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Functional Effects of Personality on Individual and Team Sport Success

By

Alex I. McKenzie

A Thesis
Submitted to the Faculty of Graduate Studies
through the Department of Kinesiology
in Partial Fulfillment of the Requirements for
the Degree of Master of Human Kinetics
at the University of Windsor

Windsor, Ontario, Canada

2021

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By

Alex I. McKenzie

APPROVED BY:

L. Buchanan
Department of Psychology

S. Scharoun-Benson
Department of Kinesiology

N. McNevin, Advisor
Department of Kinesiology

August 24, 2021

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ABSTRACT

Background: Though the relationship between the personality traits (PTs) of the Five Factor Model (FFM) and athletic performance is well documented, the functional role of PTs in athletic team settings has received scarce empirical attention. The limited research that has been conducted is often criticized for methodological flaws, such as failure to differentiate between sports (e.g., Team vs. Individual Sports).

Objective: To investigate the functional impact of personality on Team and Individual Sport performance in sport-specific settings. The principal objective was to investigate the distinct functional role of the FFM PTs and their influence on team success, based on type of PTs, and the similarity or variance of these PTs among team members. It was anticipated that teams with more similarity in certain PTs (e.g., Agreeableness, Neuroticism) and more variance in others (e.g., Extraversion, Conscientiousness) will lead to optimized team success, evident by objective — Win-Loss percentage or competitive rankings — and subjective measures — coach ratings.

Results: Statistically significant relationships were revealed between the FFM PTs and the five variables of coach ratings. The results indicate that both coach and athlete personality play a part in athletic success. Furthermore, regardless of sport type, Conscientiousness appears to be an advantageous PT in the recruitment and selection of athletes. Specific to Team Sports, Conscientiousness and Openness are two prominent PTs in promoting athletic success. The findings have several implications on the selection and recruitment process of athletes and provide empirical evidence for athlete interventions across sport types.

Keywords: FFM, PTs, Team/Individual Sport, success, coach ratings

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LIST OF ACRONYMS/SYMBOLS

aka	Also known as
AUS	Atlantic University Sports
<i>b</i>	Unstandardized beta
et al.	and others.
e.g.	for example.
i.e.	that is.
FFM	Five Factor Model
<i>M</i>	Mean
<i>N</i>	Number of terms
n.d.	no date
OUA	Ontario University Athletics
<i>p</i>	p-value
PP	Personality Psychology
PT	Personality Trait
R^2	Coefficient of determination
r_s	Spearman correlation coefficient
<i>SD</i>	Standard Deviation
<i>t</i>	T-statistic
vs.	versus.
W-L	Win-Loss
16PF	16 Personality Factor

FUNCTIONAL EFFECTS OF PERSONALITY ON INDIVIDUAL AND TEAM SPORT SUCCESS

History of Sport in Society

As early as Ancient Egypt, societies have engaged in sport for reasons ranging from religion to entertainment (Baker, 1988). Ancient Egyptians practiced sport for martial preparation, with the same holding true for other civilizations such as Ancient Greece and Ancient Rome, where sport was an important religious and social signifier (Devine & Lopez Frias, 2020). For instance, in Hellenistic Greece, athletic competition (*gymnikoi agones*) provided a platform for the cultivation and demonstration of excellence (*arete*) (Devine & Lopez Frias, 2020). The pursuit of excellence through sport was evidently essential in Hellenistic culture, where striving for body and mind perfection served as a unifying activity fundamental to society (Lunt & Dyreson, 2014). The significance of sport was similar in Mayan society, where sport became a political, religious, and social bond that spotlighted harmony while downplaying dissimilarities amidst regional diversity (Fox, 2012).

Since the genesis of Ancient Greece, philosophers have pondered the significance of sport in relation to humanity (Devine & Lopez Frias, 2020). As successors of the father of philosophy (Kreeft, 2009), Plato and Aristotle saw sport as crucial to knowledge, and by virtue, human prosperity (Reid, 2014). According to Plato and Aristotle, a Greek intellectual must maintain harmony in both mind and body by participating in athletics, among other activities (Devine & Lopez Frias, 2020).

Relevance in the public realm may have depleted during the medieval period, but sports were still focal in Roman martial training as well as imperative in Roman Catholic Church imagery (Devine & Lopez Frias, 2020). In *City of God*, Saint Augustine (of Hippo) (ca. 413) acknowledged the apostle Paul as ‘the athlete of Christ’ (as cited in Devine & Lopez Frias,

2020). Akin to Aristotle and Plato, Thomas Aquinas also advocated for cultivation of the body and spirit as fundamental to human prosperity (Kretchmar, 2017). During the Enlightenment, empiricists such as Jean-Jacques Rousseau continued the emphasis on body and mind cultivation by asserting the need to develop both in synchrony (Andrieu, 2014). Rousseau's pedagogy inspired Baron Pierre de Coubertin, who founded the Olympic Movement and considered Olympic sport a "philosophy of life which places sport at the service of humanity" (Devine & Lopez Frias, 2020).

Sport has suffused itself into multiple aspects of society, currently playing a central role in the lives of coaches, competitors, officials, and spectators. Moreover, sport heavily shapes the national media (Boyle, 2006) while also shaping school curricula worldwide (Devine & Lopez Frias, 2020). Sports are incorporated into public policy strategies used to mitigate many social issues, from obesity (Devine & Lopez Frias, 2020) to social disengagement (Cumming & Henry, 1961). Despite the evident role of sport throughout the history of humanity, the philosophy of sport did not emerge as an academic sub-discipline until the mid 1900s (Devine & Lopez Frias, 2020).

Sport Psychology and Athletic Personality

For sport psychology, its birth was not much earlier, as the sub-discipline was first examined just before the dawn of sport philosophy. Triplett (1898) analyzed cyclists and their performance in the presence of other competitors, relative to when they competed alone. His results revealed that the bodily presence of another opponent improved the completion times of cyclists, potentially stemming from a social facilitation effect (McKenzie, 2018). Zajonc (1965) defined social facilitation as the potential improvements in performance from mere bodily presence of others. He also felt that co-action effects — the influence of one's behaviour when

engaged in the same activity as another — typifies the social facilitation that could account for Triplett's findings.

Additional research by Triplett (1898) found that youth winding a fishing reel performed faster in pairs than when working alone, further supporting the notion of co-action effects in enhancing sport performance. He suggested his findings were due to the principle of *dynamogeny*, stating that the presence of others arouses competitive drive, releases energy, and increases speed of performance (as cited in McKenzie, 2018). His research underlines the potential social facilitation and more specifically, the co-action effects participating in Team Sports have in improving sporting performance. Moreover, these results allude to how social factors can interact with personality to yield better sport performance and sport success (McKenzie, 2018), potentially creating an *athletic personality*.

For nearly a century, researchers have speculated over the existence of an 'athletic personality' (Carter & Shannon, 1940; Thune, 1949). This question is integral to sport psychology — and potentially performance psychology — as it may provide insight into empirically-sound applications of sport-specific interventions previously proven effective in non-athletic domains (Allen et al., 2013). Since the emergence of sport psychology as an academic discipline, the influence of personality on athletic performance has been heavily examined and scrutinized (Gee et al., 2010). Research on the relationship between sport and personality exploded during the early '60s and '70s, when this area became one of the most explored fields in sport psychology, experiencing significant growth (Vealey, 2002). The published literature in the '60s demonstrated that personality factors (e.g., Extraversion and Neuroticism) are positively associated with, and mediate sport success alongside participation (García-Naveira & Ruiz-

Barquín, 2013). Contrarily, the literature during the '70s held that the study of personality in sport is trivial because of the inconsistency and contradictory in results obtained (Raglin, 2001).

Besides the fact that athletes tend to be more physically active than non-athletes, there has been minimal agreement on an 'athletic personality' (Guttman, 2006). It is argued that youth with a *sport habitus* — defined as a particular predisposition for sports (Bourdieu, 1978) — are more prone to school sport participation and longer engagement than those with low sport identity (Pot et al., 2014). Nevertheless, Guttman (2006) speculated that when controlling for social class, athletes tend to be similar to both non-athletes and all athletes, regardless of sport type. However, more recent findings suggest otherwise, demonstrating that personality differences exist between those who engage in organized sports and those who do not, regardless of sport type (Allen et al., 2013).

Personality, Personality Traits, and the Five-Factor Model

Since 1930, Personality Psychology (PP) has become a prominent element in the study of human behaviours (McAdams, 1997). Personality denotes individual differences in characteristics surrounding behaviour, cognition, and affect (Kazdin, 2004) that are shaped biologically and via environment (Corr & Matthews, 2009). Personality is believed to begin biological but becomes dependent on nourishment during ontogeny that begins in infancy and finishes with stable structures emerging in adulthood (García-Naveira & Ruiz-Barquín, 2013).

PP emphasizes two general areas of personality. The first emphasis involves discriminating individual differences in particular personality characteristics, and the second is understanding how the numerous parts of a person sum their whole (Kazdin, 2004). For PP, the most common practice pertains to the examination and discernment of personality traits (PTs) (McCrae & Costa, 1997, 2003). PTs are often defined as a person's relatively stable patterns of

behaviour, cognitions, and emotions (McCrae & Costa, 2003). The concerns of personality psychologists are threefold. They are motivated to study how individuals are: 1) like all others, 2) like some others, and 3) like no other (Coulter et al., 2015). These various dimensions of personality research highlight the integrative and complex nature of PP, spanning from the universality of human nature (e.g., like all other persons), to the distinct patterns that define psychological individuality (e.g., like no other person) (Coulter et al., 2015).

To mitigate the interconnected nature of PP, collated frameworks have been formulated and espoused. McCrae and Costa's five-factor theory personality system (1996) and McAdams' three-layered framework of personality (McAdams, 1995, 2013; McAdams & Pals, 2006) are the most popular and validated PP integrative frameworks. Due to its simplicity and versatility in PP, McAdams' approach is arguably the most revered and validated (Coulter et al., 2015). McAdams postulated that people are defined through three layers of comprehension and incorporation: (a) dispositional traits (social actor), (b) characteristic adaptations (motivated agent), and (c) narrative identities (autobiographical author). Combined, these layers provide a holistic perception of the person — a perspective of personality seldomly employed in sport psychology (Coulter et al., 2015).

Some posit that McAdams' framework (McAdams, 1995, 2013; McAdams & Pals, 2006) can consider the complex nature of athletes — an outlook that stresses individual peculiarities in traits (social actor), characteristic adaptations (motivated agent), and life narratives (autobiographical author) — which can confluence to provide a more complete comprehension of athletes associated with these cohorts (Coulter et al., 2015). Researchers such as Coulter et al. (2015), are strong supporters of McAdams, pushing for his framework to be recognized as pivotal in PP and sport psychology. Though there are advocates for the scholarship of this

framework in sport psychology, the main challenge hampering its universal acceptance relates to how it deviates from the broader conceptualization of personality (Coulter et al., 2015; Vealey, 2002). Traditionalists typically prefer to examine PTs of athletes through a discourse of habitual and static traits, encouraging a penchant for delineating in general terms.

Irrespective of the historical impetus for personality examination in sport psychology, Vealey (2002) held that, “many researchers ... believe that sport personality research has yielded no useful findings” (p. 71), while Gill and Williams (2008) advanced that, “most scholars see little value in global personality measures” (p. 46) (as cited in Allen et al., 2013). Despite what previous findings may suggest, more recent research has pinpointed the Five-Factor Model (FFM), also known as the Big Five Model (McCrae & Costa, 1996), as the predominant and most relevant taxonomy for PT research in sport psychology (Laborde et al., 2019; Mirzaei et al., 2013).

The FFM is an orthogonal classification of PTs pervasive in PP research, consisting of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Parks-Leduc et al., 2015). The FFM is the most widely utilized classification of PTs, demonstrating universal validity that withstands cultural and linguistic differences (Allik, 2005; Gurven et al., 2013; McCrae & Costa, 1996). The FFM hypothesizes that global personality is best assessed through five broad trait dimensions (i.e., Openness to Experience etc.) that are distinctly associated to a number of specific traits (Laborde et al., 2019). These specific PTs associated with the FFM include assertiveness, emotional stability, and a person's proclivity for experiencing distress (Mirzaei et al., 2013).

The PTs of the FFM Model

Openness, also known as **Openness to Experiences**, describes a propensity and motivation to experience new feelings and ideas, as well as flexibility and willingness to use imagination. Moreover, Openness denotes a person's ability to have original and creative thoughts (Mirzaei et al., 2013). **Conscientiousness** delineates a person who is considerate, responsible, and thorough. This dimension also involves an individual's reliability and their volition to achieve goals (Mirzaei et al., 2013). **Extraversion** denotes an endpoint of a continuum describing an individual's inclination towards being sociable, optimistic, assertive, and energetic (McCrae & Costa, 1996); while regulating whether they are talkative, assertive, gregarious, or none of the above (Mirzaei et al., 2013). **Agreeableness** explains a person's humanity, through compassion or hostility, nurturance, or a lack thereof. Behaviourally speaking, Agreeableness deems a person as affable, polite, warm-hearted, open-minded, or none of these qualities (Mirzaei et al., 2013). **Neuroticism** uncovers an individual's emotional stability and predisposition to distress, determining whether they can effectively handle affectively stressful situations. *Anxiety, depression, and worry* are often associated with this dimension of personality (Mirzaei et al., 2013). Extraversion and Neuroticism are commonly referred to as the *Big Two* (Mirzaei et al., 2013). Collectively, these PTs are widely regarded as psychological characteristics robust in predicting many facets of life, including sport participation and sport performance (Cooper, 1969; Furnham, 1990; Garland & Barry, 1990; Mirzaei et al., 2013; Piedmont et al., 1999; Renfrow & Bolton, 1981).

Built from the FFM, a *psychological profile* is often dispensed to describe the type of personality displayed by an individual (e.g., 'athletic personality') ('Sports and Personality', n.d.). Elite athletes are expected to be intrinsically motivated to rigorous training in aspirations of

optimizing their expertise and proficiencies. They also aim to enhance their skills and abilities, focusing on effectively coping and overcoming physical (e.g., injury, fatigue etc.) and mental (e.g., failure, lack of confidence etc.) challenges ('Sports and Personality', n.d.). Researchers suggest that a unique psychological profile (e.g., 'athletic personality') consisting of psychological characteristics (e.g., commitment, motivation, self-confidence) conducive for sport are necessary in order to achieve high-performance goals in sport-specific settings ('Sports and Personality', n.d.). In sport, athletes are typically required to execute behaviour in specific settings (e.g., practice, competition) which are modulated by particular environmental and task demands ('Sports and Personality', n.d.). Within these parameters, behaviour is largely predicated on the confluence of the athlete's core personality and their environmental affordances. Hence, *personality* is not just a collection of core psychological characteristics, but also consists of a weaponry of strategies, plans, and skills that individuals utilize to achieve goals ('Sports and Personality', n.d.). This integrated schema comprised of core psychological characteristics (i.e., *hard* aspect), skills, and strategies (i.e., *soft* aspect) has been espoused as the pragmatic approach for analyzing *athletic personality* ('Sports and Personality', n.d.).

In the last 60 years, there have been a plethora of attempts to identify personality characteristics that differentiate athletes from non-athletes (e.g., 'athletic personality'), differentiate successful athletes from less successful athletes, and differentiate athletes who participate in a particular type of sport from others (Ruffer 1975a, 1975b, 1975c, 1976a, 1976b; Schurr et al., 1977). As previously alluded to, the results of these studies are generally incongruent with one another (Guttmann, 2006; Raglin, 2001) and appear contradictory (Rushall, 1970). As a result, there has been no consensus among reviewers on the trends in the data, as some are even hesitant to formulate hypotheses (Schurr et al., 1977). Nevertheless, recent

literature has begun to become more consistently congruent and supportive in results (Aidman, 2007; Phillips et al., 2003; Piedmont et al., 1999; Rammstedt et al., 2016). A catalyst of these novel findings is the meticulous classification techniques researchers have created and now implement.

Classification Techniques for Sport and Personality

One of the earliest and most common classification techniques has been to categorize sports as either *direct* or *parallel* (Schurr et al., 1977). This classification stems from the observation that certain sports (e.g., football, hockey, wrestling) are conducive for *direct* aggression against opponents, whereas other sports involve no direct aggression being expressed (e.g., swimming, gymnastics, cross-country) (Schurr et al., 1977). These sports are referred to as *parallel* (Schurr et al., 1977). Berger (1970) alongside Vanek and Cratty (1970) hypothesized that Direct Sport athletes require characteristics such as mental and physical toughness, tenacity, dominance, high threshold for distressing events, and a high sense of social responsibility. These athletes are typically extraverted (Cratty, 1986; Newcombe & Boyle, 1995). Conversely, Parallel Sports (i.e., non-contact sports) demand fastidious tactical abilities and the capacity to inhibit or delay aggression (Schurr et al., 1977), usually involving individuals more introverted than Direct Sport athletes (Iso-Ahola & Hatfield, 1986; Newcombe & Boyle, 1995). Though there have been some attempts by researchers to investigate (Kane, 1970; Kroll, 1967; Newcombe & Boyle, 1995; Ogilvie & Johnsgard, 1967; Schurr et al., 1977), there is still a scarcity of research that test this classification model.

Another classification technique involves dichotomizing sports according to length of duration needed for competition (Berger, 1970). Sports are classified as either *long duration* (e.g., cross-country, tennis, golf etc.) or *short duration* (e.g., swimming) (Schurr et al., 1977).

Long duration events require resiliency, pain tolerance, durability, discipline, and emotional stability. On the other hand, short duration events require more emotional intelligence, improvisation, imagination, and shrewdness (Schurr et al., 1977).

Relative to the aforesaid classifications, the most popular and frequently utilized classification model dichotomizes sport type into Team and Individual Sports (Schurr et al., 1977). Individual Sports are operationalized as sport-specific competition in individualized situations with little to no diffusion of responsibility (e.g., track & field, wrestling, swimming, cross-country, golf, tennis etc.) (Nia & Besharat, 2010). Conversely, Team Sports are defined as sport-specific competition in group settings where there is shared responsibility (e.g., basketball, football, baseball, volleyball, soccer etc.) (Nia & Besharat, 2010). Certain sports are applicable to both categories, including tennis (e.g., doubles), swimming (e.g., relay team), and cross-country (e.g., team competitions).

Team play — or more specifically, Team Sport — is uniquely a human feature (Kniffin & Sugiyama, 2018). In non-human species, play behaviour is consistently dyadic, where even in highly sociable species, team play is a rarity (Kniffin & Sugiyama, 2018). Besides dolphins (Scalise Sugiyama et al., 2018), humans (*homo sapiens*) are the only species that evidently play in teams (Kniffin & Sugiyama, 2018). Furthermore, research has alluded that team play behaviour is in fact, specie specific (Kniffin & Sugiyama, 2018), in that Team Sports are ubiquitous across nomadic (Scalise Sugiyama et al., 2018) and industrialized societies (Deaner & Smith, 2013). This indicates that Team Sports are spurred by social motivational architecture (Kniffin & Sugiyama, 2018).

Parallel to how academic settings are recognized as labour market laboratories (Kahn, 2000), Kniffin and Sugiyama (2018) see Team Sports as “dynamic organizational laboratories”

applicable to both multi-level and sexual selection theoretical framework. They continued that compensation in professional sports is like other occupations in that employees' performance data and salary information are publicly available, hopefully with the latter being compensated according to the former. Kniffin and Sugiyama's (2018) perspective on Team Sports firmly complements Kahn's (2000) recognition of the sports industry as a "labour market laboratory". A plethora of researchers continue to examine in academic, occupational, and sport-specific settings the intricacies of conflicts coinciding with team member compensation relative to each other (Kniffin & Sugiyama, 2018). Thus, the interconnected impact of social institutions on the popularity of Team Sports is indelible.

Cratty (1986) referred to the Team—Individual Sport model as a consequence of the common stereotypes which perpetuate both the introverted Individual and the extraverted Team Sport athlete. Results from studies conducted on both men and women populations (Kroll & Crenshaw, 1970; Singer, 1969) indicate non-significant differences that warrant credence for the Individual vs. Team athlete stereotype. On the other hand, Vanek and Cratty (1970) have underpinned that Individual Sport athletes typically seem less anxious, more self-sufficient, and more self-reliant than Team Sport athletes. In a follow-up review on the literature, Vanek and Cratty (1970) asserted that Individual Sport athletes tolerate and demand more stability and predictability in their sporting environment.

Cutting-Edge Contributions to Team—Individual Sport and Personality Research

Shortly after Vanek and Cratty (1970), Schurr et al. (1977) made maverick contributions that supported and supplanted previous research. Schurr et al. (1977) demonstrated that distinct personality profiles are elicited by, and potentially identified based on the Team and Individual Sport type classification. In other words, an athlete's personality may potentially be stimulated

and identified based on their sport type. The study analyzed the influences of moderating variables on sport-personality relationships. Over a five-year period, nearly 1600 first-year university students completed the Cattell's (1973) 16 Personality Factor (16PF) Questionnaire, categorized by (1) athletic involvement, (2) sport type, and (3) success level. The types of sport included were Direct, Parallel, Individual, and Team. The research design enabled broader investigation of athletes and non-athletes, and a variety of sport groups whereby a common operational definition for both success and personality could be formulated for all groups. They hypothesized that sport type (Team—Individual, Direct—Parallel) and level of success are potentially fundamental variables that moderate the sport-personality relationship.

Schurr and colleagues (1977) yielded seminal findings in sport psychology research, establishing that distinct personality profiles can be delineated contingent on combining various groupings (i.e., athlete, non-athlete) with sport type classification procedures (i.e., Team—Individual, Direct—Parallel). They found that athletes classified as Team Sport participants were more anxious and dependent than Individual Sport participants, while also being more extraverted. Moreover, Individual Sport participants were less anxious and dependent than not only Team Sport participants, but also non-athletes. From this, one may deduce Individual Sport athletes as more self-reliant, while also being less emotional (e.g., less Neuroticism) and more pragmatic than both Team Sport athletes and non-athletes. What is unclear, however, is whether Individual Sport participants were less emotional prior to sport participation, guiding their sport selection. Or were they simply not afforded the same conditions to develop emotionality relative to Team Sport participants, resulting in their reported lower emotion. The findings of Schurr et al. (1977) also substantiate the notion regarding Team Sport participants being less self-sufficient

yet more novelty-seeking. Regarding Direct Sport participants, they were shown to be more independent and less egocentric than Parallel Sport participants.

Individual Sport scores were lower for anxiety and higher for independence and alertness, but were only statistically significant contingent on interactions, such as anxiety for Individual—Parallel Sports, and independence and alertness for Individual—Direct Sports. Hence, Schurr and colleagues (1977) felt that it is paramount to consider and account for the interconnected nature of the sport-personality relationship, examining all viable factors for variation. They also held that the niche number of statistically significant and distinct dimensions determined through this sample can provide a prototypical research design for subsequent studies in sport psychology.

Ogilvie and Johnsgard (1967) and Kroll (1967) posited that theories which consider moderating variables are especially vital to the development of sport psychology, yet miniscule amounts of empirical data is available. The research typically omits reasonably sized samples, representative non-athlete populations, sufficient classification techniques (e.g., 16PF, FFM), or adequate replication of research designs (Schurr et al., 1977). Nearly 50 years later, little progress has been made (Mirzaei et al., 2013). Nevertheless, more robust PT taxonomies such as the FFM (McCrae & Costa, 1996) have since been devised that allow for more practical and holistic analyses of athletes.

Despite making monumental contributions to sport psychology research, Schurr et al. (1977) found no significant relationship between personality and level of success. Nonetheless, they revealed interesting results that illustrate a parallel between personality, sport, and cognition. As previously stated, Team Sport members appear to seek novelty and complexity (Schurr et al., 1977), echoing the popular cognition-sport classification technique, open motor skill sports. Open motor skill sports demand “open-skills”, whereby constant adaptation is

required due to a highly unstable environment (Di Russo et al., 2010). These sports typically are team based and focus on interdependent movements, such as rugby or lacrosse. Thus, external forces determine when movement is necessary in persistently novel situations (Di Russo et al., 2010). Akin to Team Sports, open motor skill sports require much adaptability, which can be examined and expressed through the PT, Openness to Experiences. This parallel might help explain why Openness to Experience scores have typically been higher for Team Sports participants (Bojanić et al., 2019). Like many Team Sports, open motor skill sports demand flexible and adaptive cooperation with others in order to achieve a goal (McKenzie, 2018).

In contrast, Individual Sports can be seen as analogous to closed motor skill sports. Closed motor skill sports transpire in predictable and stable environments, whereby the objective and method are clearly defined (McKenzie, 2018). Swimming and golf are some examples of these sports due to movement being repetitive and skills self-induced (Di Russo et al., 2010). If Individual Sports — like closed motor skill sports — occur in predictable, stable environments, then this could explain why Individual Sport athletes appear less anxious (Schurr et al., 1977), as relative to Team Sport athletes, they potentially face less anxiety-riddling predicaments by virtue of sport type. As a result, these different sport types could potentially yield unique benefits on one's mental and physical health.

The physiological benefits of sport on health, such as prevention from chronic diseases like obesity and hypertension, have long been documented (Tomporowski et al., 2015). Socrates and Aristotle postulated the possible association between physical and mental prowess, emphasizing the maintenance of physical health as parallel to psychological health (LeUnes & Nation, 1996). More modern research has leaned towards analyzing participation in sport-oriented exercise optimizing not only physical wellbeing, but also psychological wellbeing. In

the last two decades, evidence has emerged suggesting that physical activity in a structured, purposeful, and planned manner (e.g., sports) can improve numerous components of physical fitness and psychological functioning (Tomporowski et al., 2015). One of these components is cognition. Cognition is the “processes of knowing, including attending, remembering, and reasoning, as well as the content of the processes, such as concepts and memories” (Gerrig & Zimbardo, 2002, p. 280).

Cognition is not only integral to sports, but is also an important component for eliciting, developing, and displaying PTs. Whether you are young, middle-aged, or an older adult, the personality-cognition relation remains quite consistent (Soubelet & Salthouse, 2013). The most robust personality-cognition relations have ostensibly been for the personality dimension of Openness to Experiences, as higher levels of Openness are strongly associated with higher levels of cognitive ability (e.g., planning and problem solving, working memory) (Soubelet & Salthouse, 2013). This connection between cognition and Openness is no coincidence, as Openness is often considered the “intellect trait” (Goldberg, 1993).

Consistent with Soubelet and Salthouse (2013), Rammstedt et al. (2016) also found a positive association between cognitive ability and Openness, as well as emotional stability (i.e., Neuroticism). This correlation was moderated by educational attainment. Moreover, they substantiated previous research regarding the negative correlation between cognitive ability and Conscientiousness, whereby the negative association was moderated by occupational participation. The PTs Conscientiousness and Openness were found to have direct significant effects on intention of behaviour, accounting for 65% of the variance in intention (Phillips et al., 2003). Overall, these findings demonstrated how PTs (i.e., Conscientiousness and Openness) via

mediators such as intention, autonomous intrinsic motivation, anticipated regret, and student identity strongly impact academic performance.

Research on personality and cognition typically gravitates towards success in academic (Phillips et al., 2003; Rammstedt et al., 2016; Soubelet & Salthouse, 2013) and occupational settings (Rammstedt et al., 2016). The focus has now shifted towards looking at cognitive abilities and personality in sport-specific settings, with several studies aimed at elucidating the role personality plays in these settings (Parks-Leduc et al., 2015). Predicting athletic achievement through PTs was one of the earliest and continues to be one of the most alluring applications of applied sport psychology (Aidman, 2007; Cooper, 1969; Griffith, 1928). However, academic literature supporting the use case of this practice has been ambiguous at best, resulting in skepticism of its predictive potential from many coaches and sport teams (Deaner & Silva, 2002). Nevertheless, the use of personality-based assessment tools is consistently becoming more common among professional sport teams (Deaner & Silva, 2002), as they seek any advantage in the identification and forecasting of an athlete's probability for long-term success.

Personality has shown to accurately predict and mediate athletic advancement in a sport, influencing progression from amateurism to professionalism (Aidman, 2007). Piedmont et al. (1999) aimed to determine if the PTs of the FFM could predict athletic performance, and the feasibility of the FFM as a taxonomy for organizing personality research on athletes. The sample consisted of 79 women from four different National Collegiate Athletic Association Division I soccer teams, where they were administered the Bipolar Adjective Scale designed to measure the Big Five PTs. Subjective ratings (i.e., coach ratings) on several performance dimensions alongside actual game statistics (i.e., objective ratings) were recorded.

Each player was assessed by the Assistant and Head Coach on: *coachability* (ability for player to listen, learn, and apply coaching), *athletic ability* (the athleticism the player displays), *in-game performance* (player performance overall in games), *team playerness* (ability to mesh and coincide with teammates, on and off the field), and *work ethic* (amount of effort and commitment dedicated to the team, themselves, and the coaches). These ratings were scored on a Likert scale from 1-7. Objective ratings included *games played* (number of games played by each player), *assists* (number of times a player facilitates a goal), *shots* (number of shots on goal), and *scores* (number of goals earned), with all scores combined to create an overall performance index for each player.

The PTs Neuroticism and Conscientiousness were found to explain 23% of variance in coach ratings, while Conscientiousness was the prime predictor of objective ratings, accounting for 8% of the variance. These findings provide a point of interest that can help extend the study for future research to better determine exactly how these PTs — particularly Neuroticism and Conscientiousness — influence lower or higher coach ratings. Moreover, Piedmont et al. (1999) found that personality reliably accounts for up to 45% of variance in athletic performance, irrespective of gender. Despite this evidence, research has indicated that not all PTs equally impact athletic performance. Echoing Piedmont et al. (1999), Laborde et al. (2013) highlighted Conscientiousness and Neuroticism as fundamental in predicting sport performance. Furthermore, Conscientiousness and Neuroticism have been shown to be the most significant in athletic success (Aidman & Schofield, 2004), with this association persisting across performance contexts (i.e., occupational and academic) (Aidman, 2007; Phillips et al., 2003; Rammstedt et al., 2016).

The focus of sport-personality research has undeniably established a solid relationship, determining that athletes differ from non-athletes, and that even athletes in the same sport can experience distinct sport success contingent on their PTs. The emphasis has now steered towards analyzing differences in PTs among various sport classifications, including Individual and Team Sports. Bojanić et al. (2019) wanted to analyze whether the Big Five PTs can statistically differentiate athletes vying in combat sports (e.g., Individual Sports) from athletes in Team Sports. The sample consisted of 149 participants, with ages ranging from 19 to 27 (Bojanić et al., 2019).

Bojanić et al. (2019) found that athletes in combat sports, which are mostly individualized, are characterized by positive high scores in Conscientiousness, Agreeableness, and Extraversion, as well as lower Neuroticism. They also revealed lower scores in Openness to Experiences and lower self-esteem. Contrarily, athletes in Team Sports possessed the exact opposite PTs, such as lower levels of Conscientiousness and Extraversion, which contradicts previous research on athletes in Team Sports (Allen et al., 2013; Eagleton et al., 2007; McKelvie et al., 2003). In addition, they found that self-esteem is actually higher in Team Sport athletes, making their results inconsistent with previous research (Ali et al., 2013; Laborde et al., 2016) that suggest relative to Team Sport athletes, self-esteem is more common in Individual Sport athletes. The researchers surmised that self-esteem is heavily socially influenced, therefore Individual Sport athletes may be more susceptible to self-doubt from the lack of social support in individualized sport-specific settings (Bojanić et al., 2019).

Their research also revealed Neuroticism to be significantly higher in Team Sport athletes compared to combat sport athletes, and thus, Individual Sport athletes (Bojanić et al., 2019). They suggested that their results stemmed from the focus and impulse control integral to

Individual Sports, as it demands more self-reliance with no diffusion of responsibility relative to Team Sports. Their results signify that certain personality characteristics (i.e., low self-esteem and low Neuroticism) might better foster Individual Sport participation, whereas exhibiting the opposing personality characteristics (i.e., high self-esteem and high Neuroticism) may be more conducive to Team Sport participation.

Even before Bojanić et al. (2019), researchers such as Nia and Besharat (2010) have garnered findings that support distinct personality characteristics between Individual and Team Sport athletes. They employed a unique design in which there were no clear-cut hypotheses made prior to their study. 134 University of Tehran athletes (42 Individual vs. 92 Team, 46 females vs. 88 males) were examined using the NEO Personality Inventory-Revised and Sociotropy-Autonomy Scale. They demonstrated that scores for Extraversion and Conscientiousness were relatively higher for athletes, whereas Neuroticism was relatively lower compared to the scores of non-athlete participants. These findings are parallel with previous research (Arai & Hisamichi, 1998; Conner & Abraham, 2001; Davis et al., 1991; Eagleton et al., 2007; McKelvie et al., 2003; Potgieter & Venter, 1995; Rhodes et al., 2001; Saklofske et al., 2007; Tafti et al., 2008; Yeung & Hemsley, 1997), as Nia and Besharat (2010) offered sound rationales to supplement their results. They see sport as a consortium of systematic behaviours which inevitably demand more positive emotions such as happiness, optimism, and high energy (i.e., Extraversion), while requiring fewer negative emotions such as worry, anxiety, and fear (i.e., Neuroticism). Higher Extraversion and lower Neuroticism are conditions more favourable to individual involvement in sport participation. Therefore, sport participation lays the foundation for achieving and enhancing these PTs.

The results and rationale of Nia and Besharat (2010) support Eysenck's (1967) theory that stated Extraversion is a function of cortical arousal in our central nervous system. As a result, these under-stimulated Extraverts seek optimal arousal levels through social contact (McKelvie et al., 2003). Conversely, levels of arousal for introverts are either sufficient or excessive, thus, they avoid stimulation in order to achieve optimal arousal levels. Altogether, this would implicate personality as pivotal in sport participation capacity (McKelvie et al., 2003). Still, it does not warrant selection or omission of athletes contingent on personality because the data does not look at sport-specific performance or success.

In regards to distinct athletic personality profiles between Individual and Team Sport athletes, the results revealed that Individual Sport athletes had significantly higher levels of Conscientiousness and *autonomy* relative to Team Sport athletes (Nia & Besharat, 2010). Contrarily, Team Sport athletes scored significantly higher on Agreeableness and *sociotropy* compared to Individual Sport athletes (Nia & Besharat, 2010), alluding to Individual Sport athletes and their proclivity towards autonomy. Their results are congruent with other findings (Bojanić et al., 2019; Eysenck et al., 1982; Schurr et al., 1977) that corroborate the potential differences in PTs between Individual and Team Sport athletes. This is considered a breakthrough discovery in sport psychology that can be explained through a multitude of ways.

In the FFM, *competence* is an integral component of Conscientiousness (Nia & Besharat, 2010). Despite competence achievement being feasible in both Individual and Team sport settings, its value to the athlete is truly elicited when earned through individual endeavours (Nia & Besharat, 2010). Hence, Individual Sport athletes reporting higher Conscientiousness than Team Sport athletes can be attributed to the process of personal competence attainment (Nia & Besharat, 2010). Another facet of Conscientiousness in the FFM that relates to competence is

achievement striving (Nia & Besharat, 2010). Individual Sport athletes reporting higher levels of Conscientiousness could stem from a stronger desire for achievement without necessitating social motive and affiliation (Nia & Besharat, 2010).

Alongside competence and achievement striving, *self-discipline* is another fundamental factor of Conscientiousness (Nia & Besharat, 2010). Self-discipline signifies an inclination for and attention towards order and restraint (Nia & Besharat, 2010), being much easier to attain and maintain in Individual Sports due to the absence of unpredictability pervasive in Team Sport settings. As a result, Individual Sport settings afford more opportunities for athletes to develop self-discipline, and vicariously, Conscientiousness. Competence, achievement striving, and self-discipline combine to confluence the PT Conscientiousness in the FFM, which Nia and Besharat (2010) surmised ultimately primes one for Individual Sport selection.

To support the relationship between Team Sport athletes and the FFM's Agreeableness, Nia and Besharat (2010) offered some possible explanations. First and foremost is *trust*. Trust is an integral interpersonal factor in FFM's Agreeableness, as it facilitates group reliance and develops group cohesion (Nia & Besharat, 2010). Team Sports provide pertinent conditions for achieving and honing trust (Nia & Besharat, 2010), thus, Agreeableness via trust potentially grooms an athlete for and gravitates them towards Team Sport settings.

The next major characteristic of Agreeableness is *altruism*, defined as an affinity for affection and aiding that readies an individual for cooperation and social responsibility in group settings (Nia & Besharat, 2010). In more sport-specific settings, Team Sports propagate opportunities for heightened achievement and accomplishment of altruism (Nia & Besharat, 2010). Similar to trust, the next facet of Agreeableness, *compliance*, is by virtue an interpersonal component (Nia & Besharat, 2010). Compliance represents the distancing of an individual from

their own world of attitudes and behaviours, instead steering them towards the submission of another's (Nia & Besharat, 2010). Similar to the influence of self-discipline, competence, and achievement striving on Conscientiousness; trust, altruism, and compliance converge to carve out one's Agreeableness (Nia & Besharat, 2010) which can ultimately guide an individual towards Team Sport selection.

In addition to the PTs (i.e., Conscientiousness and Agreeableness etc.), Nia and Besharat (2010) held that personality characteristics such as sociotropy and autonomy are pivotal in propelling an athlete towards Team or Individual Sports. Their findings demonstrated that Team Sport athletes are more sociotropic than Individual Sport athletes, while Individual Sport athletes are more autonomous than Team Sport athletes. Sociotropy is mediated by mechanisms of positive engagement with others alongside enduring and persevering social relationships (Nia & Besharat, 2010). In opposition, autonomy is enforced by mechanisms involving independence striving and distancing oneself from others (Nia & Besharat, 2010).

From this, Nia and Besharat (2010) assume that sociotropy and autonomy are two indicative personality models crucial to one's selection of sport type. These findings lead us to conclude that when the sociotropy characteristic is dominant, athletes are more attracted to Team Sports. Whereas when the autonomy characteristic is dominant, that gravitates the athletes more towards Individual Sports (Nia & Besharat, 2010). Whether discerning between athlete and non-athlete, or Individual Sport and Team Sport athletes; Nia and Besharat (2010) underpinned the Selection Model as crucial to understanding athletic personality development and sport participation.

Another component influencing the way personality development and sport participation is examined involves the Skeptical, and Gullible (aka Credulous) hypotheses (García-Naveira &

Ruiz-Barquín, 2013), described as the antithesis of Skeptical (Raglin, 2001). Skeptical hypothesis researchers hold that there are no differences in personality in sport-specific settings (García-Naveira & Ruiz-Barquín, 2013). The literature suggests the personality of the athlete is a static description of personality that encompasses a stable set of characteristics elicited universally (García-Naveira & Ruiz-Barquín, 2013). Contrarily, under the Gullible aka Credulous hypothesis, researchers can locate distinctions in personality, whereby certain features are considered relevant in relation to athletic performance (García-Naveira & Ruiz-Barquín, 2013). However, subsequent research has identified three different hypotheses that are most applicable to the sport-specific personality relationship, and more aligned with the findings of Nia and Besharat (2010) pertaining to the Selection Model.

Attrition, Selection, and Change Models

To resolve questions regarding personality development and athletic participation, the *Attrition, Selection, and Change Models* have been proposed (Rostraub, n.d.). The Theory of Attrition purports that people who do not possess certain PTs are more susceptible to sport drop out, leading to the apparent progressive parallelism of PTs in athletes (Roul, 1998). The Selection Model, aka the Gravitational Hypothesis (Eagleton et al., 2007), suggests that only those with particular personality characteristics participate in sport (Roul, 1998). The other model — interchangeably labelled the Change Model, Developmental Hypothesis (García-Naveira & Ruiz-Barquín, 2013), or Socialization (Eagleton et al., 2007) — posits that sport participation significantly changes the personality of participants (Roul, 1998). In the literature, the Change Model has also been referred to as the Developmental Model of Sport Participation (Côté & Vierimaa, 2014). According to Eagleton et al. (2007), Selection Model differences in

participation are early and enduring, whereas the Change and Attrition Model differences are initially unapparent, but eventually become more robust and defined.

Though there has been much debate regarding which model is most accurate, the Selection and Change Model remain the two that receive most attention (Rostraub, n.d.). García-Naveira and Ruiz-Barquín (2013) surmised that the Change Model is more applicable to adolescent athletes, whereas the Selection Model is more appropriate for adult athletes. In addition to the Selection and Change Model, researchers also stress the importance in considering other factors such as age, sex, and socioeconomic status (SES), and their modulating influences on sport-specific behaviour (Martínez-Tur et al., 1995). Sport participation and personality development therefore involve personal factors (e.g., family history with specific sport), social factors (e.g., peer participation in specific sport), and environmental factors (e.g., in hot or cold climate) (García-Naveira & Ruiz-Barquín, 2013).

Rationale for Present Study

In non-athletic settings, research has clearly demonstrated that greater variation among group members in particular PTs (i.e., Extraversion) and greater similarity in others (i.e., Agreeableness) resulted in optimized team performance (Aidman, & Schofield, 2004). These findings exemplify the impact of group dynamics on team performance. They also reverberate the aforesaid potential influence of social facilitation (Zajonc, 1965) on team success. Though the relationship between the FFM PTs and athletic performance is well documented (Aidman, 2007; Eysenck et al., 1982; Furnham, 1990; Garland & Barry, 1990; Piedmont et al., 1999; Renfrow & Bolton, 1981), the functional role of PTs in athletic team settings has received scarce empirical attention (Aidman, & Schofield, 2004). The limited research that has been conducted is often criticized for theoretical and methodological flaws, such as insufficient sample sizes and

failure to differentiate between sports (e.g., Team vs. Individual Sports) (Eysenck et al., 1982; Furnham, 1990).

Another criticism constantly permeating personality and sport performance research is the pervasive espousal of ipsative inventories (Gee et al., 2010). According to Baron (1996), ipsative inventories are, “force-choice questionnaire formats, where respondents order sets of items loading on different scales” (p.1) (as cited in Gee et al., 2010). As a result of their design, “ipsative scores not only fail to meet the assumptions of classical psychometric analysis, they also constitute an essentially ordinal level of measurement” (Baron, 1996, p.1). This has led researchers to consider normative personality inventories (i.e., FFM questionnaire) as “best practices” in forecasting future athletic success (Gee et al., 2010). This questionnaire format possesses more robust psychometric properties while enabling better establishment of social norms and social comparisons (Gee et al., 2010). Hence, this was strongly considered when selecting the research tools and taxonomies for the present study.

Lack of congruent findings may stem not only from sample sizes or the design of tools, but also from the variability in construct definitions and methodology espoused (Eysenck et al., 1982; Furnham, 1990; García-Naveira & Ruiz-Barquín, 2013). These variations include methods of statistical analysis, data collection procedures, and most notably, discrepancies in operational definitions such as “personality”, “athlete”, and “successful performance” (Schurr et al., 1977). For instance, since multiple sample sizes and types have been used — such as middle schools, high schools, universities, athletic clubs, Olympic, professional teams, or different types of sports — the definition of an athlete has varied study to study (Schurr et al., 1977). These discrepancies in sample structuring also have influenced the operational definition of success.

Later literature also substantiated Schurr's (1977) position pertaining to caution in operationally defining success. Aidman (2007) found that personality test scores of elite junior European football players could predict their progression to the professional level seven years later. This indicates that long-term sport success is partly a function of personality, whereas short-term success is unrelated to personality. Hence, researchers must carefully consider the parameters of success such as the operational definition of success, and its measured length (Allen et al., 2013).

Resounding a similar perspective to the present study, Schurr et al. (1977) questioned whether the inconsistencies among methodology and classification techniques (e.g., Team—Individual) skewed relatively straightforward sport-personality relationships. Or were these associations so intricate that they require moderating variables such as sport type (e.g., Team—Individual, Open—Closed Motor Skill) and level of success? Despite making massive contributions to sport psychology research, Schurr et al. (1977) found no significant relationship between personality and level of success. They provided many explanations for the lack of significant findings (e.g., sample size, inconsistent methodology) that we have closely considered and consequently incorporated into the present study. For this research, operational definitions of key components are clearly outlined to mitigate the concerns articulated by previous researchers (Eysenck et al., 1982; Furnham, 1990; García-Naveira & Ruiz-Barquín, 2013; Schurr et al., 1977).

Working Definitions

As mentioned earlier, *personality* is operationalized as individual differences in characteristics regarding behaviour, cognition, and affect (Kazdin, 2004) that are shaped biologically and by environment (Corr & Matthews, 2009). Though virtually impossible to find a

consensus within the literature; the operational definition of *athlete* is aligned with previously pioneering research (Schurr et al., 1977), such that it pertains to male Varsity University athletes. For a more representative participant pool and to prevent gender as a confounding variable, our sample will include both males and females. It is important to note that intra-sport and inter-sport comparisons will be made, so it is crucial to systematically build our sample via a flexible yet universal definition of athlete. When analyzing across sport, it is imperative that competition within that sport itself, and within the specific country be carefully considered (Swann et al., 2015). When analyzing within sport, athlete's definitions ought to be based on the athletes' highest standard of performance, the experience they gained at that level, and their success at said level (Swann et al., 2015).

Success or successful performance in both work and academic settings is contingent on capacity and inclination to perform, regulated by one's personality (Poropat, 2011). In sport-specific settings, success is also predicated, at least in part, on an athlete's ability (e.g., capacity to cope with distress) and their inclination to perform (e.g., effort, resilience) (Allen et al., 2013). *Subjective and objective success* echoes Piedmont and colleagues' (1999) definition of the two concepts, such that objective success is operationalized as actual game statistics, and subjective success as coach ratings of athletes. Certain PTs (i.e., Neuroticism and Conscientiousness) have previously shown to have significant variance ($R^2 = .23$) on subjective scores (Piedmont et al., 1999), so the present study also aims to analyze if these PTs are pivotal in shaping coach ratings (e.g., subjective scores). As also previously mentioned, much of the past research failed to analyze sport-specific performance or success (McKelvie et al., 2003) that enabled selection of athletes based on personality. Hence, success is a focal component of the research incorporated in order to allow for data-driven selection of athletes.

Another reason to further extend and explore this literature is due to findings either being exclusively correlative (Aidman, 2007; Aidman & Schofield, 2004; Piedmont et al., 1999) or highly inconsistent (Ali et al., 2013; Allen et al., 2013; Bojanić et al., 2019; Laborde et al., 2016; Nia & Besharat, 2010; Schurr et al., 1977). Hence, we aimed to resolve the aforesaid inconsistencies by establishing the functional role of PTs in Individual and Team Sport success.

Objective/Hypothesis

The objective was to investigate the functional impact of personality on Team and Individual Sport performance in sport-specific settings. The principal objective was to investigate the distinct functional role of the FFM PTs and their influence on team success, predicated on type of PTs, and the similarity or variance of these PTs among team members. It was anticipated that teams with more similarity in certain PTs (i.e., Agreeableness, Neuroticism) and more variance in others (i.e., Extraversion, Conscientiousness) would lead to optimized team success, evident by objective — Win-Loss (W-L) percentage or competitive rankings (if W-L not applicable) — and subjective measures — coach ratings.

METHODS

Participants

Participants consisted of varsity athletes ($N = 35$) from two Canadian universities with ages ranging 18-27 ($M = 20.2$, $SD = 2.3$). There was a total of 27 female-identifying athletes and 8 male-identifying athletes. Of these athletes, 18 played basketball, nine played hockey, five played golf, and three competed in track and field (See Table 1). The year of study for varsity athletes ranged from first year to graduate level ($M = 2.62$, $SD = 1.41$). Head Coaches ($N = 6$) from each respective varsity team — Men's Basketball, Women's Basketball, Men's Hockey, Women's Hockey, Track and Field, and Golf — also participated. Assistant Coaches ($N = 2$)

were omitted in order to mitigate against imbalance. All athletes had at least one year of varsity athletic experience — meaning that all athletes had competed the previous athletic season.

Materials and Procedure

Athletes

Varsity athletes were recruited via email (See Appendix A) sent from the lead researcher to their university's Athletic Director and coaches, respectively. To promote confidentiality, a unique identifier was created for each athlete and used to identify them throughout the process. Team (hockey & basketball) versus Individual Sports (golf & track and field) were considered to mitigate for the lack of sport differentiation in previous studies (Coulter et al., 2015; Schurr et al., 1977). As previously stated, both male and female athletes for each sport type were examined to analyse potential associations.

Athletes first completed a consent form attached to the *Demographics Questionnaire* (See Appendix B). Athletes then completed an adapted version of Goldberg's (1992) FFM self-reported questionnaire to assess PTs (See Appendix C). The FFM has been consistently utilized in sport-specific settings (Aidman, 2007; Aidman & Schofield, 2004; Eysenck et al., 1982; Furnham, 1990; Garland & Barry, 1990; Piedmont et al., 1999; Renfrow & Bolton, 1981), demonstrating sound validity and reliability in analyzing athletic success (Bojanić et al., 2019; Laborde et al., 2016). Both questionnaires were accessed online via Qualtrics and took approximately 15 minutes combined to complete.

Subjective Success: Coach Ratings

Coaches were asked to complete a consent form attached to the *Coach Rating Survey* on Qualtrics (See Appendix D). Coaches then rated each athlete on five performance-relevant dimensions: *coachability* (ability for player to listen, learn and apply coaching), *athletic ability*

(the athleticism the player displays), *in-game performance* (player performance overall in games), *team playerness* (ability to mesh and coincide with teammates, on and off the field) and *work ethic* (amount of effort and commitment dedicated to the team, themselves, and the coaches). This survey took on average approximately one minute to complete for each athlete. Coaches also completed an adapted version of Goldberg's FFM self-reported questionnaire that took approximately 10 minutes to complete. We wanted to assess whether the FFM PT scores of coaches associated with the subjective success of athletes (i.e., coach ratings), so this relationship was examined in our analyses.

Objective Success: W-L % or Competitive Rankings

Objective measures were operationalized as the most recent overall W-L percentage of the respective athlete, or their competitive ranking if W-L record was not applicable. The W-L percentage and competitive rankings were based on the 2019-2020 Ontario University Athletics (OUA) season for five of the six teams, and the 2019-2020 Atlantic University Sports (AUS) season for the remainder. There was a varsity athlete who had transferred from one OUA university to another, so their 2019-2020 OUA competitive ranking at said school was used for data analysis.

RESULTS

The initial goal was to conduct a two (Team—Individual) x two (male—female) x two (hockey—basketball, golf—track & field) Multivariate Analysis of Variance (MANOVA) to analyze the data. However, due to COVID-19, the cancelled 2020-2021 sporting season inhibited the original methodology that sought to examine the PTs of participants pre and postseason. As a result, we were unable to determine causality. Instead, Spearman's rank-order correlation was

espoused for our statistical analyses and examined using the Statistical Package for Social Sciences (SPSS version 25).

Table 1.

Frequency Distribution of Sport Type of Athletes

Sport	N	%
Basketball	18	51.4%
Hockey	9	25.7%
Track and Field	3	8.6%
Golf	5	14.3%
Total	35	100%

Table 2.

Frequency Distribution of Race of Athletes

Race	N	%
Black	4	11.4%
Caucasian	26	74.3%
Asian	1	2.9%
Mixed	2	5.7%
Other	2	5.7%
Total	35	100%

Preliminary Analyses: Coach PTs vs. Coach Ratings of Athletes

A Spearman’s rank-order correlation was conducted between coach PT scores (i.e., Neuroticism, Agreeableness) and coach ratings of success (i.e., *coachability*, *work ethic*). Four out of five of the FFM PT scores for coaches were statistically significant with three out of the five coach rating variables. More specifically, Coach Agreeableness scores were negatively correlated with *coachability* ($r_s(33) = -.41, p = .02$), *in-game performance* ($r_s(33) = -.33, p = .05$), and *work ethic* ($r_s(33) = -.38, p = .03$). Coach Extraversion scores were also negatively correlated with *coachability* ($r_s(33) = -.48, p = .01$), *in-game performance* ($r_s(33) = -.36, p =$

.05), and *work ethic* ($r_s(33) = -.44, p = .01$). However, coach Neuroticism scores were revealed to be positively correlated with *coachability* ($r_s(33) = .38, p = .03$), *in-game performance* ($r_s(33) = .70, p < .001$), and *work ethic* ($r_s(33) = .37, p = .03$). Conscientiousness scores were also found to be positively correlated with *coachability* ($r_s(33) = -.41, p = .02$), *in-game performance* ($r_s(33) = .65, p < .001$), and *work ethic* ($r_s(33) = .40, p = .02$). See Table 3 below.

Table 3.

Spearman's rho Coefficient: Coach PTs & Coach Ratings of Athletes

	Coachability	Athletic Ability	In-Game Performance	Team Playerness	Work Ethic
Coach Agreeableness	-.41*	-.16	-.33*	-.25	-.38*
Coach Conscientious.	.41*	.28	.65**	.32	.40*
Coach Extraversion	-.48**	-.19	-.36*	-.21	-.44*
Coach Neuroticism	.38*	.30	.70**	.28	.37*
Coach Openness	-.09	-.06	-.2	-.21	-.11

** $p < 0.01$; * $p < 0.05$; $N = 35$

Preliminary Analyses: Overall Sample

Personality Traits

A Spearman's rank-order correlation was conducted between each distinct PT in Goldberg's FFM self-reported questionnaire. The FFM PT scores of Head Coaches were included in this analysis. As anticipated, none of the PT types such as Extraversion, were significantly correlated with other PT types, including Agreeableness ($r_s(39) = -.03, p = .84$), Conscientiousness ($r_s(39) = -.08, p = .62$), Neuroticism ($r_s(39) = .01, p = .94$), or Openness ($r_s(39) = -.01, p = .93$). This suggests that the FFM model distinctively measures each unique attribute and safeguards against redundant testing. See Table 4 below.

Table 4.*Descriptive Statistics & Spearman's rho Coefficient: Personality Traits of Athletes and Coaches*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Extraversion	31.4	3.0				
2. Neuroticism	28.8	7.1	.01			
3. Conscientious.	35.4	3.1	-.08	.14		
4. Openness	31.9	3.8	-.01	-.21	.14	
5. Agreeableness	31.9	2.8	-.03	.04	-.70	.17

Note. * $p < 0.05$; $N = 41$

Coach Ratings

A cross-correlation was also used to analyze the five variables that comprised the coach ratings (i.e., *coachability*, *work ethic*), defined as the subjective score of success. As expected, we found strong statistical significance among the variables. More specifically, we found that *in-game performance* had a strong, positive correlation to the variables: *work ethic* ($r_s(33) = .44, p = .001$), *coachability* ($r_s(33) = .56, p < .001$), and *athletic ability* ($r_s(33) = .64, p < .001$). *Team playerness* was the only variable not statistically significant with *in-game performance*.

Furthermore, *team playerness* was only statistically significant with *coachability* ($r_s(33) = .42, p = .01$). See Table 5 below.

Table 5.*Descriptive Statistics & Spearman's rho Coefficient: Coach Ratings of Athletes*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Coachability	4.3	0.8				
2. Athletic ability	3.6	1.0	.23			
3. In-game performance	3.7	1.2	.56*	.64*		
4. Team playerness	4.3	0.8	.42*	.10	.98	
5. Work ethic	4.3	1.0	.54*	.26	.44*	.22

Note. * $p < 0.05$; $N = 35$

Statistical Analyses: Across Sport Type

A Spearman's rank-order correlation was conducted between each distinct PT of the FFM and the five variables of the coach ratings. Extraversion was revealed to have a moderate, negative relationship with *coachability* ($r_s(33) = -.40, p = .02$). Openness was revealed to be positively correlated to *work ethic* ($r_s(33) = .42, p = .02$). Conscientiousness was also positively correlated to *work ethic* ($r_s(33) = .41, p = .02$). No statistical significances were revealed for Neuroticism and Agreeableness. See Table 6 below.

Table 6.*Spearman's rho Coefficient: Personality Traits & Coach Ratings of Athletes*

	Coachability	In-game performance	Work ethic	Athletic ability	Team playerness
Extraversion	-.40* (.02)	-.17 (.21)	-.07 (.36)	.14 (.24)	-.25 (.11)
Neuroticism	-.29 (.07)	-.08 (.35)	-.08 (.35)	-.08 (.35)	-.05 (.40)
Conscientiousness	.29 (.07)	.10 (.31)	.41* (.02)	.08 (.35)	-.21 (.15)
Openness	.19 (.17)	-.10 (.32)	.42* (.02)	-.06 (.39)	-.06 (.39)
Agreeableness	-.08 (.34)	-.07 (.38)	-.06 (.39)	.06 (.39)	.18 (.19)

Note. p value in parentheses.

*p < 0.05; N = 35

Statistical Analyses: Athletes Grouped by Sport Type

To further investigate the relationship between the FFM PTs and coach ratings, the data was split and organized by specific sport type.

Golf

A Spearman's rank-order correlation was conducted between each distinct PT of the FFM and the five variables of the coach ratings. The results revealed no statistical significance.

Basketball

A Spearman's rank-order correlation was conducted between each distinct PT of the FFM and the five variables of the coach ratings. The results revealed no statistical significance.

Hockey

A Spearman's rank-order correlation was conducted between each distinct PT of the FFM and the five variables of the coach ratings. Neuroticism revealed to have a strong, negative

relationship with *work ethic* ($r_s(7) = -.79, p = .03$). There were no other significant relationships revealed.

Track and Field

A Spearman's rank-order correlation was conducted between each distinct PT of the FFM and the five variables of the coach ratings. Findings revealed that Extraversion had a strong, positive relationship with *athletic ability* ($r_s(1) = 1.00, p < .001$). For Conscientiousness, there was a strong, negative correlation with *team playerness* ($r_s(1) = -1.00, p < .001$). Openness also revealed a strong, negative correlation with *team playerness* ($r_s(1) = -1.00, p < .001$). There were no other significant relationships revealed.

DISCUSSION

The present study examined the functional impact of personality on Team and Individual Sport performance in sport-specific settings. The main objective was to examine the distinct functional role of the FFM PTs and their influence on team success, predicated on type of PTs, and the similarity or variance of these PTs among team members. We anticipated that teams with more similarity in certain PTs and more variance in others would lead to optimized team success, made evident by objective and subjective measures.

In the preliminary analyses, we found that the coach rating variables (i.e., *coachability*, *in-game performance*, and *work ethic*) were significantly correlated to all the FFM PTs of coaches except Openness. These findings illustrate the potential impact of coach personality on the success of their athletes, but also in how they perceive their athlete's success. It also illustrates the universal advantages of Conscientiousness on athletic success — whether expressed by athletes or their coaches. Moreover, our findings support previous research that has highlighted Conscientiousness and Neuroticism as fundamental in predicting sport performance

(Aidman & Schofield, 2004; Laborde et al., 2013; Piedmont et al., 1999). Future research should consider examining the association between coach personality and athletic success more meticulously to better discern the direction of this relationship and any potential causality.

In the preliminary cross-correlation analysis, we anticipated that the FFM PTs would be non-correlative. As anticipated, we found none of the FFM variables (i.e., Conscientiousness) were significantly correlated. These findings illustrate that Goldberg's FFM self-reported questionnaire is a sound taxonomical assessment for sport-specific settings. The present findings also complement previous research that underlines the robust utility the FFM maintains in personality and sport psychology research.

Alongside the FFM PTs, a cross-correlation was used to analyze the five variables that comprised the coach ratings. Gleaning from Piedmont et al. (1999), we expected these variables to be highly correlative. As anticipated, there was strong statistical significance among the variables. More specifically, we found that *in-game performance* was robustly correlated to three of the four other variables, particularly *coachability* ($p < .001$) and *athletic ability* ($p < .001$). *Team playerness* was the only variable statistically not significant with *in-game performance*. *Team playerness* also only shared statistical significance with *coachability* ($p = .01$). One can assume that *team playerness* is not necessary for success in Individual Sports, so the lack of correlation between *team playerness* and *athletic ability* is expected given there were Individual Sport athletes in the sample. Moreover, this suggests that the other four coach rating variables are independent of *team playerness*, demonstrating that *team playerness* is not a prerequisite for inter-sport success (e.g., Team vs. Individual Sports) and instead, potentially only beneficial in team-specific sports.

Conscientiousness and Work Ethic

Following the preliminary analyses, the aim was to analyze the association between the FFM PTs and coach ratings, as Piedmont et al. (1999) previously demonstrated that certain PTs — such as Neuroticism and Conscientiousness — have significant variance on subjective scores of athletic success (i.e., coach ratings). Parallel to Piedmont et al. (1999), Conscientiousness revealed to have a positive association with *work ethic*. The findings also substantiate recent research by Habib et al. (2020) that established a positive association between Conscientiousness and *work ethic* in sport-specific settings.

Conscientiousness universally characterizes success — whether on the basketball court or in the boardroom. Teshome and Beker (2015) indicated that out of all the FFM PTs, Conscientiousness was the sole predictor of sport performance ($b = .566, t = 10.94, p < 0.01$). Studies on Conscientiousness and success have found that conscientious individuals tend to show the most predictable work growth (Jackson et al., 2010). Conscientiousness is also positively correlated with productivity in team environments and increases one's likelihood of being hired or chosen for employment (Neubert, 2004). The findings from Jackson et al. (2010) and Neubert (2004) lend themselves to the current findings, such that athletes reporting higher levels of Conscientiousness also revealed higher levels in *work ethic*.

Studies have shown that conscientious persons are less likely to be absent from work, resulting in better attendance and abidance of deadlines — which ultimately cut costs for the company (Neubert, 2004). Conscientiousness not only minimizes operational costs, but it also pays dividends for those who display it. After controlling for demographics, SES, and the other FFM PTs — Duckworth and colleagues (2012) found that adults more conscientious earned and saved more money. The results coupled with previous literature (Duckworth et al., 2012; Jackson

et al., 2010; Neubert, 2004) demonstrate the economic and performance-driven advantages of Conscientiousness in team environments, whether professional sport teams or their business operations.

This collective conscience common in Team Sports is known as psychological collectivism. Martin and Eys (2018) found that psychological collectivism is at the core of many high-performance teams, including the Canadian Forces Snowbird Demonstration Team. “Everybody's connected, and nobody on the team is an individual. There's a very specific environment in there that every single one of those nine guys works for each other, not themselves” (Martin & Eys, 2018, p. 127). The current findings accompanied with Martin and Eys highlight that for many high-performance teams — whether sport or military — their success is contingent on their capacity for Conscientiousness. Despite the documented relevance of collective personality (e.g., collective conscience) in sport psychology research, Hardy et al. (2020) stressed that future studies should address the dearth of research meticulously examining this *team personality*.

Openness and Work Ethic

Javed and colleagues (2020) found that Openness, or the intellect trait, was positively related to innovative work behavior. Innovative work behavior can appear in one's *work ethic*, which has proven to be positively correlated to Openness inside and outside the sporting arena. The present results also support this previously established relationship, substantiating findings by Habib et al. (2020) that revealed a positive association between Openness and *work ethic* in sport-specific settings. The implications of this association in the sport selection and recruitment process are further discussed in subsequent sections.

Extraversion and Coachability

Incongruent with Habib et al. (2020), the present findings suggest that Extraversion and *coachability* are negatively correlated. These results may stem from the limited optics *coachability* was examined through, potentially neglecting the complexity of this construct in the process. Even though many coaches habitually highlight the importance of *coachability*, most sport psychology research has inadequately examined it. Those who have examined *coachability*, have narrowly defined the construct which can consequently result in data misinterpretation or misrepresentation (Favor, 2011).

Giacobbi and colleagues (2000, 2002) determined that *coachability* is a much more complex concept than previously hypothesized. Giacobbi (2000) held that *coachability* consists of six constructs: *intensity of effort*; *trust and respect for coaches*; *openness to learning*; *coping with criticism*; *working with teammates*; and *reaction to feedback*. Subsequent analysis of data suggested that *coachability* is also comprised of: *reacting positively to negative reinforcement*, *displaying low frustration*, *being motivated*, *listening and being receptive to coaching and change*, and *being adaptive and able to adjust to the unanticipated* (Giacobbi et al., 2002). Giacobbi (2000) also posited that relative to Extraversion — *coachability* has a stronger association with Agreeableness and Conscientiousness. Hence, *coachability* seems to be significantly more complex than originally theorized, and Giacobbi (2000, 2002) implored other researchers to examine the relationship between *coachability* and an athlete's core personality structure (i.e., FFM PTs), ensuring that future extensions consider the nuanced nature of *coachability*.

Conscientiousness/Openness and Team Playerness – Track and Field

The track and field athletes demonstrated high levels in Conscientiousness, yet associated more with being an Individual Sport athlete. Therefore, despite track and field athletes displaying Conscientiousness as anticipated (Nia & Besharat, 2010), their sporting conditions may instead encourage Individual Sport attributes — resulting in lower levels of *team playerness* expressed. The same explanation may hold true when describing the potential relationship between Openness and *team playerness*. In other words, track and field is typically an Individual Sport that may cause athletes to naturally embrace Individual Sport inclinations (e.g., lack of *team playerness*), regardless of their level of Conscientiousness or Openness. Future extensions should include more athletes in a wider variety of track and field events (e.g., pole vault, shot put, 4x400 relay etc.) to better examine these relationships. Extraversion and *athletic ability* revealed a strong, positive correlation but only for track and field athletes, so including more athletes from a wider array of events will also augment the assessment of this relationship.

Neuroticism and Work Ethic – Hockey

When further examining the data split by specific sport, the results revealed that Neuroticism was negatively correlated to *work ethic* for hockey athletes. Neuroticism in Team Sports has been well documented (Bojanić et al., 2019; Schurr et al., 1977) but particularly in hockey, with recent research demonstrating a moderate relationship between Neuroticism and elite hockey athletes (Veysel & Kazim, 2019). Parallel to the effects of anxiety, a notorious associative of Neuroticism (Balyan et al., 2016), lack of control and uncertainty have grown into important determinants of superstitious beliefs in sport (Martens et al., 1990; Spielberger, 1972, as cited in Barkoukis et al., 2011). Superstitions in elite hockey athlete populations, especially varsity athletes, have long been established as commonplace (Gregory & Petrie, 1975). The more

involved and elite you become in a sport — especially hockey — the more prevalent superstitions are (Neil et al., 1981).

However, our results demonstrated that high levels of *work ethic* were negatively correlated with Neuroticism — and by extension, superstitions — which in turn may suggest that hockey athletes who work harder feel more in control, and thus less compelled to engage in superstitions. The current results combined with the aforementioned research further captures the existing relationship between hockey athletes and Neuroticism, while also helping to explain the utility and ubiquity of superstitions in hockey. Nevertheless, the data also indicates that Team Sport athletes, not least hockey athletes, can potentially reduce their superstition belief and practice through higher levels of *work ethic* as expressed by hard work.

Limitations and Future Extensions

COVID-19 presented many obstacles, namely that the 2020-2021 competitive season was cancelled for all Canadian Interuniversity Sport schools, impacting the OUA and AUS. Another potential limitation was self-reporting bias, which due to COVID-19 was unavoidable. Analyzing potential long-term changes in PTs via sport type exposure is critical for future considerations, especially when attempting to resolve longstanding questions regarding personality development and athletic participation (i.e., Attrition, Selection, Change Models). Future extensions with similar demographics (i.e., elite adult athletes) should aim to verify whether the Selection Model is indeed the most relevant, or whether the Change Model is more applicable due to PTs altering over time. The imbalance between Team Sport and Individual Sport athletes must also be considered for future extensions to better safeguard data generalizability.

Implications for Sport Practice: Selection and Recruitment

Despite its ubiquity in sport practice, there is much learning to be desired regarding improving the recruitment and selection process. The up-to-date evidence suggests that selection decisions in sport can be erroneous, bias driven (i.e., implicit bias), and even blatantly unempirical. Collectively, these mistakes result in “talent wastage”, defined as the aftermath a team faces from a coach’s improper selection and/or deselection of an athlete (Johnston & Baker, 2020). These talent wastage errors are critical to the efficacy and success of all sport teams, especially the more elite competition becomes. Talent wastage is particularly important in professional sports, whereby ineffective selection and recruitment results in negative repercussions for all stakeholders involved (Johnston & Baker, 2020).

A method to mitigate against talent wastage that high-performance teams can use is to adopt a selection process centered around *ability* and *fit* — while striving for logical, unbiased, and accurate decision-making. This method has proven highly effective for the Canadian Snowbirds, whose work is characterized by formation flying that fundamentally requires a high degree of teamwork and synchronicity (Martin & Eys, 2018). This same process of *ability* and “fit” should be considered in the selection and recruitment process of sport teams, especially when coupled with how impactful specific PTs — like Conscientiousness and Openness — are on sport success.

Parallels can be drawn between the results of Martin and Eys (2018) and the present study. The present findings confirm the salient role Conscientiousness has on subjective success in sport, revealing a positive correlation with *work ethic*. The results also illustrate how Openness and *work ethic* are positively correlated. From this perspective, *ability* can be seen as analogous to one’s Openness and *work ethic*, while Conscientiousness and *work ethic* can define

one's *fit*. Thus, Conscientiousness and Openness, or the 'Platinum Two', are evidently two PTs that coaches and decision-makers must deliberate on when creating a climate or culture conducive to team success. The complex relationship between *coachability* and Extraversion should be further explored and considered in this selection process. However, more causal research must be conducted before concrete conclusions can be drawn.

Implications for Sport Practice: Interventions

The present results and the extant literature clearly delineate Conscientiousness as a relevant PT for success in both Team and Individual Sports. Nevertheless, the relevance of the other FFM PTs seems to depend on sport type. For example, Li and colleagues (2020) found that Conscientiousness, Extraversion, and *work ethic* may be necessary for an optimal psychological state for performance success. Contrarily, Agreeableness and Openness were not part of the personality and emotional trait profile of athletes, suggesting that these PTs may be irrelevant to sport competition. However, their research was conducted on Taekwondo athletes who mostly identify as Individual Sport athletes.

In contrast with Li et al. (2020), other researchers have found that Openness is in fact, related to innovative work behavior in team settings (Javed et al., 2020). Innovative work behavior is fundamental to *work ethic*, which has proven to be positively correlated to Openness inside and outside the sporting world. The present findings also confirm this previously established relationship, supporting the research by Habib and colleagues (2020) that demonstrated the positive association between Openness and *work ethic* in sport-specific settings. As previously stated, Li et al. (2020) revealed *work ethic* to be significant for athletic success. From the present findings alongside Javed et al. (2020) and Habib et al. (2020), one can

assume that *work ethic* and Openness are highly correlated in team settings and thus, relevant to Team Sport success.

To optimize athletic success for Team Sports, practitioners should promote Conscientiousness, Openness, and *work ethic*. For Individual Sports, Conscientiousness and *work ethic* have been underpinned as points of emphasis for enhancing athletic success. The relationship between Extraversion and *coachability* requires more examination before one can confirm them as central to interventions across sport type (e.g., Team or Individual Sport). Agreeableness must also be considered when designing interventions but assessed and operationalized through a culturally contingent context.

The other FFM PT, Neuroticism, has been recognized as typical in many Team Sports, but particularly in hockey. The current research corroborates this by demonstrating that Neuroticism and *work ethic* are negatively correlated in elite hockey athletes. Hence, creating strategies that mitigate against Neuroticism — whether anecdotal (i.e., superstitions) or evidence-based (i.e., mindfulness meditation) (Hanley et al., 2019) — while limiting adverse effects should be focal for hockey-based interventions. Interventions that promote stronger levels of *work ethic* in hockey athletes via motivation (Keegan et al., 2011) should also be considered. These findings provide empirical insights into interventions that can optimize athletic success while reducing time and resource wastage in sport.

SUMMARY

The current research examined the functional effects of the FFM PTs on success in varsity athletes across sport types (i.e., Individual vs. Team Sport). When analyzing the overall sample, we were unable to determine statistical significance between the FFM PTs and objective success — measured by W-L percentage or competitive rankings. However, significant

relationships were revealed between the FFM PTs and the five variables of coach ratings — the subjective measures of success.

In the preliminary analyses, we found that the coach ratings of athletes were significantly correlated to all the FFM PTs of coaches except Openness. This suggests that both coach and athlete personality play a role in athletic success. Future research should explore this relationship more in-depth to determine causality and the direction of this relationship. In our statistical analyses, Extraversion was negatively correlated to *coachability*, while Openness and Conscientiousness were both positively correlated to *work ethic*. Conscientiousness was found to be negatively correlated to *team playerness*, but only statistically significant for track and field athletes. *Team playerness* was also negatively correlated with Openness in track and field athletes, but future research requires a larger sample size before making concrete conclusions.

Regarding recruitment and selection of athletes, Conscientiousness appears to be an advantageous PT regardless of sport type. Specific to Team Sports, Conscientiousness and Openness are two prominent PTs to consider when aspiring to promote athletic success. Furthermore, Conscientiousness and Openness appear to be significantly related to *work ethic* in Team Sport settings, as these relationships help define athletic success. Regarding interventions for Team Sport athletes, Conscientiousness, Openness, and *work ethic* should be emphasized. Openness is ostensibly only a relevant PT for optimizing in Team Sport settings — but future research with a more balanced and larger sample size should be considered to further examine this relationship. Thus, Conscientiousness and *work ethic* have been pinpointed as focal in optimizing athletic success for Individual Sport athletes.

The relationship between Extraversion and *coachability* requires more examination before one can confirm either as central to interventions across sport type (e.g., Team or

Individual Sport). Agreeableness must also be considered when designing interventions or when selecting/recruiting athletes, but through a culturally relevant lens. Neuroticism has been previously identified as statistically significant in Team Sports, but particularly in hockey as substantiated by the current findings. The results exemplify the importance of designing hockey-based interventions mitigating Neuroticism while encouraging *work ethic*, whether through anecdotal or empirical measures.

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APPENDICES

Appendix A

Participant Recruitment Advertisement VARSITY ATHLETES & COACHES NEEDED FOR SPORT & PERSONALITY RESEARCH

Researchers are looking to recruit male and female Varsity basketball, hockey, track and field, and golf athletes. The research will be examining how variance and similarity in athletes' personality traits (i.e., Conscientiousness, Extraversion) potentially influence their overall success in individual and team sports.

Athletes are asked to fill out a demographics questionnaire and a personality trait questionnaire. Both questionnaires can be accessed online via Qualtrics and should take no more than 15 minutes combined to complete.

The Head and Assistant Coaches will be asked to rate each athlete on 5 performance-relevant dimensions: *coachability*, *athletic ability*, *in-game performance*, *team playerness* and *work ethic*. This survey is accessible via Qualtrics and should take approximately 1 minute to complete. Coaches are also asked to fill out a personality trait questionnaire that should take approximately 10 minutes to complete. All responses will remain confidential.

Your participation would be contributing to ground-breaking research that could have major implications for coaching as well as sport and exercise psychology. If interested, please contact Alex McKenzie at ...

Appendix B

Demographics Questionnaire

CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: **Personality, Sport Type, and Sport-Specific Success**

You are asked to participate in a research study conducted by Alex McKenzie under the supervision of Dr. Nancy McNevin, from the Human Kinetics Department at the University of Windsor. The research is funded by the Ontario Graduate Scholarship and will be contributing to McKenzie's Master's thesis. If you have any questions or concerns about the research, please feel free to contact Alex McKenzie at ...

PURPOSE OF THE STUDY The present study aims to investigate the impact of personality on team and individual sport performance in sport-specific settings. The principal objective is to examine the distinct functional role of personality traits (i.e., conscientiousness, neuroticism) and their influence on team success, based on the type of personality trait, and the similarity or variance of these traits among team members. If you volunteer to participate in this study: Athletes are asked to fill out a demographics questionnaire and a personality trait questionnaire.

Both questionnaires can be accessed online via Qualtrics and should take no more than 15 minutes combined to complete.

All responses will remain completely confidential. If participants wish to access the results at the end of the study, they can do so at <https://scholar.uwindsor.ca/research-result-summaries/> where a summary of results will be posted.

POTENTIAL RISKS AND DISCOMFORTS Discussing your personality and socioeconomic status as an athlete can potentially result in low psychological and emotional risks. If at any time throughout the research you do feel overwhelmed with discomfort, you are free to withdraw from participation without consequences. Conducting research online presents some risk in regards to data security. To mitigate, the data will be securely stored on a USB drive and cloud storage via Qualtrics, and when necessary, appropriately disposed.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY To the best of our knowledge, no research to date has examined the functional role of personality traits on team success in athletic settings. The proposed study would make pioneering contributions to research that has been understudied and provide evidence for personality traits conducive to optimal team success. As such, these findings could have important implications on athlete selection based on suitability for team or competition (Allen & Laborde, 2014).

CONFIDENTIALITY Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Email addresses and the first 3 letters of one's last name will be the only identifiable information used. This information will be stored securely on a USB drive and will be retained for 1 year or however long as prescribed by the REB until digitally destroyed. Email addresses are stored in a pool detached from athlete's data, to better ensure confidentiality.

PARTICIPATION AND WITHDRAWAL Participants reserve the right to withdraw from participation at any time up until data has been uploaded. The questionnaires are administered on Qualtrics, so closing the browser before submitting or clicking on the "Exit Survey" button indicates that you are withdrawing from participation. There are no consequences for withdrawing from participation.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS After completion of the study, a research result summary will be submitted at

<https://scholar.uwindsor.ca/research-result-summaries/> where it can be accessed. Results are expected to be available by May, 2021.

SUBSEQUENT USE OF DATA These data may be used in subsequent studies, in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS If you have questions regarding your rights as a research participant, contact: The Office of Research Ethics, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE I understand the information provided for the study **Personality, Sport Type, and Sport-Specific Success** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. Do you consent? By Clicking 'Yes', you are providing your consent to participate.

Yes (1)

No (4)

Q13 There are 11 questions in total. Please follow instructions and answer all questions as accurately as possible. It should take approximately 5 minutes to complete.

Q13 Please enter your unique identifier assigned to you based on participant number, sex, and sport type. (e.g.,001MTF)

Q1 Please enter your age.

Q2 Gender.

Q9 Year of university

- Arabic (1)
- Caribbean (2)
- European (3)
- Southeast/South Asian (4)

Q3 What ethnicity do you most identify with?

- Arabic (1)
- Caribbean (2)
- European (3)
- Southeast/South Asian (4)
- Indigenous (5)
- Latin American (6)
- West/East African (7)
- Other (8)

Q4 What race do you most identify with?

- Black (African-American, African, Caribbean) (1)
- Caucasian (2)

- Asian (3)
- Hispanic (4)
- Indigenous (5)
- Pacific Islander (6)
- Mixed (7)
- Other (8)

Q5 The highest degree or level of school you have completed? (If currently enrolled in school, please indicate the highest degree you have received)

- High school degree or equivalent (1)
- Some college, no degree (2)
- Bachelor's degree (e.g., BA, BS) (3)
- Master's degree (e.g., MA, MS, MEd) (4)
- Professional degree (e.g., MD, DDS) (5)
- Doctorate (e.g., PhD, EdD) (6)

Q7 Family household income?

- Less than \$20,000 (1)
- \$20,000 to \$34,999 (2)
- \$35,000 to \$49,999 (3)
- \$50,000 to \$74,999 (4)

\$75,000 to \$99,999 (5)

Over \$100,000 (6)

Prefer not to say (7)

Q8 List the sport you play at a varsity level. (Please only write 1 sport)

Q10 Which sport do you feel is the *most* physically challenging? (Please only write 1 sport)

Q11 Which sport do you feel is the *most* psychologically challenging? (Please only write 1 sport)

Q12 If you listed a sport than can be categorized as **both Team and Individual** (e.g., Golf, Track & Field), rate from 1-5 (1 is strongly *Team*, 5 is strongly *Individual*) which you associate more with.

Appendix C

Adapted version of Goldberg's (1992) Five Factor Model PT Questionnaire

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment, 4*(1), 26–42. <https://doi.org/10.1037/1040-3590.4.1.26>

There are 50 questions in total. Please follow instructions and answer all questions as accurately as possible. It should take approximately 10 minute to complete.

Please enter your unique identifier assigned to you based on participant number, sex, and sport type. (e.g.,001MTF)

Q1 I am the life of the party.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q2 Feel little concern for others.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q3 I am always prepared.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q4 I get stressed out easily.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q5 Have a rich vocabulary.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q6 Do not talk a lot.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q7 Am interested in people.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q10 Am relaxed most of the time.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q9 Leave my belongings around.

- Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q11 Have difficulty understanding abstract ideas.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q13 Feel comfortable around people.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q14 Insult people.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q15 Pay attention to details.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q16 Worry about things.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q17 Have a vivid imagination.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q18 Keep in the background.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q19 Sympathize with others' feelings.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q20 Make a mess of things.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q21 Seldom feel blue.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q22 Am not interested in abstract ideas.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q23 Start conversations.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q24 I am not interested in other people's problems.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q25 Get chores done right away.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q26 Am easily disturbed.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q28 Have excellent ideas.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q29 Have little to say.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q30 Have a soft heart.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q31 Often forget to put things in proper place.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q32 Easily gets upset.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q33 Do not have a good imagination.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q34 Talk to a lot of different people at parties.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q35 Am not really interested in others.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q36 Like order.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q37 Change my mood a lot.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q38 Am quick to understand things.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q39 Don't like to draw attention to myself.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Q40 Take time out for others.

- Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q41 Avoid or neglect my duties

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q42 Have frequent mood swings.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q43 Use difficult words.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q44 Don't mind being the center of attention.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q45 Feel others' emotions.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q46 Follow a schedule.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q47 Get irritated easily.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q48 Spend time reflecting on things.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q49 Am quiet around strangers.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q50 Make people feel at ease.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q51 Am exact in my work.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q52 Often feel blue.

Very Inaccurate (1)

Moderately Inaccurate (2)

Neutral (3)

Moderately Accurate (4)

Very Accurate (5)

Q53 I am full of ideas.

- Very Inaccurate (1)
- Moderately Inaccurate (2)
- Neutral (3)
- Moderately Accurate (4)
- Very Accurate (5)

Appendix D

CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: **Personality, Sport Type, and Sport-Specific Success**

You are asked to participate in a research study conducted by Alex McKenzie under the supervision of Dr. Nancy McNevin, from the Human Kinetics Department at the University of Windsor. The research is funded by the Ontario Graduate Scholarship and will be contributing to McKenzie's Master's thesis. If you have any questions or concerns about the research, please feel free to contact Alex McKenzie at ...

PURPOSE OF THE STUDY The present study aims to investigate the impact of personality on team and individual sport performance in sport-specific settings. The principal objective is to examine the distinct functional role of personality traits (i.e., conscientiousness, neuroticism) and their influence on team success, based on the type of personality trait, and the similarity or variance of these traits among team members.

If you volunteer to participate in this study: The Head and Assistant Coaches will be asked to rate each athlete on 5 performance-relevant dimensions: *coachability, athletic ability, in-game performance, team playerness* and *work ethic*. This survey is accessible via Qualtrics and should take approximately 1 minute to complete for each athlete. Coaches are also asked to fill out a personality trait questionnaire that should take approximately 10 minutes to complete. All responses will remain completely confidential. If participants wish to access the results at the end of the study, they can do so at <https://scholar.uwindsor.ca/research-result-summaries/> where a summary of results will be posted.

POTENTIAL RISKS AND DISCOMFORTS . Rating your athletes as a coach could present psychological and emotional risks. If at any time throughout the research you do feel overwhelmed with discomfort, you are free to withdraw from participation without consequences. Conducting research online presents some risk in regards to data security. To mitigate, the data will be securely stored on a USB drive and cloud storage via Qualtrics, and when necessary, appropriately disposed.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY To the best of our knowledge, no research to date has examined the functional role of personality traits on team success in athletic settings. The proposed study would make pioneering contributions to research that has been understudied and provide evidence for personality traits conducive to optimal team success. As such, these findings could have important implications on athlete selection based on suitability for team or competition (Allen & Laborde, 2014).

CONFIDENTIALITY Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Email addresses and the first 3 letters of one's last name will be the only identifiable information used. This information will be stored securely on a USB drive and will be retained

for 1 year or however long as prescribed by the REB until digitally destroyed. Email addresses are stored in a pool detached from athlete's data, to better ensure confidentiality.

PARTICIPATION AND WITHDRAWAL Participants reserve the right to withdraw from participation at any time up until the data has been uploaded. The questionnaires are administered on Qualtrics, so closing the browser before submitting or clicking on the "Exit Survey" button indicates that you are withdrawing from participation. There are no consequences for withdrawing from participation.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS After completion of the study, a research result summary will be submitted at <https://scholar.uwindsor.ca/research-result-summaries/> where it can be accessed. Results are expected to be available by May, 2021.

UBSEQUENT USE OF DATA These data may be used in subsequent studies, in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS If you have questions regarding your rights as a research participant, contact: The Office of Research Ethics, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone:_____, ext._____; e-mail:_____

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE I understand the information provided for the study **Personality, Sport Type, and Sport-Specific Success** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. Do you consent? By Clicking 'Yes', you are providing your consent to participate.

Yes (1)

No (2)

Coach Ratings Survey

Piedmont, R. L., Hill, D. C., & Blanco, S. (1999). Predicting athletic performance using the five-factor model of personality. *Personality and Individual Differences*, 27(4), 769–777. doi: 10.1016/s0191-8869(98)00280-3

There are 6 questions in total. Please follow instructions and answer all questions as accurately as possible. It should take approximately 1 minute to complete for each athlete.

Please enter the unique identifier of the athlete you are rating based on participant number, sex, and sport type. (e.g.,001MTF)

Q1 What type of coach?

Assistant Coach (1)

Head Coach (2)

Q2 From 1 - 5 (1 is lowest, 5 is highest), rate this athlete's *coachability* (ability for player to listen, learn and apply coaching).

Q3 From 1 - 5 (1 is lowest, 5 is highest), rate this athlete's *athletic ability* (the athleticism the player displays).

Q4 From 1 - 5 (1 is lowest, 5 is highest), rate this athlete's *in-game performance* (player performance overall in games).

Q5 From 1 - 5 (1 is lowest, 5 is highest), rate this athlete's *team playerness* (ability to mesh and coincide with teammates, on and off the field).

Q6 From 1 - 5 (1 is lowest, 5 is highest), rate this athlete's *work ethic* (amount of effort and commitment dedicated to the team, themselves and the coaches).

VITA AUCTORIS

NAME: Alex I. McKenzie

PLACE OF BIRTH: Nassau, New Providence, The Bahamas

YEAR OF BIRTH: 1995

EDUCATION: Lakeshore Collegiate Institute Toronto, ON, 2013

University of Western Ontario, B.A (Hons),
London, ON, 2018

University of Windsor, MHK, Windsor, ON,
2021