players, or kinesthetic cues that are necessary for successful motor patterns. High motivation is achieved if appropriate psychological and physiological activation levels are given in order to attend to incoming stimuli. For instance, with too little arousal athletes do not pay attention to feedback and performance cues. Nor do athletes attend to feedback or performance cues with too much arousal (Huber, 2013). The relationship between arousal, anxiety, and emotional states on the one hand and performance on the other, is a very compelling relationship that sport psychologists studied in recent years (Weinberg & Gould, 2011). However, instead of looking at arousal from a motivational perspective, several of the identified books of this content analysis focus more on the relationship between anxiety and performance as a consequence of high arousal levels (e.g. Tenenbaum & Eklund, 2007). This could explain a relatively lower representation of 62% in this content analysis.

Often connected to the experience of peak performance is the psychological construct of flow. Flow is defined as “the state in which people are so involved in an activity that nothing else seems to matter” (Csikszentmihalyi, 1990, p.4). The individual most responsible for applying the principles of flow to sport is Susan Jackson. Through their research, Jackson and Csikszentmihalyi have investigated a variety of elements that make sport activities intrinsically more interesting and engaging (see Jackson & Csikszentmihalyi, 1999). Early research has

already shown that athletes who experience flow have higher self-confidence before performances (Catley & Duda, 1997), lower anxiety levels, and are more likely to have a task goal orientation (Jackson, Kimiecik, Ford & Marsh, 1998; Jackson & Roberts, 1992). Overall, flow is an integral and essential theory of the sport and coaching literature due to its positive influence on peak performance and intrinsic motivation.

Self-concept, self-worth, expectancy of success, and utility value. The next most common group of constructs includes self-concept, self-worth, and expectancy of success showed a representation of 54%, whereas the construct utility value was represented in 38% of the analyzed books. In psychology, it is hard to imagine a topic that has generated more interest than the self (Fox & Wilson, 2008). Self-concept is a description of “the individual as known by the individual” (Murphy, 1947, p.996). It includes relevant abilities, qualities, norms, morals, roles, and responsibilities. Self-worth, on the other hand, concerns individuals’ emotions, affects, or feelings about themselves. It can be seen as an affective or emotional reaction to the self (Schunk, Pintrich, & Meece, 2008). Self-concept is more of a self-description, whereas self-worth is more of a long-term self-rating (Fox, 2000). Given that sport and exercise activate the physical system of the body, it becomes obvious that the physical self has been prominent in developments of self-concept or self-worth theory. For instance, Marsh and Perry (2005) investigated the impact of self-concept on championship performance with elite swimmers and the results showed that the effect of global swimmer self-concept on championship performance was significant. In terms of self-worth, research illustrated that self-critical perfectionism ensures that the establishment and maintenance of self-worth through athletic performances remains a concern. Contingent self-worth is a feature of negative forms of perfectionism, which can ultimately lead to perceived failure and burnout (e.g., Stoeber, Kempe, & Keogh, 2008; Sturman,

Flett, Hewitt, & Rudolph, 2009) and Hill, Hall, Appleton, and Kozub (2008) demonstrated that self-worth mediated the relationship between dimensions of perfectionism and burnout in a group of elite junior soccer players. However, the constructs of self-worth and self-concept have been criticized in the past. For instance, Elliot and Dweck (2007) point out in their handbook of motivation that researchers have not agreed on concrete operational definitions for the two constructs. Furthermore, they state that researchers have not outlined the tenets of the constructs as Bandura has done for self-efficacy. This could explain the results of this analysis that more books in the realm of sports put their emphasis more on self-efficacy instead of self-concept and self-worth. Not only does self-efficacy provide richer operational definition but it also correlates more directly with performance attainments (Gilson & Feltz, 2012), which is the predominant interest in competitive sports settings.

The constructs of expectancy of success and utility value are parts of the overarching expectancy-value theory. As mentioned in the literature review, the theory was formulated by Eccles and her colleagues and embraces a multidimensional view of achievement choices and behaviors (Eccles et al., 1983; Eccles, Wigfield, & Schiefele, 1998; Wigfield & Eccles, 1992, 2000). Expectancies of success reflect the question “Can I do this task?” (Eccles et al., 1998). Therefore, success expectancies are very similar to efficacy beliefs or confidence in being good at an achievement activity (Weiss & Amorose, 2008). This could explain the relatively lower representation of the concept expectancy of success in the sports literature. For instance, the analyzed book “Foundations of Sport and Exercise Psychology” by R. Weinberg and D. Gould (2011) mainly focuses on self-efficacy theory and Vealey’s (2001) sport confidence model and does not cover expectancy-value theory. Utility value, on the other hand, is an element of the subjective task value, which is the second major determinant of achievement choices and

behaviors in the expectancy-value theory. The subjective task value addresses the question “Do I want to do this task and why?” More specifically, utility value explains the perceived usefulness of an activity in relation to short- and long-term goals (Eccles et al., 1998). Although Huber (2013) and Weiss and Amorose (2008) point out the importance of utility value for motivating athletes, only limited research has investigated subjective task values in competitive sport settings. Stuart (2003) identified sources of utility value and the importance of sports in adolescents and Cox and Whaley (2004) reported that high school student-athletes’ perceptions of usefulness were positively correlated with effort and persistence in basketball. However, no study in the analyzed books could be identified that specifically analyzes utility value in peak performance settings. Further research is necessary to provide empirical evidence that the utility value within expectancy-value theory can play a role in elucidating peak performance in sport. Overall, the relatively lower representations of expectancy of success and utility value line up with the conclusions of the literature review in Chapter 2.

Situational interest. Lastly, the code situational interest showed the lowest representation. Only one of the analyzed books covered the underlying construct within its content. Interest as a motivational variable refers to the psychological state to interact with objects, events, or ideas over time. More specifically, situational interest is the temporary engagement in an activity based on curiosity and activation through the environment (Hidi & Renninger, 2006). Although, Huber (2013) talks about the importance of the concept and how it relates to intrinsic motivation in sports, the concept has not been introduced to the main sport literature yet. Only a few studies in the realm of physical education have investigated the effects of situational interest on motivation (e.g., Ding, Sun, & Chen 2013) but no study could be found analyzing the concept in competitive sports settings. However, the main literature does cover

connected constructs that are closely related to the concept of situational interest. For instance, the sports literature does analyze the concept of attention in great detail (see Wulf, 2007). It can be argued that attention and its positive impact on concentration, motivation, and motor skill learning is triggered by higher levels of situational interest (Schunk et al., 2008; Weinberg & Gould, 2011). As a result, the lack of representation of situational interest in the sports literature could be explained by differences in terminologies (attention/concentration vs situational interest), as well as the novelty of the construct in the field of education. Based on personal experience I argue that the application of the concept in competitive sports would lead to fruitful results due to the relatedness to other constructs, which have already led to impactful findings.

Reliability and coder discrepancies. Given that the goal of this analysis was to objectively identify the MUSIC components in the sport psychology and coaching literature, reliability of the coding process was paramount. Without the establishment of reliability, the applied measure could not be considered valid (Neuendorf, 2017). Based on Holsti's method (1969), the overall PA_O of all analyzed variables is .94. PA_O stands for "proportion agreement, observed" between two coders. This criterion is concerned with whether the two coders agree on the values assigned to cases on a given variable (Neuendorf, 2017).

According to Riffe et al. (1998) the minimum reliability indices requirement was suggested to be higher than .70 and Kassarian (1977) stated that the lowest acceptable level of coefficients of reliability should be above .80. The value of .94 that was obtained in the present study can therefore be interpreted as good. Due to the thorough coder training and the relative straight forward analysis process, high percentage agreements between the two coders were expected. Table 6 shows the overall and the individual percentage agreements of the coders, as well as the coded values for every variable within each book.

Table 6

Summary of Coder Agreement Coefficients, Coder Discrepancies, and Frequency Statistics for all analyzed codes in identified books

		Codes														
		NfA	UV	GS	SE	EoS	NfC	SC	SW	GOT	AT	A	SI	NfAr	F	NfR
Books	1	Coder1	O	X	O	O	X	O	X	O	O	O	X	X	O	O
		Coder2	O	X	O	O	O	O	X	O	O	O	X	X	O	O
	2	Coder1	O	O	O	O	O	O	O	O	O	O	X	X	O	O
		Coder2	O	O	O	O	O	O	O	O	O	O	X	X	O	O
	3	Coder1	O	X	O	O	O	X	O	O	O	O	X	O	O	O
		Coder2	O	X	O	O	X	X	O	O	O	O	X	O	O	O
	4	Coder1	O	O	O	O	O	O	O	O	O	O	X	O	O	O
		Coder2	O	O	X	O	O	O	O	O	O	O	O	O	O	O
	5	Coder1	O	X	O	O	X	O	X	X	O	O	X	X	X	O
		Coder2	O	X	O	O	X	O	X	X	X	O	X	X	X	O
	6	Coder1	O	X	O	O	O	O	X	O	O	O	X	O	O	O
		Coder2	O	X	X	O	O	O	X	O	O	O	X	O	O	O
	7	Coder1	O	X	O	O	X	O	O	O	O	O	X	O	O	O
	Coder2	O	X	O	O	X	O	O	O	O	O	X	O	O	O	
8	Coder1	O	X	O	O	X	O	O	X	O	O	O	O	O	O	
	Coder2	O	X	O	O	X	O	O	X	O	O	X	O	O	O	
9	Coder1	O	O	O	O	O	O	O	X	O	X	O	X	X	O	
	Coder2	O	O	O	O	O	O	O	X	O	O	X	X	X	O	
10	Coder1	O	X	O	O	O	X	O	X	X	O	X	O	O	O	
	Coder2	O	X	O	X	O	X	O	X	X	O	X	O	O	O	
11	Coder1	O	O	O	O	O	O	X	O	O	X	X	X	X	O	
	Coder2	O	X	O	O	O	O	X	X	O	X	X	X	X	O	
12	Coder1	O	O	O	O	O	O	O	O	X	O	X	O	X	O	
	Coder2	O	O	O	O	O	O	O	O	X	O	X	O	X	O	
13	Coder1	O	X	O	O	X	O	X	X	O	O	X	O	O	O	
	Coder2	O	X	O	O	O	X	X	O	O	O	X	O	O	O	
Univariate Frequencies		100%	38%	100%	92%	54%	100%	54%	54%	92%	69%	92%	8%	62%	85%	100%
Intercoder Reliability (per Code)		1.00	0.92	0.85	0.92	0.77	1.00	1.00	0.92	0.92	0.92	1.00	0.85	1.00	1.00	1.00
Overall Reliability		0.94														

Note. The symbol O represents codes that are represented in the analyzed book. X stands for codes not represented in the analyzed book. Colored fields represent code discrepancies between the two coders. Dark colored grey fields show included codes in analyzed book after second analysis. Light colored grey fields show excluded codes after second analysis.

Good overall coder agreements show functioning operational instructions and coder training, as well as functioning choices of variables (Krippendorff, 2013). The percentage agreement coefficients for each of the individual codes ranged from .77 to 1.00. The code expectancy of success showed the most discrepancies between the two coders with a percentage agreement of .77, whereas the codes need for autonomy, need for competence, self-concept, anxiety, need for arousal, and need for relatedness demonstrated perfect agreement between the two coders.

Overall, 12 coding discrepancies were identified after the first analysis. The grey colored fields in table 6 show the identified differences. The two coders conducted a second analysis of the initial identified discrepancies. After a second combined analysis, five codes were diagnosed as present (O). The dark grey colored fields illustrate the included codes, whereas the light grey colored fields represent the excluded codes. The two coders analyzed the 12 codes together and discussed the differences and possible solutions. For instance, during the first coding process the coders disagreed on whether to assign the code “goal setting” as a present code in Jeffrey Huber’s book “Applying Educational Psychology in Coaching Athletes”. After a second analysis, the two coders made the decision to identify the code as present (O) in the book. Although, Huber does not assign a chapter to goal setting, he does talk about the importance of having specific goals for each practice session in his chapter about deliberate practice (p. 222). In this part of the book he clearly describes a possible goal setting process in sports and how coaches can improve all aspects of their practice through the implementation of setting specific standards. He further describes how goal setting can create purpose and meaning to the elite athlete, a proposition which is directly related to the usefulness component.

Conclusion. This content analysis showed that the majority of the underlying theories of the MUSIC[®] Model of Motivation were represented well in the sport psychology and coaching literature. Therefore, I argue that the MUSIC[®] Model of Motivation should be used and tested in the field of competitive sport settings. The findings support the idea that the MUSIC model has the potential to serve as a holistic framework for coaches to design and plan seasons and practice sessions. The MUSIC model is built on a strong foundation of motivational theories and constructs from a multitude of backgrounds, which are overwhelmingly represented and tested in a variety of competitive sport and coaching settings.

Chapter 4

Study 2: Developing the MUSIC Model of Athletic Motivation Inventory

The purpose of the second study was to revise the MUSIC® Model of Academic Motivation Inventory to create a new MUSIC® Model of Athletic Motivation Inventory.

Participants

I surveyed Division 1 student-athletes from a large land-grant university. The subject pool included 532 student-athletes who were members of the baseball, women's basketball, men's basketball, football, men's golf, women's golf, lacrosse, women's soccer, men's soccer, softball, swimming & diving, men's tennis, women's tennis, track and field, volleyball, wrestling, and spirit programs teams.

Sampling

The sampling method was based on convenience sampling as a non-probability sampling method that relies on data collection from a specific population. I chose this sampling method due to the limited number and specific characteristic of the student-athletes population. The IRB was submitted to the review board at the institution before collecting the data and conducting the analysis.

Recruitment Method

I received the email lists of the student-athletes through the Athletic Department. A recruitment email was sent out as well as one reminder email two weeks after the first email. The survey was filled out online and distributed through a link via email. At the start of the survey, students were informed about the purpose and duration of the survey. Participation was voluntary. The students were able to complete the online survey in any place where they had

access to the Internet, at a time of their choosing. I estimate that it took less than 10 minutes, on average, for participants to complete the online survey.

Record of Data and Possible Risks

Data was collected through a Qualtrics online survey. All student-athletes received the same questions. Data was collected and recorded electronically. The data files were stored on the researchers' password-protected computers. There were no physical, legal, or economic risks to participating in the survey. There were no social or dignity risks, as the survey was anonymous, and coaches and other members of the team did not see the results, nor did they know who took the survey. The only emotional risk that could possibly result was if, through self-reflection while taking the survey, the athletes discovered that they did not put in maximal effort or that their team did not meet their motivational needs. The risk that this reflection emotionally harmed the student-athletes was very low.

Instruments

Using the original college student version of the MUSIC[®] Model of Academic Motivation Inventory (Jones, 2012) with its underlying constructs as a guide, I modified the items of the inventory to assess athletes' perceptions of their athletic environments in relationship to the MUSIC components. I used my experience as a coach and former student-athlete to ensure that a variety of items that sufficiently cover the breadth and depth of each of the five MUSIC constructs were included. The new sport specific athletes' inventory for the MUSIC model was developed in close collaboration with Dr. Brett Jones. His expertise in the realm of motivation research and my experience as a former student-athlete and coach guided the developmental process of MUSIC Athletic Inventory items.

After Brett Jones and I agreed on an initial set of items, two college student-athletes and one college coach analyzed the items to identify any possible understanding and interpretation issues. The inventory included the same 6-point Likert-type scale as the original MUSIC Academic Inventory, which was labeled at each point: *1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, 6 = strongly agree*. The items were grouped to form a scale for each of the MUSIC components. That is, some items were averaged to create a mean score for the empowerment scale, other items were averaged to obtain a usefulness scale, etc.). Overall the first version consisted of 31 items. In contrast to the MUSIC[®] Academic Inventory (Jones, 2012), we decided to separate the usefulness component into two parts. The two usefulness components were labeled “usefulness performance” and “usefulness personal”. The items of usefulness performance scale targeted the extent to which the practice environment, resources, and coaches’ feedback are fruitful for the athletic development of the athletes, whereas the items of the usefulness personal scale focused on the personal development of the student athletes based on taught life lessons, norms, and values that were taught. We included the personal usefulness component because much of the educational interest in competitive sports relates to the notion of transfer of learning from the physical to other learning and life contexts (see Jones, 2006; Orlick, 2016). We also assumed that if athletes perceived their athletic environment as useful to their personal and emotional development it would be more likely that they would be engaged and buy into the mission and activities of their program.

Example items of all the constructs included: “My coaches are flexible in allowing me to individualize my practice” (empowerment), “In general, the practice sessions are useful for my performance development” (usefulness performance), “The life lessons I learn from my coach are useful to me” (usefulness personal), “I am confident that I can succeed in practice” (success),

“The exercises in practice are engaging” (interest), “My coaches are willing to assist me if I need help in practice” (caring).

Data Analysis

With the first sample, an exploratory factor analysis (EFA) was performed to provide evidence of construct validity. EFA is a data reduction technique in which the relationships among items are reduced to one or more abstract concepts called factors. It generates a matrix of factor loadings (Λ) that best explain the correlations among the input indicators (Brown, 2015). The reduced set of underlying variables accounts for the differences in the items. The reduced set is the factor solution, which illustrates the construct being measured. As a result, results of the EFA are typically used to reduce the number of items (Netemeyer et al., 2003). It was my goal to use the EFA to spot problematic items and to use the findings to revise and improve the first version of the MUSIC[®] Athletic Inventory. Principal Axis Factoring (PAF) with Promax Rotation and Kaiser Normalization was performed. Such a method analyzes common variance and distinguishes between observed and latent variables. The distinction also implies that each indicator contains an error term that reflects unique variance (Kline, 2016). Other methods, such as Principal Component Analysis (PCA), do not distinguish between unique variances, which can lead to inflated factor loadings (Costello & Osborne, 2005). Due to the fact that the MUSIC components have been shown to be correlated, an oblique Promax rotation was utilized, which correlates all factors on multiple dimensions. This method rotated the values on a third plane, showing correlations through a third dimension. The rotation method enhances the interpretability of the retained factors (Kline, 2016).

After I conducted list-wise deletion for missing values, I was able to include 122 participants. In terms of sample size, there are different rules of thumb. For instance, Gorsuch

(1983), Kline (1979), and MacCallum and colleagues (1999) recommend a sample size of at least 100, which was met with my sample size of 122. Other researchers recommend subject-to-variable ratios, which for my sample was 6:1 (122 subjects for 20 items). For example, Garson (2008) proposed that there should be at least 10 cases for each item in the instrument being used, whereas Bryant and Yarnold (1995) propose a subject-to-variable ratio of no lower than five. Given these varied criteria, I was able to exceed the minimum requirements of sample size.

Results and Discussion

The EFA using principal axis factoring and a Promax rotation with Kaiser normalization produced three factors with eigenvalues greater than 1 and it explained 73.0% of the variance. The determinant of the correlation matrix was acceptable ($< .001$), the .93 value for the Kaiser-Meyer-Olkin measure of sampling adequacy was marvelous (Kaiser, 1970, 1974), and the Bartlett test of sphericity was statistically significant ($\chi^2[190] = 2,274.7, p < .001$). The values for the pattern matrix for the 20 items included in the analysis are provided in Table 7. The magnitude of the pattern coefficients for each factor was generally excellent and none of the cross-loadings were greater than .30. The Cronbach's alpha coefficients ranged from good to excellent ($\alpha = .87$ for empowerment, $\alpha = .94$ for usefulness, $\alpha = .84$ for success, $\alpha = .86$ for interest, and $\alpha = .92$ for caring).

Table 7
Pattern Matrix for the EFA

	Factors		
	1	2	3
M2	.941		
C6	.840		
C1	.831		
M4	.826		
M3	.775		
C4	.760		
M1	.593		
C2	.587		
U1		.919	
U2		.916	
U5		.913	
U4		.757	
I3		.710	
I5		.492	
I2		.482	
I1		.392	
S2			.855
S1			.817
S4			.635
S5			.395

Note. Only coefficients greater than .3 are shown.

The descriptive statistics and correlation matrix for the three factors are provided in Tables 8 and 9. Item I1 had the highest average rating with a value of 5.28 and the lowest standard deviation with .77, whereas the item M3 had the lowest average rating with 3.79. Question C6 showed the highest standard deviation with a range of 1.635. The construct Success displayed the highest overall mean with a value of 4.91 and empowerment showed the lowest average with 4.37. The correlations between the three factors shown in Table 7 ranged between .557 and .783.

Table 8
Means and Standard Deviations for the EFA

Descriptive Statistics EFA			
	M	SD	N
M1	4.22	1.540	120
M2	4.63	1.271	120
M3	3.79	1.629	120
M4	4.84	1.270	120
UP1	4.96	1.141	120
UP2	4.90	1.273	120
UP4	4.48	1.523	120
UP5	4.60	1.325	120
S1	5.08	0.922	120
S2	4.89	1.052	120
S4	4.69	1.165	120
S5	4.98	1.025	120
I1	5.28	0.788	120
I2	4.37	1.372	120
I3	4.68	1.189	120
I5	4.35	1.294	120
C1	4.84	1.167	120
C2	4.83	1.218	120
C4	4.53	1.593	120
C6	3.98	1.635	120

Note. Likert scale values ranged from 1 to 6.

The factors are moderately correlated, which is consistent with prior research of the MUSIC model (e.g., Jones & Wilkins, 2013). Correlations below .8 also show good discriminant validity between the three factors and suggests that a more parsimonious solution should not be obtained (see Brown, 2015). In an attempt to improve the EFA, we took out items UP3, S3, I4, C3, and C5. These items did not load on the anticipated factors. For instance, item S3 asks student-athletes whether the practice tasks and exercises have the appropriate level of difficulty for them to develop athletically. This item did not load on the same factor with the other success

items, but instead loaded on the factor of usefulness performance. The other success items focused more on the perception of confidence, as well as mental and physical levels of preparation. As a result, we decided to take out item S3.

Table 9
Factor Correlation Matrix of EFA

Factor Correlation Matrix			
Factor	1	2	3
1	1.000	.783**	.557**
2	.783**	1.000	.572**
3	.557**	.572**	1.000

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

In addition to deleting the above-mentioned items, we also removed all of the items related to the usefulness development construct. Although four of the items loaded nicely on one factor we excluded the items of the construct for conceptual and theoretical reasons. The usefulness component for personal development focuses on life lessons, norms, values, and interpersonal relationships that are beneficial for the holistic development of athletes. Compared to the other constructs the usefulness component of personal development does not directly target a motivational need for athletic peak performance. In addition, the construct goes beyond the mere relationship between athletes, coaches, and their intermediate practice environment. For instance, within an athletic department other support staff such as academic support staff, career advisor, and administrators could influence this factor. Although we believe that coaches' behavior has an impact on this factor, many other variables could influence this construct as well. This does not line up with the overall goal to develop a motivational questionnaire for coaches to assess athletes' motivational needs in order to foster high levels of motivation in peak performance settings.

As shown in Table 7, the results of the remaining analyzed questions indicate that the items loaded on the anticipated factors with two notable differences: the empowerment and caring items loaded on the same factor (Factor 1) and that the usefulness and interest items loaded on the same factor (Factor 2). These results suggested at least two possible explanations.

Conceptual similarities. First, it is possible that student-athletes do not discern the differences between empowerment and caring, or between usefulness and interest in the same way as students in academic environments. For the overlap between empowerment and caring, it could be the case that athletes in competitive settings are not used to autonomy-supportive coaching (as measured by the empowerment items). Based on my personal experience as a former-student athlete, coaches still embrace autocratic coaching philosophies built on controlling coaching behavior. In addition, autonomy-supportive coaching might also be restricted due to NCAA regulations, such as limited practice hours. Some athletes in peak performance environments might not value empowerment as an important motivational need or might not be familiar with it. Table 2 also shows that the construct of empowerment has the lowest overall mean of all constructs with a value of 4.37. Although, extant findings support the importance of autonomy in peak performance settings (see Standage, 2012), one study in sports psychology yielded results that did not support the predictions of autonomy-supportive coaching (Chantal et al., 1996). These researchers examined motivational profiles of elite Eastern European athletes and showed that less autonomous forms of extrinsic motivation were associated with better performances. Even though the authors commented that the communist structure of the sports system could have influenced the data and many other studies show the importance of empowerment in coaching (e.g., Pelletier et al., 2001), it is plausible that some

athletes are unfamiliar with the concept of autonomy, and therefore, associate it with caring behavior of their coaches.

The constructs of usefulness and interest also loaded on the same factor. Athletes might perceive these constructs as interdependent. In the books “The Champion’s Mind” (2014) and “Peak: Secrets from New Science of Expertise” (2016), the authors Jim Afremow, Anders Ericsson, and Robert Pool illustrate that peak performance athletes embrace a growth mindset and experience fulfillment out of the process of cultivating their full potential as athletes. Peak performers are stimulated by the process of getting better and enjoy optimizing details in their environment that could help them improve their performance. One can assume that it is likely that the two constructs of interest and usefulness are closely connected and interdependent. Athletes might seek out for exercises and instructions that are beneficial for their performance development, which ultimately spike their situational interest and attention. As a result, if athletes perceive exercises as useful for their performance development they are also interested in them because of their desire to cultivate their potential. Further research has to show whether the components of interest and usefulness can be used interchangeably at the peak performance level.

Format of items. Another explanation for the overload on factor 1 and 2 is that the items did not differentiate between the MUSIC components sufficiently. For example, only the empowerment and caring items begin “My coaches...” Perhaps the format and language of these questions had an effect on students’ responses. In the MUSIC® Model of Academic Motivation Inventory, only the caring items begin with “My teachers,” the empowerment items do not include the word “teachers.” Possibilities of changing the items for the next version of the MUSIC® Model of Athletic Motivation Inventory were discussed with Brett Jones, athletes, and

coaches. An adjusted version of the MUSIC[®] Model of Athletic Motivation Inventory based on the findings of the EFA is presented in Study 3, which is explained in the next section.

Chapter 5

Study 3: Providing Validity Evidence for a Revised MUSIC® Model of Athletic Motivation Inventory

The purpose of Study 3 was to make modifications to the first version of the MUSIC Athletic Inventory based on the results of Study 2 and to re-test it by collecting more data and conducting a confirmatory factor analysis (CFA).

Participants and Data Collection

The process of the data collection for the CFA was similar to the one used in Study 2. Characteristics of participants, sampling method, recruitment method, as well as the recording of data was identical to the procedures of the first data collection. An updated version of the MUSIC® Model of Athletic Motivation Inventory was sent out to the Athletic Department at the same university in May of 2017, two years after the first version of the inventory was sent out. For the second data collection, I was able to increase the sample size compared to Study 2 and 160 student-athletes participated in Study 3.

Modifications of the MUSIC® Model of Athletic Motivation Inventory

Based on the findings of Study 2, I worked with Brett Jones to make adjustments to the MUSIC® Athletic Inventory. In addition, I consulted with two student-athletes to further revise the language of the problematic items. The content and the language of the items was assessed and revised on an item-by-item basis for the loadings of the factors that were not adequate in the EFA. A common social science practice for selecting factor values uses a minimum cut-off of .3 (Garson, 2008), whereas other rule-of thumbs indicate that loadings of .5 or higher indicate a desirable and stable factor (Costello & Osborne, 2005). My goal was to achieve the more stringent factor loadings of .5 or higher as suggested by Costello and Osborne (2005). One of the

main goals of Study 3 was to design items that would separate the eMpowerment items from the caring items and separate the usefulness items from the interest items in the CFA.

eMpowerment and caring. We speculated that the construct of eMpowerment and caring loaded together in Study 2 due to the usage of similar language in the items. All items of the two constructs started with the words “My coaches...” We decided to rephrase the beginning of all the eMpowerment items to avoid this similarity. For instance, instead of using “My coaches allow me to give input about my practice” we changed the sentence structure to “I am encouraged to give feedback to my coaches about practice.” As a result, we altered the beginning of the items from “My coaches...” to “I...” for all of the eMpowerment items. We hoped that the changes in the language structure would allow the student-athletes to perceive their learning environment from a caring perspective, as well as autonomy perspective.

Usefulness performance and interest. The results of the EFA in Study 2 showed that the items of usefulness and interest loaded together on Factor 2. Based on the results of Study 2 and the findings in the literature on expert performers in athletics, we concluded that the two constructs could have loaded together because athletes might be more likely to pay attention to exercises and learning environments if they perceive those as useful to their performance development. Therefore, for the items in Study 3, we put more emphasis on emotional, rather than cognitive, aspects of interest. We believed that doing so may make further distinctions between the usefulness and interest components. Consequently, the revised interest items focus on excitement, fun, energy, and passion rather than the cognitive aspects of attention and concentration. For instance, many of the exercises at the peak performance level are tedious and demanding. Athletes might perceive them as helpful for their performance development and

therefore pay attention to them and show engagement. However, we also hypothesize that a fun, energizing, and exciting learning environments can lead to higher levels of motivation.

Items below .5. According to the findings of the EFA in Study 2, I planned to revise problematic items that showed factor loadings of less than .50. Items I1 (.392) and S5 (.395) showed factor loadings below the .50 threshold. Item I1 was already changed due to the emphasis on the emotional aspects of interest. The item changed from “I pay attention in practice” to “I enjoy participating in practice.” The other item, Item S5, “I feel physically prepared for the athletic challenges I face” appeared to be too confusing for the student-athletes. During a consulting session with two student-athletes it became apparent that the athletes had difficulties to understand the meaning of “physical preparedness.” For instance, physical preparedness could be interpreted differently for a wrestler with weight class limitations, compared to athletes in sports without those limitations. As a result, we decided to simplify this item to “I am capable of succeeding in my sport.”

Data Analysis

To test the revised inventory, we performed a CFA. EFA is generally a more descriptive and exploratory process, whereas in CFA the researcher has to pre-specify all aspects of the factor model, such as the number of factors and the pattern of indicators. CFA is typically used in later stages of scale development after underlying features have been established by prior EFA, as well as on theoretical grounds (Brown, 2015; Kelloway, 1995). The CFA enabled me to test the hypotheses of the factor structure and model fit by using inferential techniques. I used LISREL 9.8 to compute the fit indices of the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). Using values suggested by Hu and Bentler (1999), I interpreted CFI values above .90

as reasonable fits and values above .95 as good fits. SRMR values also vary between 0 and 1. With lower values indicating better fit. Byrne (2001) argues that values less than .05 indicate good model fit and values less than .1 represent a reasonable fit of the model (Kline, 2016). With the RMSEA, lower values also indicate a better fit. Values less than .08 indicate reasonable fit and values less than .05 indicate good fit (Browne & Cudeck, 1993; Bryne, 2001; Kline, 2016).

Results

Score reliability. The internal consistency reliability, or the degree to which responses are consistent across items, showed good results for the five factors of the MUSIC[®] Athletic Inventory. Based on the criteria proposed by Kline (2016), Cronbach's alphas were very good for empowerment and success and excellent for usefulness, interest, and caring: empowerment $\alpha = .85$; usefulness $\alpha = .92$; success $\alpha = .85$; interest $\alpha = .91$; caring $\alpha = .92$. Overall, the Cronbach's alphas indicate that the scales are reliable, which does not limit possible correlations among the five factors of the MUSIC model.

Construct validity. I conducted a CFA to analyze how the items of the MUSIC[®] Athletic Inventory fit the structure of the five MUSIC model components. The analysis showed that items fit the underlying model well. The following values indicated a good model fit. The CFI showed a value of 0.97. The fit index ranges from 0-1 with values greater than .90 indicating a relatively good fit and values of .95 or higher representing a good model fit (Hu & Bentler, 1999; Kline, 2016) The root mean square error of approximation (RMSEA) of this analysis had a value of 0.088. The RMSEA also ranges from 0 to 1 and values between .05 and .08 represent a reasonably good fit (Browne & Cudeck, 1993; Byrne, 2001; Kline, 2016). The SRMR had a value of 0.07. The values range from 0 to 1 as well and represent the average residuals between

the observed and hypothesized covariance matrix. Values between .05 and .08 represent a reasonably good fit (Browne & Cudeck, 1993; Byrne, 2001; Kline, 2016).

Table 10
CFA Factor Loadings – Completely Standardized Solution

Items	M	U	S	I	C
M1	0.84	--	--	--	--
M2	0.87	--	--	--	--
M3	0.63	--	--	--	--
M4	0.68	--	--	--	--
U1	--	0.91	--	--	--
U2	--	0.88	--	--	--
U3	--	0.85	--	--	--
U4	--	0.83	--	--	--
S1	--	--	0.83	--	--
S2	--	--	0.74	--	--
S3	--	--	0.76	--	--
S4	--	--	0.74	--	--
I1	--	--	--	0.89	--
I2	--	--	--	0.85	--
I3	--	--	--	0.88	--
I4	--	--	--	0.75	--
C1	--	--	--	--	0.85
C2	--	--	--	--	0.88
C3	--	--	--	--	0.86
C4	--	--	--	--	0.89

Note. Abbreviations: M = eMpowerment; U = Usefulness; S = Success; I = Interest; C = Caring

Table 10 shows the standardized solution of the computed CFA. The factor loadings were good and ranged from .63 to .91. Of the 20 items, only two questions were less than .74 and 14 items had factor loadings of .83 or higher. The hierarchical intercorrelated five-factor structure with the unstandardized solution can be seen in Figure 10.

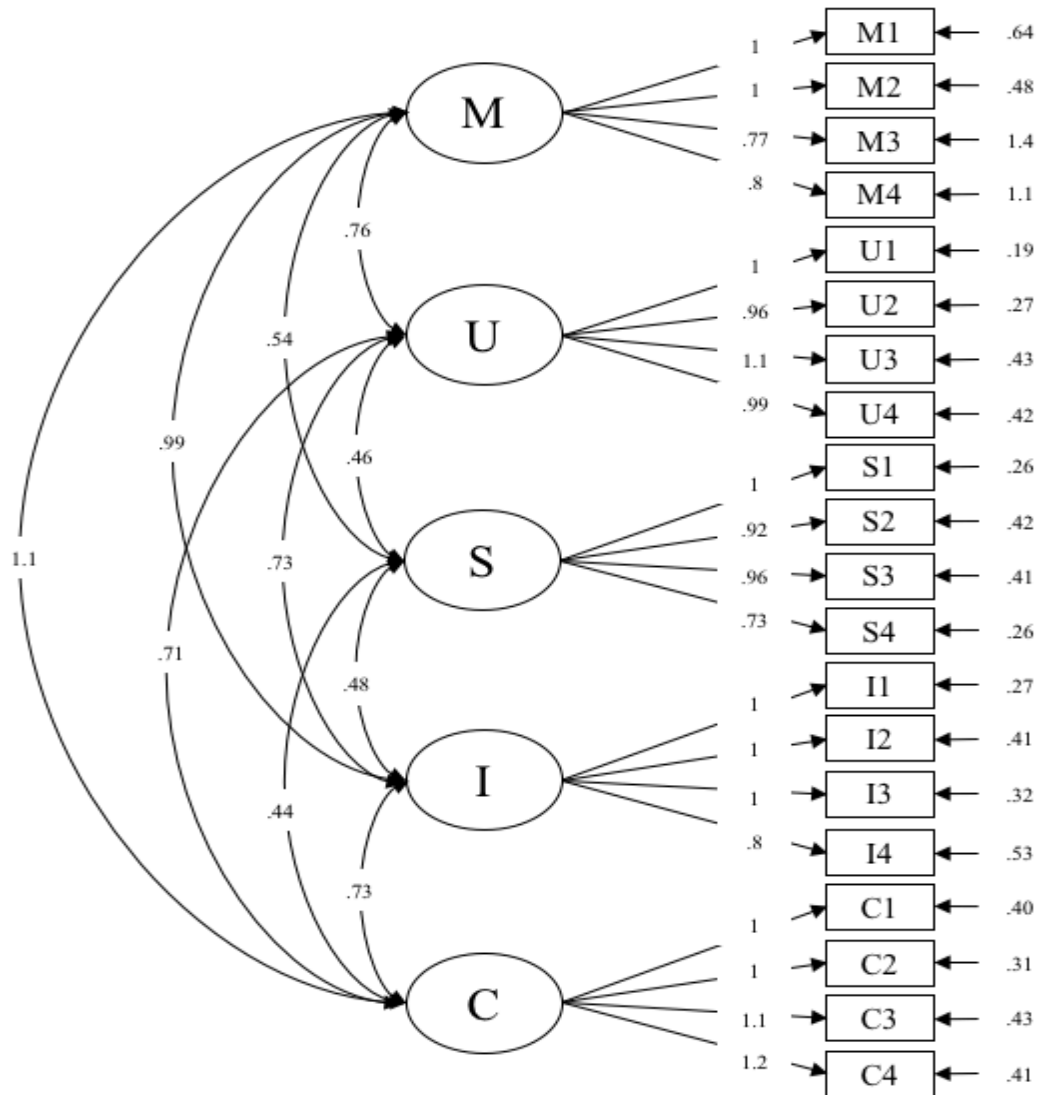


Figure 10. Unstandardized solution of the MUSIC model as a hierarchical intercorrelated five-structure comprised of empowerment (M), usefulness (U), success (S), interest (I), and caring (C).

Discriminant and convergent validity. Results of CFA provide evidence of the convergent and discriminant validity of theoretical constructs. Whereas convergent validity indicates that items of theoretically similar or overlapping constructs are strongly interconnected, discriminant validity is indicated by evidence that indicators of theoretically distinct constructs are not highly interrelated (Brown, 2015).

The fit indices of the CFA illustrated that the data in Study 3 fit the model reasonably well. A closer look at the correlations among the MUSIC scales is helpful to provide further discriminant and convergent validity evidence. Table 11 shows the correlations between the five constructs of the MUSIC® Athletic Inventory.

Table 11
Correlations of the Five MUSIC Constructs and Descriptive Statistics

	M	U	S	I	C
eMpowerment					
Usefulness	0.50**				
Success	0.47**	0.55**			
Interest	0.67**	0.66**	0.55**		
Caring	0.74**	0.68**	0.53**	0.65**	
Mean	3.69	4.91	5.1	4.26	4.59
SD	1.2	1.03	0.75	1.03	1.14

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

The five constructs were moderately correlated with coefficients ranging between .47 and .74. Those correlations are consistent with prior research in educational settings (e.g., Chittum & Jones, 2017; Jones & Skaggs, 2016; Jones & Wilkins, 2013; Schram & Jones 2016) and show that the MUSIC components are moderately correlated. The correlation between the caring and empowerment constructs is relatively high with a value of .74, which indicates that 55% of the variance is shared between these constructs. The EFA from Study 2 revealed that the student-athlete did not differentiate between the factors of empowerment and caring and the two constructs loaded on one factor. This issue could not be resolved completely, despite the language changes in the second inventory. However, the correlation coefficient for Study 3 is lower than the threshold of .85, which is often used as the criterion to define poor discriminant validity (Brown, 2015).

Table 12 presents the correlations between all of the inventory items. In general, the correlations within the scales were higher than the correlations between the items in different scales. The items of empowerment showed the highest cross correlations of all the constructs. This supports the concerns of study one that student-athletes have problems of perceiving empowerment as a separate construct.

Table 12

Correlations between all 20 items of the Athletic MUSIC Inventory

	M1	M2	M3	M4	U1	U2	U3	U4	S1	S2	S3	S4	I1	I2	I3	I4	C1	C2	C3	C4
M1	1.00																			
M2	0.72	1.00																		
M3	0.52	0.53	1.00																	
M4	0.55	0.57	0.68	1.00																
U1	0.53	0.53	0.3	0.29	1.00															
U2	0.49	0.49	0.26	0.21	0.79	1.00														
U3	0.57	0.6	0.24	0.28	0.78	0.75	1.00													
U4	0.44	0.46	0.19	0.2	0.78	0.76	0.67	1.00												
S1	0.32	0.42	0.29	0.3	0.39	0.31	0.34	0.33	1.00											
S2	0.29	0.32	0.21	0.2	0.32	0.33	0.28	0.29	0.69	1.00										
S3	0.49	0.53	0.28	0.27	0.65	0.57	0.56	0.62	0.59	0.5	1.00									
S4	0.29	0.45	0.24	0.25	0.45	0.39	0.36	0.39	0.64	0.54	0.54	1.00								
I1	0.55	0.60	0.4	0.44	0.57	0.57	0.55	0.43	0.47	0.36	0.59	0.41	1.00							
I2	0.61	0.62	0.45	0.48	0.61	0.55	0.57	0.50	0.34	0.26	0.49	0.37	0.74	1.00						
I3	0.59	0.59	0.5	0.48	0.58	0.55	0.53	0.45	0.38	0.27	0.48	0.36	0.8	0.76	1.00					
I4	0.48	0.5	0.37	0.32	0.53	0.51	0.45	0.43	0.39	0.36	0.54	0.37	0.71	0.62	0.63	1.00				
C1	0.63	0.64	0.36	0.46	0.55	0.57	0.63	0.53	0.41	0.43	0.55	0.35	0.57	0.5	0.53	0.5	1.00			
C2	0.62	0.65	0.43	0.46	0.57	0.55	0.65	0.49	0.39	0.31	0.49	0.39	0.52	0.55	0.56	0.45	0.78	1.00		
C3	0.65	0.7	0.33	0.42	0.58	0.55	0.71	0.52	0.38	0.32	0.51	0.37	0.53	0.53	0.56	0.38	0.74	0.74	1.00	
C4	0.74	0.75	0.45	0.59	0.47	0.45	0.59	0.45	0.32	0.25	0.48	0.35	0.55	0.56	0.57	0.42	0.72	0.79	0.77	1.00

Note. Grey and bolt areas show correlations within each subscale.

Chapter 6

Discussion and Conclusion

The goal of these three combined studies was to develop an athletic inventory to measure the five components of the MUSIC[®] Model of Motivation, with the ultimate goal of applying and using the inventory in the field of competitive sports. I began by conducting a content analysis in Study 1 to demonstrate that the theories that have been used in sport psychology have also been used in education, and specifically, in the creation of the MUSIC Model of Motivation. Given this similarity, I conducted Studies 2 and 3 to develop and validate an athletic inventory for college student-athletes. In this chapter, I discuss the findings of these three studies and conclude that the newly developed MUSIC Model of Athletic Motivation Inventory is valid for use with college student-athletes.

Reliability and Validity Evidence for the MUSIC Athletic Inventory

In sport and exercise psychology, the main approaches used for measuring perceptions, emotions, attitudes, and opinions are introspective in nature. However, as important as introspective measures are, new measures must be interpreted cautiously and psychometricians show concern about their biasedness and lack of scientific rigor (Tenenbaum, Eklund, & Kamata, 2012). As a result, it becomes even more important that new measures fulfill the criteria of reliability and validity, in order to become sufficient and well-established. Table 13 summarizes how issues of reliability and validity have been taken into consideration in this study.

Table 13
Sources of Reliability and Validity Evidence

Reliability/ Validity Evidence	Sources
Internal consistency reliability (item analysis)	<ul style="list-style-type: none"> • Cronbach’s alpha values for the MUSIC Inventory scales
Content Validity	<ul style="list-style-type: none"> • Systematic Content Analysis
Construct Validity	<ul style="list-style-type: none"> • EFA and CFA in Study 2 and Study 3
Discriminant Validity	<ul style="list-style-type: none"> • Correlations of the MUSIC items and inventory subscales
Convergent Validity	<ul style="list-style-type: none"> • Correlations among MUSIC inventory subscales

Internal Consistency Reliability

The internal consistency reliability was evaluated by computing Cronbach’s alpha values for each MUSIC inventory subscale for the EFA and CFA. Cronbach’s alpha provides a means to assess the extent to which items within any a scale are related to one another (Howell, 2007). It represents the average correlation that would be obtained over all possible split halves of a test. Cronbach’s alpha is the most widely used and reported method for estimating reliability of test scores (Vaughn, Lee, & Kamata, 2012). According to criteria specified by Kline (2016), the alphas from the EFA and CFA showed good to excellent reliability, with alpha values ranging from .84 to .94. This evaluation is consistent with reliability expectation in the sport and exercise psychology literature (see Vaughn, Lee, & Kamata, 2012). As a result, this study illustrated that each of the scales that comprise the MUSIC® Athletic Inventory are reliable measures of the constructs they intend to measure. This is important because a reliable measure is a prerequisite condition for validity.

Content Validity

Content validity is mainly subjective. Oftentimes it includes content experts who assess aspects of a questionnaire based on operational definitions. Content validity is concerned with

how accurately an assessment taps into the various aspects of a specific construct (Vaughn & Daniel, 2012). In this study, athletes' motivation was the construct of interest and the components of the MUSIC model provided the foundation for the assessment tool. According to Vaughn and Daniel (2012), content validity is often summarized by the percentage of items matched to given objectives. The content analysis in this study provided evidence for content validity in Study 1 by showing the existence of the MUSIC components in the realm of exercise and sport psychology. With an average overlap of over 84%, the content analysis showed clear evidence that the core underlying constructs and theories of the MUSIC model are represented in the sport and exercises literature. The analysis indicated that the underlying MUSIC constructs are already an integral part of motivation research in sport, which supports the usage and implementation of the MUSIC model as a holistic approach in this sports, which includes the college athletics context investigated in these studies.

Construct Validity

Netemeyer, Bearden, and Sharma (2003) described construct validity as the degree to which inferences can be made from a study measure and used to identify and measure the theoretical construct of interest. Construct validity is the credibility to which an operational definition represents the abstract construct it is supposed to represent. As recommended by other researchers (see George & Mallery, 2003; Vaughn & Daniel, 2012), I used the EFA and CFA in this study to establish construct validity. Researchers argue that the decision about whether a construct is valid or not should always take the definition of the construct into consideration because one is dealing with an abstraction and not with a concrete object against which the measure can be applied (Pedhazur & Schmelkin, 1991). It is therefore important that the measurement is consistent with an identified definition of the construct. In this study, I

interpreted athletes' motivation as the "psychological processes that energize, direct, and regulate achievement behavior" (Roberts, Treasure, & Conroy, 2007, p. 3). This definition is consistent with the conception of motivation used in the MUSIC model, in which motivation is affected by students' perceptions of empowerment, usefulness, success, interest, and caring within a learning environment (Jones, 2018).

Pedhazur and Schmelkin (1991) also argue that factor analyses can only produce meaningful applications with priori assumptions of the relationships between the investigated variables. The original MUSIC[®] Model of Academic Motivation Inventory and the MUSIC[®] Model of Athletic Motivation Inventory are based on the five MUSIC components. The components and the conceptual context are grounded in motivation theories and research (Jones, 2009, 2018) and the analysis of the sport and exercise psychology literature I conducted in Study 1 showed that the underlying theories of the MUSIC model are represented in the realm of sport psychology. The data from Study 2 were used to identify problematic items and revise the original version of the MUSIC Athletic Inventory. The subsequent CFA in Study 3 tested the factor structure and model fit. The fit indices indicated good model fit, which provided further evidence to support the construct validity of the MUSIC[®] Model of Athletic Motivation Inventory.

Discriminant and Convergent Validity

Convergent or criterion validity can be interpreted as the degree to which the operational definition is related with the variables of interest; it is the relationship of the construct of interest to other chosen constructs that are expected to be related to the construct of interest. These selected constructs are predicted to have a significant amount of shared variance with constructs that are of interest (Hagger & Chatzisarantis, 2009; Vaughn & Daniel, 2012). Kline (2005)

argues that correlations between .3 and .5 are ideal between the construct of interest and the constructs chosen for validation purposes and Vaughn and Daniel (2012) stated that they should not exceed a coefficient of .8. The correlation coefficients between the MUSIC Athletic scales ranged between .47 and .74. Besides the higher correlation between caring and empowerment, the moderate correlations between the other subscales were expected and are consistent with prior research (see Chittum & Jones, 2017; Jones & Skaggs, 2016; Jones & Wilkins, 2013).

In comparison, discriminant or divergent validity is the degree of discrimination between the target construct and closely related (but conceptually distinct) variables. Discriminant validity is evidenced by low or non-existing correlations between operational definitions (based on instrument scores) and distinct or irrelevant variables (Vaughn & Daniel, 2012). Study 3 indicated that correlations within scales were generally higher than items outside of the same scale. In addition, the results from the factor structure and fit indices of the CFA illustrated that the items within each scale are closer connected to each other than the ones in other scales. However, a closer look at the item correlations in Table 12 shows that student-athletes still had problems of perceiving the construct of empowerment as a separate entity. The cross correlations between the empowerment items and the items of the other constructs were relatively high, despite the implemented language changes for the revised inventory.

Applications of the MUSIC® Model of Athletic Motivation Inventory

The results of the content analysis, EFA, and CFA provide strong evidence for the application of the MUSIC model and the validity of the MUSIC® Model of Athletic Motivation Inventory. These results are encouraging because an instrument that assesses motivational needs of athletes holistically could be a valuable tool for practitioners and coaches in competitive sport settings. For athletes to obtain high-level performance and expert status, athletes must excel in

physiological, technical, cognitive, emotional, and psychological development (Janelle & Hillman, 2003). The overall performance development of athletes in all of these categories can only be achieved if athletes are able to cultivate a high level of psychological development in the form of *motivation*. Duda and Treasure (2010) and Vealey (2005) argue that motivation is a critical element of every performance development journey and coaches should use effective strategies to motivate their athletes. In the milieu of competitive sports where small differences in athletic performance can have significant implications, coaches must therefore develop a good understanding of motivation, including factors and methods that enhance motivational states in individuals and groups.

The MUSIC® Model of Motivation could be the foundation to satisfy the motivational needs of athletes and to close the theory-practice gap between practitioners and the current theoretical knowledge about motivation in sports. The MUSIC® Model of Motivation would provide a holistic framework to support coaches and practitioners in the design of more engaging and professional athletic environments, as well as to simplify the evaluation process of athletes' engagement levels. The inventory results could not only guide the design and development of coaching strategies throughout the year but could also directly influence individual practice sessions based on the immediate feedback of athletes. The MUSIC® Model of Athletic Motivation Inventory could also be used across sports inside of athletic departments. Strength and weaknesses of different athletic settings could be identified. Ideally the results of those investigations would cultivate more collaboration between coaches and best coaching strategies could be identified across sports and events. Coaches from a variety of backgrounds could share their experiences in relation to the results of the athletic MUSIC inventory. Ultimately, coaches could motivate athletes by attending to how they: *empower* athletes, help athletes understand

how their practice and performance activities are *useful* to their goals, ensure that athletes believe that they can *succeed*, keep athletes *interested* in the practice and performance activities, and show that they *care* about athletes' success and care about their well-being and development.

Limitations and Assumptions

There are some limitations and assumptions that underlie this study. Limitations are influences that I could not control or could not alter during this study but that may have had an impact on the results and interpretations. This limitation section includes two parts. The first part covers the limitations of the content analysis of Study 1. The second part discusses the shortcomings and limitations of the EFA in Study 2 and the CFA in Study 3. Studies 2 and 3 show the same limitations due to similar procedures and conducts.

Study 1: Content Analysis

The content analysis showed that the underlying components of the MUSIC model were represented in the main coaching and sport psychology literature. However, there are limitations to this content analysis. First, the analysis merely focused on the representation of the underlying constructs and theories in the identified sport literature. However, all of the identified books cover sport psychological issues, such as motivation, from a variety of perspectives. For example, in their book "*Foundations of Sport and Exercise Psychology*" Weinberg and Gould (2011) cover psychological theories and constructs from performance and group processes, as well as health and well-being perspectives. A clear identification of the context in which specific underlying constructs have been covered could not have been made. Future content analyses that focus more on context specific approaches could be beneficial.

Second, the conducted analysis identified main books in the field of sport psychology. The publishing dates of the identified books ranged from 2005-2013. Although it can be seen as

an advantage to analyze the presence of the underlying theories in the well-established literature first, further studies that put an emphasis on up to date studies in peer-reviewed articles can be seen as fruitful.

Third, I examined the theories used in the MUSIC model based on those described in Jones (2016). However, the MUSIC model was developed based on many theories (Jones, 2018), including those beyond the ones I examined. Therefore, it would have been difficult, if not impossible to conduct a complete, comprehensive examination of all the related theories. Instead, I used the theories in Jones (2016) as a reasonable representation of the main theories underlying the constructs in the MUSIC model.

Lastly, the intercoder reliability of this content analysis is based Holsti's method (1969), a form of percentage agreement between two coders. Historically, simple percentage agreements have been one of the most commonly reported coefficients (e.g., Feng, 2015; Manganello & Blake, 2010). However, percentage agreements entail several disadvantages, such as the failure to account for potential chance agreement between the coders (Neuendorf, 2017). Therefore, researchers like Lombard and his colleagues (2002) argue that percentage agreement should be viewed as insufficient to test intercoder agreement. It was the initial goal of this analysis to use Cohen's kappa (Cohen, 1960) as a chance-corrected statistic. Cohen's kappa differentiates between "proportion agreement observed" and "proportion agreement expected by chance." However, Neuendorf (2017) suggests that the sample size for Cohen's kappa should range between 50 and 300. Due to the set-up of this analysis (is the code present in the identified book or not) only a small sample resulted. As a result, it was not feasible to calculate Cohen's kappa appropriately. As mentioned earlier, a future study that focuses on up-to-date peer-reviewed articles in the sports literature would allow a much higher number of cases compared to this book

analysis and would also present itself to apply Cohen's kappa as the intercoder reliability coefficient.

Study 2 and 3: EFA and CFA

The results of the EFA and CFA provided evidence for the validity of the scores produced by MUSIC® Model of Athletic Motivation Inventory. However, there are two limitations that underlie the analysis of the EFA and CFA that should be considered. The first limitation of the EFA and CFA concerns sample size. Although minimum requirements of sample size have been fulfilled (see Gorsuch, 1983; Kline, 1979; MacCallum et al., 1999), other researchers recommend larger sample sizes for factor analyses. For instance, Garson (2008) proposed that there should be at least 10 cases for each item in the analysis. However, it should also be noted that little statistical research has been done to establish concrete minimum desirable levels of sample size in factor analysis (see MacCallum, Widman, Zhang, & Hong, 1999). I believe that the sample sizes of the EFA and CFA were sufficient for this analysis. Obtaining a large sample of student-athlete participants is difficult. Even as a former student-athlete and current volunteer coach I had difficulties recruiting the student-athletes at the investigated institution due to restrictions and demands of the athletic administration. It is my goal to improve my relationships with athletic departments across the United States, so that validation studies with a broader student-athletes population and bigger sample sizes are possible.

The second limitation concerns the issue that the responses to the empowerment and caring items were similar. The results of the EFA showed that the items in the caring and empowerment scales loaded together on one factor. Although the fit indices of the CFA in study three indicated that the factor structure of the MUSIC components were acceptable, a closer look

at the correlations of the subscales revealed that the factors of empowerment and caring were still relatively highly correlated. The correlation between empowerment and caring was .74, despite the language changes that were implemented in the revised inventory for Study 3. Based on my experience as a former student-athlete and coach at two division I institutions, I believe that student-athletes have problems understanding what it means to be empowered because they are not likely to be exposed to democratic and autonomy supportive learning environments. Therefore, they may not have answered the empowerment items as accurately as possible. For example, they might have thought that they had a lot of empowerment even if they did not have much because they did not truly know what an empowering environment could be like. NCAA regulations including practice time restrictions, an increase of management and recruiting duties of coaches, and the high monetary stakes in athletics might support a tendency of controlling and autocratic coaching environments. I have seen this recently in a football administration that shifted to a more controlling athletic environment after a successful season in order to protect and micromanage their student-athlete body. Players got picked up to go to class, personal tutors monitored every academic and social move, and even the assistant coaches got monitored daily by a new quality manager who directly reports to the head coach.

Despite the tendencies of more controlling coaching environments, there are however other athletic programs that value possible benefits of an empowering culture. For instance, the Carolina Panthers realized that their athletes can offer important insights and perceptions that improve training and competition decisions. In 2016, Mike Shula (the offensive coordinator of the Carolina Panthers football team) reported that the coaches started to listen to the insights and feedback of quarterback Cam Newton more often, after struggling the year prior: “We needed to listen to Cam more...It was time to be more creative and adjustable with our thinking”

(Pennington, 2016). In addition to the Carolina Panthers, an interesting combination between empowerment inside of boundaries can be seen in Urban Meyer's coaching philosophy. Although Meyer's philosophy is mainly based on an incentive-based system he has also created opportunities for athletes to gain more autonomy and freedom if guidelines and expectations of behaviors are met. For instance, players are considered grown men and mature individuals with full responsibilities if they reach the gold (last) stage of the incentive-based system. Besides having more autonomy, members of the gold level also take responsibility in serving as mentors for players in the first level (Gavazzi, 2015). Future research of the MUSIC® Model of Motivation in athletic settings will show which role empowerment plays and how it relates to the other MUSIC components.

Future Research

Vallerand, Donahue, and Lafrenière (2012) point out that new inventories about motivation in sport and exercise need high levels of validity and reliability and should be validated throughout a multitude of studies. In order to establish the MUSIC® Model of Athletic Motivation Inventory in the sport psychology and coaching literature it would be necessary to replicate the promising results of this analysis by generating larger sample sizes from a variety of athletic departments. This approach would eliminate the weakness of a relatively small sample size and reveal whether the tendencies and findings of this analysis are consistent across other student-athletes populations. Moreover, similarities and differences of student-athletes' motivational needs across sports and athletic departments could be identified. Other variables such as age and gender could also be investigated.

In addition to conducting possible validation studies, it could be helpful to receive feedback from coaches and practitioners about the MUSIC® Model of Motivation

with the help of qualitative research approaches in the form of interviews or focus groups. Coaches' insights could help to close the theory-practice gap and summarize practical strategies that could be organized under the umbrella of the MUSIC model. The best strategies for each component could be identified and collaborations among coaches from different sports and athletic backgrounds could be fostered.

Another research approach that could be interesting is the implementation of true experimental designs, in which the MUSIC components are actively fostered through interventions within specific athletic environments. For instance, it could be a possibility to initially test the MUSIC components and monitor them over time within a group of athletes, while the components are actively fostered through specific strategies and interventions. Experimental or quasi-experimental designs could be utilized. This would enable researchers to analyze the development of the MUSIC components over time and how the perceptions of those motivational needs change depending on the intervention. Ideally the interventions would also lead to an overall increase of the average MUSIC components. The scores could then be correlated to effort scores or other objective performance outcomes that measure performance and effort improvements.

Conclusion

The results of Studies 1, 2, and 3 suggest that the newly developed MUSIC Athletic Inventory produces valid scores with student-athletes. Therefore, it could be a useful tool for coaches to use to assess student-athletes' motivation-related perceptions. Based on the results of the inventory, coaches could consider modifying their coaching strategies or trying new coaching strategies consistent with the MUSIC[®] Model of Motivation. Specifically, the MUSIC model suggests that coaches can motivate athletes by attending to how they: *empower* athletes, help

athletes understand how their practice and performance activities are *useful* to their goals, ensure that athletes believe that they can *succeed*, keep athletes *interested* in the practice and performance activities, and show that they *care* about athletes' success and care about their well-being and development. The MUSIC Model may help coaches to prepare for working with athletes by being more intentional and systematic about designing activities that motivate their athletes. And preparation is important not only for athletes, but also for coaches.

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