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Examining the Relationship between Basic Needs Theory and Mental Toughness Transfer in Mentally Tough Athletes

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EXAMINING THE RELATIONSHIP BETWEEN BASIC NEEDS THEORY AND MENTAL TOUGHNESS TRANSFER IN MENTALLY TOUGH ATHLETES

Chelsi Scott

33 Pages

Mental toughness can be defined as a psychological skill encompassing an individual's ability to overcome adversity while still achieving high levels of performance and functioning. Sport is commonly referred to as a domain that helps to develop an athlete's life skills, including mental toughness. The benefits of mental toughness stretch across multiple domains, making the ability to transfer mental toughness from one domain to another, advantageous. Transferring life skills is a multi-dimensional process involving an individual's interaction with their environment and the degree to which they internalize the life skills but there is little evidence to explain if and how life skills transfer actually occurs (Pierce et al., 2017). The Self-Determination Theory (SDT; Deci & Ryan, 2000) provides a theoretical framework for examining the relationship between the internalization of mental toughness and an individual's ability to transfer this skill to other domains. **PURPOSE:** The purpose of this study is to determine the relationship between the satisfaction of the basic needs of competence, relatedness and autonomy and the transfer of mental toughness as a life skill. **METHODS:** 307 collegiate student-athletes were distributed measures to assess their mental toughness, basic needs satisfaction and the degree to which they transferred mental toughness to other domains. **RESULTS:** Satisfaction of the basic needs of autonomy, competence and relatedness have a significant positive relationship with mental toughness transfer as a life skill. Furthermore, need satisfaction of autonomy significantly

predicts mental toughness transfer as a life skill. CONCLUSION: For students self-reporting as mentally tough, mental toughness can be transferred as a life skill.

KEYWORDS: Basic needs theory; Life skills transfer; Mental toughness; Sport life skills.

EXAMINING THE RELATIONSHIP BETWEEN BASIC NEEDS THEORY AND MENTAL
TOUGHNESS TRANSFER IN MENTALLY TOUGH ATHLETES

CHELSI SCOTT

A Thesis Submitted in Partial
Fulfillment of the Requirements
for the Degree of

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EXAMINING THE RELATIONSHIP BETWEEN BASIC NEEDS THEORY AND MENTAL
TOUGHNESS TRANSFER IN MENTALLY TOUGH ATHLETES

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CHAPTER I: INTRODUCTION

Mental toughness is considered a highly desirable characteristic in athletes and rated by coaches as a crucial component in many aspects of performance (Gould, Hodge, Peterson, & Petlichkoff, 1987). In the sport context, mental toughness is viewed as a tool box comprised of characteristics that allow individuals to regularly achieve and sustain high levels of performance (Jones, Hanton, & Connaughton, 2002). Outside of sport, mental toughness is linked to positive outcomes in both the workplace as well as educational environments. Higher levels of mental toughness have been found to be directly associated with positive affect, goal attainment and the ability to effectively cope with stress; subsequently leading to greater levels of performance (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015). In addition, the characteristics and development of mental toughness closely resemble the development and characteristics of life skills. Thus, having the ability to transfer mental toughness in sport to a variety of other contexts is highly desirable.

Sports have long been recognized as a platform to enhance life skills. The National Collegiate Athletics Association (NCAA), lists “preparation for life” as one of the top reasons for participation in college athletics. The NCAA recognizes that “there are over 400,000 student-athletes, and most of them will go pro in something other than sports,” (Gallo, 2011) and prides itself on helping athletes hone in on those life skills to prepare for life beyond college athletics. For many years, the NCAA operated the CHAMPS Life Skills program that focused on helping student-athletes gain skills and qualities to help them be successful in life outside of sport (<http://www.ncaa.org/about/resources/leadership-development/life-skills>). While the NCAA has now moved away from its CHAMPS Life Skills initiative, the organization has recently partnered with the National Association of Academic Advisors for Athletics (N4A) to help

support academic advisors in their student-athlete focused programming that targets life skill developments for professionals. This approach has reflected the widely advertised goals of the NCAA and some discourse in popular media that has reinforced the value of being a student-athlete. For example, a 2013 Forbes Magazine article listed reasons why employers should hire “athletes”. While more broadly referring to an athlete mentality, the list of reasons include items that are very similar to mental toughness qualities such as “they have the drive to practice a task rigorously, relentlessly, and even in the midst of failure until they succeed”, “athletes achieve their goals” and “athletes develop new skills” (Williams, 2013).

Mental Toughness in Sport

There are many definitions of mental toughness, ranging from specific behaviors to overall dispositions. In sport, Jones and colleagues (2008) defined mental toughness as possessing attributes of self-belief, desire and motivation, focus (performance-related), focus (lifestyle-related), dealing with competition-related pressure (external) and anxiety (internal), and dealing with physical and emotional pain. Mental toughness has also been specifically defined by stakeholders in the collegiate sport setting. From a coaches’ perspective, athlete mental toughness is perceived to be a crucial component in sport at the collegiate level, listing traits and skills such as focus, confidence, knowledge and mental planning, motivation to work hard, persistence, ability to rebound from setbacks and handling and performing under pressure as mental toughness components (Weinberg, Butt, & Culp, 2011). Athletes have a similar belief about the definition of what constitutes mental toughness in collegiate sport. In a study conducted in NCAA Division I athletes, athletes’ perception of mental toughness encompassed six themes: performing under pressure, motivated, positive psychological attributes, working hard, anticipation skills, and leadership (Butt, Weinberg & Culp, 2010).

Mental toughness is consistently cited as a primary factor in greater performance within a variety of sports such as basketball (Newland, Newton, Finch, Harbke, & Podlog, 2013), running (Jones & Parker, in press), soccer (Thelwell, Weston, & Greenlees, 2005) and cricket (Bull, Shambrook, James, & Brooks, 2005). While a majority of mental toughness research is done within elite athletes, athletes with higher levels of achievement are not necessarily more mentally tough (Golby & Sheard, 2004; Nicholls, Polman, Levy, & Backhouse, 2009). In addition, research has demonstrated that mental toughness is most likely a universal sport skill, with Nicholls et al., (2009) finding no significant differences in mental toughness scores between team and individual contact and non-contact sports. At the collegiate levels, coaches and athletes reported mental toughness as a critical factor in performance (Weinberg et al., 2011; Butt et al., 2010). Specifically, Weinberg et al. (2011) found coaches consider mental toughness as a key component for success at the collegiate level and tend to recruit athletes who display higher levels of mental toughness or potential to develop mental toughness.

Collectively, research has reflected that mental toughness consists of distinct attributes related to an athlete's natural and developed abilities that help athletes cope with the demands of training and competing better than that of their opponent (Jones et al., 2002). From a developmental perspective, mental toughness can be enhanced through both informal socialization or implicit coaching processes and formal intervention or explicit coaching approaches (Gould, Griffes & Carson, 2011). Implicit theories regarding the development of mental toughness suggest a predominantly incremental theory among performers, with a majority of individuals considering it a malleable characteristic (Gucciardi et al., 2015). Athletes also tend to attribute significant others, such as coaches, parents and teammates as having an effect on mental toughness development, specifically mentioning creating challenging practices, role

modeling mental toughness qualities, and providing encouragement and support as ways to enhance mental toughness (Butt et al., 2010). Coaches also believe that mental toughness can be developed over time through creating positive and competitive environments, practicing game-like situations, hard conditioning and providing teaching opportunities on mental toughness (Weinberg et al., 2011).

Mental Toughness as a Transferable Life Skill

Gould and colleagues (2011) have proposed that the similarities between mental toughness and life skills demonstrate that mental toughness is a life skill. Life skills in sport are ‘those internal personal assets, characteristics and skills such as goal setting, emotional control, self-esteem, and hard work ethic that can be facilitated or developed in sport and transferred for use in non-sport settings’ (Gould & Carson, 2008a, p. 60). Assessing the alignment of definitions, Gould and colleagues (2011) stated that mental toughness and life skills share characteristics of learned emotional control, developing a positive self-belief, exerting maximum effort and dealing with adversity. As for the enhancement of mental toughness and life skills, it has been argued that both follow similar direct and indirect developmental patterns. Mental toughness can grow through informal socialization with significant others and the environment and can occur via formal intervention programs (Gould et al., 2011), just as transferrable life skills can be developed through implicit approaches and explicit coaching approaches (Turnnidge, Côté, & Hancock, 2014).

When certain sport program conditions exist such as positive coach, athlete and peer relationships, a focus on personal achievements and a task oriented motivational climate, life skills transfer can occur implicitly or without direct teaching of such skills. Conversely, when a program is systematically designed to coach specific life skills and directly promote the transfer

of these skills to other domains, life skills transfer can occur explicitly (Turnnidge et al., 2014). One example of an explicit life skills program is that of The First Tee program, whose mission is “to provide youth with educational programs that build character, instill life-enhancing values and promote healthy choices through the game of golf” (<https://thefirsttee.org/about/faqs/>). The First Tee program is considered a Positive Youth Development program (PYD) as it teaches both desired life skills, such as goal setting and emotional regulation, as well as how to apply those skills in other contexts. This teaching occurs in a sport based environment that emphasizes supportive coaching behavior and caring climates and was found to lead to life skills transfer both immediately after and one-year past the program had finished (Weiss, Bolter, & Kipp, 2014).

Inherent in both potential approaches for life skills development and transfer is the notion of autonomy-supportive environments. Recently, Hodge, Danish and Martin (2013) used the Basic Needs Theory (BNT) and Life Development Intervention (LDI) as the theoretical backdrop for understanding life skills in sport. The authors conceptualized the LDI/BNT model of life skills, hypothesizing that life skills development is dependent on the degree to which the basic needs are satisfied in the motivational climate of the sport/life skills program. When an individual perceives their sport environment as conducive for autonomy, competence and relatedness, those needs are more likely met and life skills more likely to be internalized. With the internationalization of life skills, they become central to the individual’s sense of self and are generalized, or transferred to other life domains, thus increasing overall optimal psychological well-being. This model, therefore, helps to explain how life skills development through the satisfaction of autonomy, competence and relatedness in sport can occur and may set an athlete up to transfer the life skills beyond sport.

Kendellen and Camiré (2015) used the LDI/BNT model to examine life skills development and transfer within high school athletes. The researchers interviewed twenty former athletes on their high school experience, specifically designing questions that would illustrate the athletes perceived autonomy, competence and relatedness in the previous sport environments. From their study, the researchers found that through participating in high school sports, athletes reported developing and transferring life skills relating to all three basic need. Specifically, within autonomy, athletes reported developing self-control and self-regulation. For competence, athletes reported developing interpersonal communication and coping with stress. Lastly, for relatedness, athletes reported developing a consideration for others' feelings and social responsibility. In addition, the researchers reported the athletes believed they applied these skills outside of the sporting contexts. However, while their research was able to identify specific life skills developed in high school athletes, there is a need for a closer examination of life skills transfer. While individuals may be able apply life skills across multiple domains, the automatic transfer of life skills cannot be assumed (Gould & Carson, 2008). It is necessary to explore if and how the satisfaction of athletes' need for autonomy, competence and relatedness in sport helps them transfer life skills beyond sport.

Life skills transfer is “the ongoing process by which an individual further develops or learns and internalises a personal asset (i.e. psychological skill, knowledge, disposition, identity construction, or transformation) in sport and then experiences personal change through the application of the asset in one or more life domains beyond the context where it was originally learned” (Pierce, Gould & Camiré, 2017, p. 194). Based on this definition, Pierce and colleagues (2017) suggest that life skills transfer from sport can be conceptualized as the discrete movement of one skill learned in sport (e.g., goal setting), and the direct use and application of that skill in

another context, such as the classroom. Additionally, life skills transfer can occur when an individual attributes sport for a deeper transformational personal change that impacts how he or she views and acts in different environments. For example, a recent study by Chinkov and Holt (2016) interviewed former Brazilian Jiu-Jitsu participants and found life skills acquisition from sport positively impacted their lives in a way that they viewed their Jiu-Jitsu experiences as transformative. The experience helped to shape how they viewed the world and how they applied and transferred those life skills outside of the sport context (Chinkov & Holt, 2016). As such, the latter view of life skills transfer implies that sport can be a transformative experience. In educational psychology, transformative experiences occur when individuals apply newly learned or further developed skills, such as mental toughness, in a way that expands their perception and value of the skill as well as motivates them to use the skill in new ways (Pugh, Linnenbrink-Garcia, Koskey, Stewart, & Manzey, 2008).

This transformational view of life skills transfer offers interesting insight into the study of mental toughness, as a quality that may be transferred from sport to influence performance and experiences in other life domains. Gucciardi et al., (2015) have found links between mental toughness and positive outcomes (e.g., decreased stress, ability to cope with challenges) in contexts outside of sport environments, which provides evidence that having the ability to transfer mental toughness as a life skill outside of sport is advantageous and does occur. The researchers conducted two studies within Australian workplace and educational environments. Within the workplace environment, results indicated a positive association between self-reported mental toughness and supervisor-rated performance, lower levels of stress and greater levels of coping. Similarly, within education environments, results indicated that mental toughness

significantly predicted negative emotional states, positive emotions, thriving and academic and social goal progress (Gucciardi et al., 2015).

As mental toughness is promoted and valued by the NCAA and coaches as a key quality for student-athletes to be successful in sport and life, it is vital that research directly examines mental toughness as a life skill in college athletics. Compounding this with the need for studies that directly assess and measure life skills transfer, there is great scientific and practical need to examine mental toughness as a transferrable life skill for collegiate student-athletes.

Purpose of the Study

Using our understanding of the relationships between SDT, the satisfaction of psychological needs and the life skills transfer process, the purpose of this study is twofold. First, for athletes self-reporting as mentally tough, do they believe they transfer mental toughness as a life skill? Secondly, does the satisfaction of autonomy, competence and relatedness predict the transfer of mental toughness as a life skill? Based on previous research, our hypotheses are (1) for athletes self-reporting as mentally tough, they do believe they transfer mental toughness as a life skill and (2) the satisfaction of autonomy, competence and relatedness will positively predict the transfer of mental toughness as a life skill.

CHAPTER II: METHODS

The purpose of this study is to determine the relationship between the satisfaction of the basic needs of competence, relatedness and autonomy and the transfer of mental toughness as a life skill. Based on prior research and Hodge et al. (2010) model, we hypothesize that the satisfying the basic needs will facilitate the transfer of mental toughness as a life skill. In order to analyze this relationship, we surveyed Division I and III student-athletes on their mental toughness, basic need satisfaction and life skills transfer using the Mental Toughness Index, Basic Need in Sport Scale and Transformative Experience Scale, respectively.

Participants

Initial data collection included 307 student-athletes from NCAA Division I and III institutions located within the Midwestern, United States. From this sample, The Mental Toughness Index (Gucciardi et al., 2015) was used to identify those athletes who self-reported mentally tough. The Mental Toughness Index consisted of eight-item Likert scale, ranging from 1 (false 100% of the time) and 7 (true, 100%) of the time, with items such as *I believe in my ability to achieve my goals and I constantly overcome adversity*. The MTI was found to be internally reliable, with a Cronbach alpha of .86. In order to be considered as self-reported mentally-tough, participants must have had an average score between five and seven. We determined five to be the cutoff score based on the descriptions attributed to each value, with a score of five indicating that the participant self-reported to be mentally tough over 50% of the time, which we thought is indicative of someone possessing mental toughness. Of the 307 initial student-athletes, 241 student-athletes (150 male, 89 female) met the criteria for self-reported mentally tough, with the average score of 6.09. Within this sample ages ranged from 17 to 23. Eight sports were represented in the sample, including track and field (n=143), baseball (n=47),

football (n=15), swimming (n=14), soccer (n=13), tennis (n=6), volleyball (n=2) and cross country (n=1). Scholarship status of participants included no scholarship (n=75), partial scholarship <25% (n=51), partial scholarship 26-75% (n=65), partial scholarship 76-99% (n=23) and full scholarship (n=25).

Procedures

Following approval from the university research board, athletic administrators or coaches from across the Midwest and Mid-Atlantic regions of the United States were emailed requesting their teams' participation in the research study. These regions were selected because of convenience and access for the research team. We selected both Division I and Division III athletes to capture several different skill and competition levels of play. Following subsequent approval, a convenient day and time was scheduled and we met with athletic teams at their training facilities during their regularly scheduled practices. During this meeting an investigator(s) informed the student-athlete of the nature of this study. Before being given the survey, the participants were verbally informed of their rights as participants including: their right to confidentiality, the ability to withdraw at any time for any reason without penalty, that all responses will be kept anonymous, and that acceptance and completion of the survey implied voluntary consent. After agreeing to participate, participants were given the pen and paper survey and completed the survey which lasted approximately 15 to 20 minutes. When collecting data from a team of individuals, the researcher would ensure that any coaches, trainer or non-participant athletes were asked to leave the research area. After completion, athletes individually handed them to researchers and left the premises.

Measures

Demographics

Participants were asked to report their gender, age, race/ethnicity, year in school, which sport they participated in and their scholarship status.

Basic Needs Satisfaction in Sport Scale (BNSSS; Ng et al., 2011)

The BNSSS was used to measure basic psychological need satisfaction in the participant's sporting environment. It is a 20-item seven-point Likert scale (1=not true at all, 7=very true), and was used to assess general satisfaction of the psychological needs of relatedness (five items e.g. "In my sport, I feel close to other people."), competence (five items e.g., "I am skilled in my sport.") and autonomy (ten items e.g., "In my sport, I can take part in the decision-making process."). The initial validation study by Ng et al. (2011) reported support for internal consistency (Cronbach's $\alpha=.80$), and the factor structure of the scale.

Transformative Experience Scale (adapted from Pugh et al., 2010, to reflect mental toughness).

In its original development, the Transformative Experience Scale was used to measure the extent to which individuals apply learning in their everyday life in a way that results in value and an expanded perception (Pugh et al., 2010). In this sense, transformative experience closely resembles the ability to transfer learning between contexts and subsequently, in the current study, was used to assess the participant's transferring mental toughness as a life skill. It is a 29-item 4-point Likert scale (1=strongly disagree, 4=strongly agree), consisting of three subscales: motivated use (twelve items e.g., "I love talking about mental toughness just for the fun of it."), expansion of perception (seven items e.g., "I notice examples of mental toughness outside of my sport.") and experiential value (nine items e.g., "I am interested when I hear things about mental toughness outside of my sport."). In the initial development and validation study by Pugh et al.

(2010), Rasch analysis (Rasch, 1960, 1980) indicated high internal consistency and factor structure, reporting an item reliability of .99 and person reliability of .96.

Data Analysis

Data were first screened for outliers and normality. Descriptive statistics revealed means and standard deviations. To investigate the relationship between basic need satisfaction and the transfer of mental toughness as a life skill, we conducted Pearson r correlations between all variables. In addition, to examine if the satisfaction of the basic needs could predict mental toughness transfer as a life skill, a multiple linear regression was conducted. A multiple linear regression assesses the relationship among a set of predictor variables.

CHAPTER III: RESULTS

The purpose of this study is to determine the relationship between the satisfaction of the basic needs of competence, relatedness and autonomy and the transfer of mental toughness as a life skill. Based on prior research and Hodge et al. (2013) model, we hypothesize that satisfying the basic needs will facilitate the transfer of mental toughness as a life skill. Our analyses were conducted in two parts. The preliminary analysis specifically examined the sample score means of the Mental Toughness Index (MTI), Basic Needs Satisfaction in Sport Scale (BNSSS) and Transformative Experience Scale (TES) as well as the simple correlations between the scores of the BNSSS and the TES. From this data we were able to narrow down our variables for the main analysis, specifically combining the three subscales of the TES (motivated use, expansion of perception and experiential value) into one overall transfer score. In the main analysis, we sought to determine if the satisfaction of the basic needs could predict mental toughness transfer as a life skill using a standard multiple linear regression analysis.

Descriptive Statistics

The descriptive statistics of the observed variables are presented in Table 1. Overall the participants scored relatively high on all measures. Specifically, the average scores for mental toughness ($M=6.09$, $SD=0.58$), competence need satisfaction ($M=6.10$, $SD=0.73$), autonomy need satisfaction ($M=5.75$, $SD=0.81$), relatedness need satisfaction ($M=6.16$, $SD=0.81$), transfer-motivated use ($M=4.97$, $SD=1.01$), transfer-expansion of perception ($M=5.14$, $SD=1.08$), and transfer-experiential value ($M=5.09$, $SD=1.17$) were all above scale-midpoints. Initial analysis of variables revealed that the three subscales of mental toughness transfer (motivated use, expansion of perception, experiential value) were all highly correlated ($r_s \geq .74$) and thus were collapsed to one general mental toughness transfer variable. Once combined, the average overall

transfer score was also above the scale midpoints ($M=5.06$, $SD=.99$), indicating that participants scored above “neither disagree nor agree” and below “strongly agree”. From this result, it can be concluded that on average participants felt that they were using mental toughness in a way that expanded their value, perception and overall usage beyond the sporting domain and thus believed that they had transferred mental toughness as a life skill.

Table 1
Means and Standard Deviations of Measures

Measures	M	SD
Mental Toughness	6.09	0.58
Competence Need Satisfaction	6.10	0.73
Autonomy Need Satisfaction	5.75	0.81
Relatedness Need Satisfaction	6.16	0.81
Transfer-Motivated Use	4.97	1.01
Transfer- Expansion of Perception	5.14	1.08
Transfer-Experiential Value	5.09	1.17
Transfer Overall	5.06	0.99

Main Analyses

Results from the simple correlations revealed significant relationships between all variables at the $p<.05$ level. Specifically, competence need satisfaction was positively associated with autonomy need satisfaction ($r(241)=.61$, $p<.001$), relatedness need satisfaction ($r(241)=.42$, $p<.001$) and transfer overall ($r(241)=.24$, $p<.001$). In addition, autonomy need satisfaction was positively associated with relatedness need satisfaction ($r(241)=.49$, $p<.001$) and transfer overall ($r(241)=.42$, $p<.001$). Lastly, relatedness was also positively associated with transfer overall ($r(241)=.19$, $p<.007$). A detailed breakdown of correlations can be found in Table 2. Overall, there were medium, positive correlations between the three basic needs of competence, autonomy and relatedness with each other as well as with transfer overall. Participants who

reported higher levels of competence need satisfaction also reported higher levels of autonomy need satisfaction, relatedness need satisfaction and overall transfer of mental toughness as a life skill. Participants who reported higher levels of autonomy satisfaction also reported higher levels of relatedness satisfaction and overall transfer of mental toughness as life skill. Participants who reported higher levels of relatedness need satisfaction also reported higher levels of overall transfer of mental toughness as a life skill.

A standard multiple linear regression analysis was conducted to develop a model for predicting transfer of mental toughness as a life skill from need satisfaction of autonomy, relatedness and competence. The results of the regression indicated the three predictors explained 42% of the variance ($F(3,237) = 17.303, p < .001, R^2 = .18$). Our hypotheses that the satisfaction of the basic needs of autonomy, relatedness and competence would predict the transfer of mental toughness as a life skill was partially supported. That is, autonomy was the only basic need to significantly predict mental toughness transfer in the multiple linear regression model ($\beta = .44, p < .001$). Competence need satisfaction ($\beta = -.01$) and relatedness need satisfaction ($\beta = -.03$) did not significantly predict mental toughness transfer.

Table 2
Pearson Correlations among Basic Need Satisfaction in Sport and Mental Toughness Transfer

Measure	1	2	3	4	5	6	7
Competence Need Satisfaction	--						
Autonomy Need Satisfaction	.61**	--					
Relatedness Need Satisfaction	.42**	.49**	--				
Transfer-Motivated Use	.20**	.40**	.14*	--			
Transfer- Expansion of Perceptions	.21**	.35**	.15*	.75**	--		
Transfer- Experiential Value	.24**	.42**	.21**	.74**	.76**	--	
Transfer Overall	.24**	.42**	.19**	.90**	.92**	.92**	--

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

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

CHAPTER IV: DISCUSSION

The purpose of this study was to explore the relationship between collegiate student-athletes' satisfaction of the basic needs of competence, relatedness and autonomy and their ability to transfer mental toughness as a life skill. The results of the current study found that student-athletes, who self-reported as mentally tough in sport, believed they transfer mental toughness as a life skill. Previous research lists mental toughness as a critical component of collegiate athletics, with both coaches and athletes attributing mental toughness as having an effect on athletic performance (Weinberg et al., 2011; Butt et al., 2010). Outside of sport, mental toughness was also found to have an effect on performance in both the classroom and work environment (Gucciardi et al., 2015). The results of the current study further expands our knowledge of mental toughness by exhibiting that athletes believe that they use mental toughness in the collegiate classroom context and provides greater evidence that mental toughness is a life skill. According to Gould and colleagues (2011), characteristics of mental toughness include self-belief, intelligence, high motivation/work ethic/commitment, the ability to concentrate, and the ability to cope with and handle pressure. Thus, examples of mental toughness in the classroom may include preparing early for tests, attending a professor's office hours to better understand class material and participating in classroom activities and discussions.

In addition, our results partially supported our hypothesis related to the relationship between the satisfaction of competence, autonomy and relatedness and the transfer of mental toughness as a life skill. Specifically, greater levels of need satisfaction associated with greater levels of mental toughness transfer. It was interesting however that only the satisfaction of the basic need for autonomy significantly predicted the transfer of mental toughness as a life skill. The satisfaction of competence nor relatedness significantly predicted the transfer of mental

toughness as a life skill. Thus, to the degree that student-athletes transferred mental toughness outside of sport could largely be determined by the degree to which their need for autonomy was satisfied. Our results are similar to the model proposed by Hodge et al. (2013) LDI/BNT model which, in accordance to SDT/ BNT, postulates that the satisfaction psychological basic needs have a role in the development and transfer of life skills in sport, hypothesizing that with the satisfaction of autonomy, competence and relatedness, individuals are more like to internalize, or development, life skills and then generalize, or transfer, those life skills to other domains. There has been minimal testing of the LDI/BNT to date, with most model testing using qualitative data to examine the specific life skills associated with each basic psychological need (Kendellen and Camiré, 2015). While this information is useful in identifying specific life skill development in former high school athletes, the present study expands on this knowledge by explicitly linking basic needs satisfaction with mental toughness transfer as a life skill.

Unlike Hodge et al. (2013) model, our results did not find that the satisfaction of competence and relatedness significantly predict mental toughness transfer as a life skill. This finding is unique as, in the model, it is the satisfaction of all three needs that facilitates both internalization and generalization of life skills. According to the self-determination theory (Deci & Ryan, 2000), for an individual to experience integrity and well-being, their basic needs of autonomy, competence and relatedness must be satisfied within their environments. However, while the satisfaction of all three needs may lead to optimal functioning, greater well-being and the development of life-skills (Hodge et al., 2013), there may be something unique about need satisfaction of autonomy that specifically helps to facilitate the life skills transfer process or more so, the specific transfer of mental toughness as a life skills. Relatedness is said to be the connection between the person and others in their environment resulting in caring for others and

being cared for by others and is associated with feelings of belongingness (Hodge et al., 2013). While relatedness may be a crucial component for developing mental toughness transfer by forming trusting, respectful and positive relationships with others (Gucciardi et al., 2009), these may be more situational elements and dependent on contextual factors rather than learned skills that are then transferrable. Additionally, competence refers to an individual feeling effective in their environment and experiencing opportunities to act on and express their capabilities (Hodge et al., 2013). In regards to mental toughness development, environments that are challenging and pressure-filled are said to help satisfy the need for competence (Gucciardi et al., 2009). However, the challenges and pressures that an athlete experiences in their sport may not directly be comparable to the pressures and challenges they feel in the classroom or work environments. Additionally, while an athlete may be competent in their athletic ability, they may perceive this competence differently than their competence in the classroom and other life contexts. Taken together, these two lines of thought may help explain why competence did not significantly predict transfer of mental toughness as a life skill. Conversely, need satisfaction of autonomy did significantly predict transfer. Autonomy is said to be the degree to which an individual perceives there are at the origin or their behavior and have an authentic sense of self-direction and volition. When examining mental toughness, autonomy is thought to be satisfied when the environment involves the athlete in their preparation and competition. Interestingly, competence is known to be facilitated by autonomy in that when an individual engages with their environment on their own, they are more likely to learn new skills and competencies (Hodge et al., 2013), which may help to explain why in our results autonomy served as the sole transfer predictor in our model results. Previous studies have examined autonomy-supportive environments and have identified autonomy support as having a positive effect across multiple domains, including school, work,

healthcare and sport and exercise. Furthermore, individuals are more likely to transfer behaviors from one context to the other to the degree they feel that they are in control of those behaviors (Deci & Ryan, 2008).

It is critical to recognize that our study examined how student-athletes perceived their sport experience and its influence on mental toughness transfer, and did not examine perceptions of experiences in transfer contexts. While suggesting that basic needs satisfaction in sport can facilitate mental toughness transfer for collegiate student-athletes, the gaps in our findings highlight the need to understand student-athletes their experiences outside of sport. As Pierce and colleagues (2017) discussed with their life skills model, we still are lacking the specific mechanisms to understand exactly how transfer is experienced and perceived when athletes are in the transfer contexts (i.e., student-athletes in the classroom).

Examining if and how basic needs are satisfied in transfer contexts (e.g., the classroom for student-athletes) may be one fruitful avenue for future research in life skills transfer from sport. In particular, to better understand exactly how the satisfaction of the basic needs, specifically autonomy, predicts the transfer of mental toughness as a life skill, future research should examine a potential mediating relationship of autonomous motivation. Participating in activities that are more autonomously motivated makes the adaptive need-satisfying elements, such as positive affect, perceived competence, satisfaction, autonomy and a greater sense of alignment with their authentic selves, salient. These positive outcomes will then translate into individuals seeking out and engaging in similar autonomously motivated behaviors in order to satisfy their basic needs through the process of internalization, or the process by which individuals engage in activities that were once externally motivated but are now more internal and self-endorsed (Hagger & Chatzisarantis, 2017). With a focus on the physical education

domain in schools, the Trans-Contextual Model (TCM), first proposed by Hagger & Chatzisarantis (2002), postulates that there is a positive relationship between autonomy supportive environments and autonomous motivation in the learning context. Subsequently, this relationship leads to a positive relationship between autonomous motivation in the learning context and autonomous motivation in a different context. Although this model helps explain how certain behaviors are transferred from different learning contexts, it does not measure exactly how autonomy support and autonomous motivation are related.

Several studies have extended the model to both test the TCM hypotheses as well as extend it to capture the missing link between autonomy support and autonomous motivation. Specifically, Barkoukis, Hagger, Lambropoulos, & Tsorbatzoudis (2010) conducted a three-wave study with 274 Greek secondary students. In the first wave participants completed a survey measuring perceived autonomy support from physical education teachers, autonomous motivation in a physical education context, and need satisfaction. In the second wave, conducted a week later, participants completed surveys measuring components of the theory of planned behavior, autonomous motivation in a leisure-time physical activity setting, need satisfaction, and past behavior. Lastly, in wave three, conducted five weeks later, participants completed surveys measuring physical activity behavior. Results not only confirmed a positive relationship between autonomy support in physical education and autonomous motivation for physical activity in physical education, but indicated that this relationship was mediated by the basic need satisfaction of autonomy and competence. Furthermore, they discovered autonomous motivation for physical activity in physical education positively predicted autonomous motivation for physical activity during leisure time. However unlike our current findings that competence satisfaction did not predict mental toughness transfer, need satisfaction of competence in

physical education had both a direct and indirect effect on autonomous motivation for physical activity in leisure time. This meant that, not only did satisfying the need for competence in physical education have an indirect effect on autonomous motivation in leisure time but that satisfying the need for competence in physical education also directly predicted autonomous motivation for physical activity in leisure time.

In a similar study by Standage, Gillison, Ntoumanis, & Treasure (2012), 494 English secondary school students completed surveys at three different time periods. In the first time period, students completed surveys assessing perceptions of autonomy support, autonomy, competence, relatedness and physical education motivation in school physical education. One week later in the second time period, students completed measures assessing their motivation toward exercise. At this time, students were also given a pedometer to record the number of steps they took during the next four consecutive days. Finally at time three, conducted one week after time two, students completed surveys measuring their health-related quality of life and physical self-concept. Results confirmed a positive relationship between autonomy support in physical education and the basic need satisfaction of autonomy, competence and relatedness. Similar to both the results of the current study, as well as Barkoukis et al. (2010), Standage and colleagues (2012) were able to confirm that basic need satisfaction of competence and autonomy were positive predictors of autonomous motivation towards physical education. Additionally, autonomous motivation in physical education positively predicted autonomous motivation in exercise, with autonomous motivation in exercise resulting in a greater step count.

Subsequently, to better understand the transfer of life skills, such as mental toughness, from collegiate sport to other life domains, future research should examine a potential mediating relationship of autonomous motivation in the classroom context as well as in the sport context. It

may also be beneficial to compare and contrast autonomous motivation with that of controlled, or extrinsic motivation, in which individuals behave in a way that results in an external reward or avoids a punishment (Ryan and Deci, 2008). While autonomous motivation is known to be associated with greater persistence, more positive affect and greeter psychological well-being (Deci and Ryan, 2008), often it is controlled motivation that is used in the short term to motivate individuals to engage in certain behaviors. Interestingly, individuals have also reported that they feel autonomous while being extrinsically motivated with SDT accrediting this to the various stages of internalization and integration found within the motivational model (Deci & Ryan, 2008). Because sport is a context in which individuals may be motivated both intrinsically (i.e. the joy of the sport) or extrinsically (i.e. to win or to avoid a punishment), with motivation occurring on a continuum, it may be interesting to examine not only examine if autonomous motivation helps explain and mediate the findings of the present study, but also if this relationship is different for the various forms of controlled motivation.

Practical Implications

The results of the present study highlight the important role of coaches in helping to facilitate the transfer of mental toughness beyond the sporting domain as a life skill. While coaches and athletes may already be aware of how a coach's actions can either help or hinder mental toughness development in sport (Butt et al., 2010, Weinberg et al., 2011), it should be noted that their behaviors may also help dictate whether or not this development is further internalized so that the student-athlete perceives and applies mental toughness in other contexts. Specifically, coaches should engage in behaviors that satisfy the student-athlete's need for autonomy, competence and relatedness as satisfaction in these three areas are positively associated with mental toughness transfer as a life skill. Our results suggest that targeting the

development of autonomy should be a focus for coaches. Behaviors such as trying to establish caring relationships with the student-athletes, providing plenty of opportunities to work on skill and providing athletes choices within their own training will help to not only develop mental toughness in sport but transfer it to other life domains. Coaches especially should try and engage in autonomy-supportive behaviors, as autonomy alone significantly predicted mental toughness transfer as a life skill.

In addition, life skills development programs, such as the NCAA CHAMPS Life Skills program, should both structure their programs in a way that satisfy the basic needs but also helps educate others on how to engage in autonomy-supportive behaviors so that they can positively impact their current teams as well as their future life domains. As it was found in the present study, satisfying the basic needs of competence, relatedness and most importantly autonomy, will help aid in the internalization and generalization of mental toughness as a life skill, which will subsequently help prepare student-athletes for life after college sports.

Limitations

The present study had several limitations of note. The first was in the selection of participants. While this was the first known study to examine the LDI/BNT model within collegiate student-athletes, it did not include Division II athletes nor athletes of lower or higher levels of competition, such as recreational athletes and Olympic athletes. Although research does suggest that level of competition does not affect overall mental toughness levels (Golby & Sheard, 2004; Nicholls, Polman, Levy, & Backhouse, 2009), both the lower and upper levels of competition might possess different challenges that would affect how an athlete perceives their autonomy, competence and relatedness support and subsequently may affect the transfer of mental toughness as a life skill in way that is different from our present findings. Future research

should include samples from a variety of sports and levels of competition to better understand how the LDI/BNT model functions.

Additionally, our examination of the life skills transfer process focused solely on mental toughness. Mental toughness comprises a multitude of lower order life skills (Weinberg et al., 2011; Butt et al., 2010) that, when studied individually, may have a unique relationship with autonomy-supportive environments. There also may be life skills not captured in the mental toughness index, such as the ability to relate to peers and empathize with peers, that certain environmental conditions may help to facilitate transfer that were not found in the present study. It may be beneficial and insightful for future research to identify, separate and examine other life skills not captured in the framework of mental toughness to assess whether they are transferred by the same mechanisms.

Conclusion

The present research findings partially supported Hodge et al. (2013) model of life skill development by finding a significant relationship between the satisfaction of the need for autonomy and the transfer of mental toughness as a life skill in athletes self-reporting as mentally tough. In light of these findings, coaches and sport stakeholders interested in developing and transferring mental toughness as a life skill should work to implement autonomy-supportive environments in their practice and game situations. Such behaviors include using non-controlling language, providing the athlete's choice in decisions and providing the athletes with rationale for certain drills and exercises. These behaviors will help to create an environment that fosters need satisfaction for autonomy will subsequently lead to transferring mental toughness as a life skill.

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APPENDIX A: DEMOGRAPHIC QUESTIONNAIRES

Sport Background	
1.	What sport are you currently playing (e.g., soccer)? _____
2.	How many years <u>total</u> have you participated in your current sport? _____ <i>years</i>
3.	How many seasons have you been a member of your <u>current team</u> ? _____ <i>seasons</i>
4.	How long have you been playing for your <u>current coach</u> ? _____ <i>years</i>
5.	Circle the gender of your coach. <i>male</i> <i>female</i>

Personal Information				
How old are you? _____ <i>years</i>				
What year are you in school? _____				
Circle your gender: <i>male</i> <i>female</i>				
How would you describe yourself? (<i>circle one</i>)				
<i>African Americ an</i>	<i>Asian</i>	<i>Hispanic</i>	<i>Native American</i>	<i>White</i>

APPENDIX B: MENTAL TOUGHNESS INDEX

Using the scale below, please indicate how true each of the following statements is an indication of how you typically think, feel, and behave as an athlete – *remember there are no right or wrong answers so be as honest as possible.*

1
2
3
4
5
6
7
False, 100% of the time
True, 100% of the time

		1	2	3	4	5	6	7
1	I believe in my ability to achieve my goals	1	2	3	4	5	6	7
2	I am able to regulate my focus when performing tasks	1	2	3	4	5	6	7
3	I am able to use my emotions to perform the way I want to	1	2	3	4	5	6	7
4	I strive for continued success	1	2	3	4	5	6	7
5	I execute my knowledge of what is required to achieve my goals	1	2	3	4	5	6	7
6	I consistently overcome adversity	1	2	3	4	5	6	7
7	I am able execute appropriate skills or knowledge when challenged	1	2	3	4	5	6	7
8	I can find a positive in most situations	1	2	3	4	5	6	7

(Gucciardi et al., 2015)

APPENDIX C: BASIC NEEDS SATISFACTION IN SPORT

Please indicate the extent you agree or disagree with each of the following descriptors about your general experiences in sport.								
		<i>Not True At All</i>						<i>Very True</i>
		1	2	3	4	5	6	7
1.	I can overcome challenges in my sport	1	2	3	4	5	6	7
2.	In my sport, I get opportunities to make choices	1	2	3	4	5	6	7
3.	In my sport, I feel I am pursuing goals that are my own	1	2	3	4	5	6	7
4.	In feel I participate in my sport willingly	1	2	3	4	5	6	7
5.	In my sport, I feel close to other people	1	2	3	4	5	6	7
6.	I am skilled at my sport	1	2	3	4	5	6	7
7.	In my sport, I have a say in how things are done.	1	2	3	4	5	6	7
8.	In my sport, I really have a sense of wanting to be there.	1	2	3	4	5	6	7
9.	In my sport, I feel that I am being forced to do things that I don't want to do.	1	2	3	4	5	6	7
10.	I show concern for others in my sport.	1	2	3	4	5	6	7
11.	I feel I am good at my sport.	1	2	3	4	5	6	7
12.	In my sport, I can take part in the decision-making process.	1	2	3	4	5	6	7
13.	In my sport, I feel I am doing what I want to be doing.	1	2	3	4	5	6	7
14.	I choose to participate in my sport according to my own free will.	1	2	3	4	5	6	7
15.	There are people in my sport who care about me.	1	2	3	4	5	6	7
16.	I get opportunities to feel that I am good at my sport.	1	2	3	4	5	6	7
17.	In my sport, I get opportunities to make decisions.	1	2	3	4	5	6	7
18.	In my sport, There are people who I can trust.	1	2	3	4	5	6	7
19.	I have the ability to perform well in my sport.	1	2	3	4	5	6	7
20.	I have close relationships with people in my sport.	1	2	3	4	5	6	7

(Ng et al., 2011)

APPENDIX D: TRANSFORMATIVE EXPERIENCES SCALE

In many sports, coaches want their student-athletes to be mentally tough. This can include being mentally tough in sport and in other areas of life (e.g., the classroom). Mental toughness is the attribute that enables you to thrive in demanding situations. We are interested in what you learned about mental toughness in your college sport experience. After reading the following statements, please circle the response that best represents your level of agreement.

		<i>Strongly Disagree</i>				<i>Neither Agree nor Disagree</i>			<i>Strongly Agree</i>
1.	I talk about mental toughness with others in my sport	1	2	3	4	5	6	7	
2.	I think about mental toughness when I have to in my sport	1	2	3	4	5	6	7	
3.	I apply my mental toughness when I have to in my sport	1	2	3	4	5	6	7	
4.	When people ask me about my sport, I talk with them about mental toughness	1	2	3	4	5	6	7	
5.	I think about mental toughness in other places like the classroom, study center, or other activities	1	2	3	4	5	6	7	
6.	I think about mental toughness outside of my sport	1	2	3	4	5	6	7	
7.	I apply the my mental toughness even when I don't have to	1	2	3	4	5	6	7	
8.	I love talking about mental toughness	1	2	3	4	5	6	7	
9.	I talk about mental toughness just for the fun of it	1	2	3	4	5	6	7	
10.	I think about mental toughness outside of my sport just because I'm interested in the ideas	1	2	3	4	5	6	7	
11.	I find myself thinking about mental toughness in all kinds of everyday situations	1	2	3	4	5	6	7	
12.	I look for chances to apply my mental toughness in my everyday life	1	2	3	4	5	6	7	
13.	During my sport, I see things in terms of mental toughness	1	2	3	4	5	6	7	
14.	When I am doing something in my sport, I think of it in terms of mental toughness	1	2	3	4	5	6	7	
15.	I notice examples of mental toughness during sport	1	2	3	4	5	6	7	

16.	When I notice the way other people behave, I think about them in terms of mental toughness	1	2	3	4	5	6	7
17.	I notice examples of mental toughness outside of my sport	1	2	3	4	5	6	7
18.	I look for examples of mental toughness outside of my sport	1	2	3	4	5	6	7
19.	I can't help but see behavior outside of sport in terms of mental toughness now	1	2	3	4	5	6	7
20.	During my sport, I think the stuff we are learning about mental toughness is interesting	1	2	3	4	5	6	7
21.	I find it interesting when we talk about behavior outside of sport in terms of mental toughness	1	2	3	4	5	6	7
22.	The ideas of mental toughness are useful for me to learn for my future work	1	2	3	4	5	6	7
23.	I think mental toughness is an interesting topic	1	2	3	4	5	6	7
24.	The ideas of mental toughness help me to better understand behavior	1	2	3	4	5	6	7
25.	The ideas of mental toughness make my sport much more interesting	1	2	3	4	5	6	7
26.	My mental toughness is useful in my current, everyday life	1	2	3	4	5	6	7
27.	I'm interested when I hear things about mental toughness outside of my sport	1	2	3	4	5	6	7
28.	I find that the ideas of mental toughness make my experiences outside of my sport more interesting	1	2	3	4	5	6	7
29.	I find it exciting to think about mental toughness outside of my sport	1	2	3	4	5	6	7

(Adapted from Pugh et al., 2010)