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Exploring the Relationships Between Collegiate Sport Coaches' Creative Productivity and
Factors of Creative Potential

A thesis

presented to

the faculty of the Department of Sport, Exercise, Recreation, Kinesiology

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Science in Sport Management

by

Sean Flanders

May 2020

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ABSTRACT

Exploring the Relationships Between Collegiate Sport Coaches' Creative Productivity and Factors of Creative Potential

by

Sean Flanders

Sport coaches are perceived as problem solvers who engage in creativity to handle the spontaneity of competitive activity and generate winning results. However, while creativity in athletes has been researched, little has been investigated regarding coaches. Therefore, the purpose of this study was to examine different aspects of creativity – *person, process, press, and product* – among collegiate team sport coaches in the United States. Specifically, how personality traits, ideational fluency, remote association ability, years of coaching experience, and work climate related to creative product impact and frequency. A modified creativity personality test was found to be positively related to both the impact and frequency of creative products. Further, self-confidence and years of coaching experience were positively related to creative product impact, while inventiveness was positively related to creative product frequency. Analyzing the creative potential factors related to creative productivity may be useful in enhancing creativity for collegiate coaches and improving outcomes.

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DEDICATION

To Carley and Skylar, my wife and daughter, who taught me life's purpose.

ACKNOWLEDGEMENTS

I would like to thank everyone who has helped make this thesis possible. Members of my committee – Dr. Jones, Dr. Dotterweich, and Dr. Gentles – who gave sage counsel; Dr. Bradshaw for his outsider review of my oral defense; East Tennessee State University for the opportunity to fulfill the master’s sport management program; and last but not least, I would like to pay special regards to Dr. Smith who guided me through it all. Thank you.

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Chapter 1. Introduction

Sport coaches are responsible for the results of competitive activities that are spontaneous and unpredictable (Coakley, 1994) and dilemmas derived from balancing individual and collective needs (Rovengo & Kirk, 1995). The coaching process involves handling problems arising from a variety and multitude of factors (Jones & Turner, 2006). Consequently, sport coaches are perceived as problem solvers (Schön, 1983), who engage in creativity to generate new solutions by challenging assumptions, exploring alternative solutions, and integrating previous knowledge (Farres, 2004). Schempp (1998) also suggested coaches should focus on how knowledges connect and are expressed through human interaction to solve problems. While sport coaching is seemingly tied to creativity, whether explicitly stated, little research has been done to analyze this relationship.

Besides the use of creativity in solving problems, the engagement of creative behavior has other benefits for sport coaches, especially at the collegiate level. The need for creativity in the workplace has increased as it has been determined to be an antecedent for innovation (Kalyar, 2011). The reward for successful products and processes have also become greater (Hartono, 2013). Indeed the pressure to win has only increased as the commercialization of college sport has expanded (Won & Chelladurai, 2016). Therefore, collegiate sport coaches may provide value to their universities through engaging in creative behavior and developing innovations. Notably, creativity and innovation are similar constructs, by which the difference is that innovation is the implementation of a creative product. Innovation also makes organizations more competitive, especially in dynamic environments, and promotes long-term success (Hartono, 2013). As the leader of a team or group of athletes, sport coaches must continually

innovate and adapt in their dynamic environments to beat their competitors. Accordingly, creative ability is a factor in how effective a sport coach may be in accomplishing these tasks.

Finally, the recruitment of student-athletes, number of athletic scholarships, number of coaches and their salaries, and budgets allotted to different sports are all valuable resources that have a significant impact on athletic performance at the college level of sport (Won & Chelladurai, 2016). Collegiate coaches must assist in creatively gaining competitive advantages over these resources for their respective universities, especially since athletic leaders are generally given autonomy to make decisions independently and cultivate their own culture (Schroeder, 2010). Creativity has even been regarded as a source of competitive advantage itself (see Florida, 2002). Understanding and identifying the underlying factors related to creative productivity for collegiate sport coaches is then a credible pursuit, and the focus of this study.

Chapter 2. Literature Review

The majority of creativity research focuses on more commonplace organizations and professions, yet relative connections may still be made between the current creativity literature and sport coaching. Specifically, the relationships between leadership and creativity, as well as sport and creativity may be of use and will be noted. Finally, a brief analysis of different creativity aspects and particular tests for these aspects will be provided.

Sport Coaching and Creativity

Sport researchers have seldom expanded beyond sport-specific contexts when studying creativity (Bowers, Green, Hemme, & Chalip, 2014). This is surprising considering how much creative ability is required in the sport coaching profession. Non-routine, problematic, and complex contexts dictate coaches to respond flexibly to challenges (Jones & Turner, 2006), and they must demonstrate considerable agency in what and how they coach (Jones & Wallace, 2005). Coaches must also face situations combining personal, financial, economic, political, and environmental factors (Anderson, Knowles, & Gilbourne, 2004). Understandably, creativity and problem-solving skills have been recognized as necessary for high-quality coaching (Cassidy, Jones, & Potrac, 2004). From a player-coach perspective, coaches are tasked with identifying tactical solutions to increase players' proficiency (Memmert, 2011). Furthermore, coaches may increase player creativity by demonstrating creative behavior themselves and encouraging players to be open to divergent views (Rego, Cunha, & Simpson, 2018).

Nevertheless, sport coaches are faced with many barriers to engagement in creativity. Often practicing in isolation (Knowles, Tyler, Gilbourne, & Eubank, 2006), sport coaches may not be regularly exposed to new ideas and concepts, thus suppressing creative potential. Sport coaches are also primarily judged on their athletes' performance, for which identifying

weaknesses and developing them is a common solution (Hughes, Lee, & Chesterfield, 2009). By focusing on conventionally fixing weaknesses, sport coaches may miss out on exploring new avenues to success and creatively advancing their skillsets. Lastly, sport coaches recurrently conform their written reflections to only include necessary knowledge (Chesterfield, Jones, & Mitchell, 2007), once again squandering creative opportunity. Sport coaching undoubtedly requires creativity, even in the face of these barriers. Although sport coaching has received little attention from creativity research, facets of sport coaching, such as leadership, have been analyzed.

Leadership and Creativity

Simonton (1984) suggested that leadership was a form of creativity. Insights from the relationship between leadership and creativity research may glean value. Mueller, Goncalo and Kamdar (2011) found that creative leaders more effectively motivate followers and bring about positive change. For instance, leader creativity was shown to positively correlate with members' behaviors that benefited their respective organizations (Deng & Guan, 2017). Leaders are also tasked with creatively addressing members' achievement, self-esteem, and ideals, and studies have suggested that the creativity aspect of divergent thinking is positively related with leader performance (Matthew, 2009). By engaging in creative behavior, sport coaches may promote better performances from their athletes through more effective motivation and adequately addressing the problems they face.

Leaders substantially influence member creativity as well (Wang, Liu, & Zhu, 2018). Close supervision by leaders was found to negatively relate to employee creativity (George & Zhou, 2001), and leaders' creative abilities were reported to positively relate to members creative performance (Tierney, Farmer, & Graen, 1999). Mathisen, Einarsen, and Mykletun (2012) also

proclaimed that creative leaders may develop supportive environments with high tolerance for different ideas and that their creative behavior may have more of an impact on creative productivity of an organization than their personality. Subsequently, creative sport coaches may foster environments that tolerate differing ideas and employ more of a “hands-off” leadership style, which in turn can improve the tactical creativity of their players.

The profession of sport coaching is situated in a dynamic environment (see Greenwood, Davids, & Renshaw, 2014). In a dynamic environment, the traditional management model of relying on leaders’ wisdom has been found to inefficiently address the associated tasks (Chen, Liu, Zhang, & Qian, 2018). However, the creative traits of tolerance for ambiguity and risk taking have been identified as positive contributors toward leadership performance in such environments (Moses & Lyness, 1990). Additionally, creativity and leadership have both been reported to positively relate to the personality traits of self-confident, self-accepting, independent, original, open to experience, flexible, and to having domain-specific knowledge (Matthew, 2009). Expanding on domain-specific knowledge, Amabile (1988) suggested more experienced individuals may have a greater depth of knowledge, which could be used to engage in creative behavior more effectively.

Yet, not all literature supports the betterment of organizations through creative leadership. The creative behavior of leaders has been found to reduce perceived leadership potential by members and creative people may find it more difficult to obtain leadership positions compared to those who present unoriginal, but useful, solutions to problems (Kamdar, 2012). Additionally, leaders with creative solutions may bring about ambiguity, which does not align with expectations of leaders to control situations and provide clear goals (Kamdar, 2012). It is necessary to recognize that creative leadership may not always yield positive outcomes.

Sport and Creativity

There has been considerable exploration of the relationship between creativity and sport in general. Creativity has been defined as an emergent property of sport, in part, due to players' need to address constraints brought on by opposing players' actions (Leso, Dias, Ferreira, Gama, & Couceiro, 2017). Continuing, individual athlete constraints have rendered the establishment of universal and optimal techniques for sports as fruitless, despite its dominance in talent development programs (Phillips, Davids, Renshaw, & Portus, 2010). Every athlete has a unique makeup of strengths and weaknesses that must be addressed to enhance their capabilities and improve their performance. Hence, sport coaches creatively tailoring athletes' training likely improves their chances of realizing their potential. In fact, youth athletes who achieve a more even balance between organized and unstructured sport settings may prompt greater creative development (Bowers et al., 2014). Additionally, coaches providing less instruction to youth athletes, which allows them to devote greater attention to complex situations and explore alternative solutions, has been found to improve players' tactical creativity (Memmert, 2011). Memmert (2011) also suggested cognitive giftedness may predict athletes' abilities to generate creative solutions. For the most part, creative players provide the advantages of unpredictability and disruption of opponents' efforts (Memmert, 2015). Thus, fostering the development of creative abilities amongst athletes may be a useful endeavor.

Finally, although many ties have been drawn between creativity and sport, Bowers et al. (2014) have suggested sport's culture may identify more with militarism, authority, and obedience than creativity. Wolfe, Wright, and Smart (2006) characterized professional sport as a tradition bound, conservative industry that has a tendency toward oligarchical leadership and hierarchical structures. Upholding traditions and hierarchical environments are less likely to lead

to sustainable creativity (Wolfe et al., 2006). Collegiately, the NCAA's support of commercial policies shapes athletic department operations (Southall, Nagel, Amis, & Southall, 2008), and the influence from revenue sources, such as media and sponsors, can attract those in leadership roles to make decisions counter to department assumptions (Schroeder, 2010). In effect, collegiate athletic departments may hold similar values and objectives of professional sport organizations, and thus creativity is less likely to hold a substantial role. However creative behavior has and will continue to play a role in the realm of sport, despite the landscape of the culture and associated work environments.

Creativity Aspects

There are many different aspects of creativity to consider when studying it as a construct. Rhodes' (1961) 4 P's model of creativity is a model used extensively in the creativity literature (see Said-Metwaly, Noortgate, & Kyndt, 2017). Rhodes (1961) defined creativity as "a noun naming the phenomenon in which a person communicates a new concept," (p. 305). He continued that new concepts were considered *products*, which were created through mental *processes*, and influenced by an individual's environment, or *press*. An individual as a *person*, i.e. personality, intellect, temperament, etc., factored into creativity as well. Collectively, Rhodes (1961) termed *person*, *process*, *press*, and *product* as the 4 P's of creativity. Each of these aspects will be explored in the following sections, though an exhaustive review is beyond the scope of this paper.

Person. The creativity aspect of *person* refers primarily to personality traits associated with individuals who produce creative achievements. Gough (1979) suggested observations of artistic temperament and aesthetic disposition being related to creative potential was support for assessing the relationship between personality and creativity. Special types of thinking and

motivation (Taylor, 1960) and personality (Getzels & Jackson, 1962) were also propounded to have a more influential role on creativity than intelligence. Furthermore, there is an assumption that individuals who exhibit characteristics favorable to creative behavior are more likely to be creative than those who don't (Said-Metwaly et al., 2017). Such traits identified in the literature include attraction to complexity, high energy, behavioral flexibility, intuition, emotional variability, self-esteem, risk taking, perseverance, independence, introversion, social poise and tolerance of ambiguity (Said-Metwaly et al., 2017). Although there have been personality traits correlated with creative behavior, Runco (2014) argued creative personalities may differ between domains and persons. Feist (1999) additionally found that the personalities of creative scientists and creative artists emphasized different personality traits. Differences between domains likely inclines individuals to possess a particular set of personality traits for engaging in creativity relevant to their field.

Process. The *process* aspect of creativity refers to the cognitive processes and structures related to creative production. Two processes found to relate to creativity are divergent thinking and remote associations. Guilford (1967) described divergent production as the intellectual ability to retrieve information from memory in order to meet the objective of producing varied responses. He continued that divergent thinking could be broken down into fluency – the ready flow of ideas; flexibility – the readiness to modify information; elaboration – to describe in detail; and originality – the unusualness of an idea. Guilford (1967) also identified several categories for which individuals could engage in divergent thinking, i.e. visual-figural, semantic, symbolic, auditory, and suggested multiple categories may be relevant to a particular domain. Additionally, divergent thinking has been associated with the ideation phase of producing a creative solution (Zeng, Proctor, & Salvendy, 2011). The other phases are problem analysis,

evaluation, and implementation (Zeng et al., 2011). Notably, divergent thinking studies have reported mixed results on whether or not divergent thinking is positively or negatively associated with creative achievement (Said-Metwaly et al., 2017). Nonetheless, divergent thinking is still considered a cognitive process related to creativity.

Another cognitive process related to creativity is remote associations. Mednick (1962) defined the process of creative thinking as the “forming of associative elements into new combinations which either meet specified requirements or are in some way useful,” (p. 221) and suggested that any ability or tendency used to combine remote ideas is part of the creative process. The more remote the associations are for a combination, the more creative the solution, and thus originality is inversely related to the probability of a creative solution in a given population. Mednick (1962) also suggested that new and useful solutions arise from random, usually accidental, combinations of elements (serendipity), combinations of similar elements (similarity), and combinations of common elements (mediation). Individuals making remote associations often times cannot describe how they came to their creative solution (Ben-Zur, 1989). Lastly, the cognitive processes for deriving remote associations has been postulated to be related to the processes required for finding insightful solutions to complex problems (Bowden & Jung-Beeman, 2003). Divergent and remote associations are seemingly cognitive processes necessary to engage in and complete creative actions.

Press. The *press* aspect of creativity focuses on the environment or climate in which creativity is being produced. Previous literature supports an indirect relationship between environmental factors and creativity (Hennessey & Amabile, 2010), and the environment levels generally focused upon in creativity research are at the individual, organizational, and cultural (Said-Metwaly et al., 2017). The dynamic interactions between individuals and their

organizations can significantly affect their engagement in creative behaviors (Richter, Hirst, van Knippenberg, & Baer, 2012). Climate can also affect the creative output of groups or teams within an organization (Somech & Drach-Zahavy, 2013). It should be noted that the effects of the same climate on different individuals may vary (Said-Metwaly et al., 2017), and that highly creative individuals may exist within an organization, but the organization may not generate creative output because of its climate (Sosa, 2011).

Although there has been controversy over the meaning of “climate” (Anderson & West, 1998), Ekvall (1996) described organizational climate as the realized attitudes, feelings and behaviors of an organization’s members, absent of their own perceptions. With regard to creativity in the workplace, Ekvall (1996) theorized 10 dimensions that had an impact on the creative climate and subsequently creative production of an organization’s members. These dimensions consisted of challenge – the emotional involvement in operations and goals; dynamism and liveliness – the eventfulness of the work environment; playfulness and humor – the display of spontaneity and ease; freedom – the independent behavior exerted by members; risk taking – the tolerance of uncertainty; idea time – the amount of time members can use, and do use, for elaborating new ideas; idea support – how new ideas are treated; trust and openness – the emotional safety in relationships; debate – the occurrence of clashing encounters between viewpoints, ideas, and differing experiences and knowledge.; and conflict – the personal, interpersonal, or emotional tensions between members. Notably, all of these dimensions were found to be positively correlated with creativity in the workplace, except for conflict which had a negative correlation (Ekvall, 1996). Additionally, a climate’s disposition for creative behavior of its inhabitants has been shown to fluctuate depending upon the primary objectives of an

organization (Ekvall, 1996). In general, climate indirectly affects the creative behaviors of the individuals participating within it as determined by its favorability towards creativity.

Product. The *product* aspect of creativity pertains to the level of creativity associated with a particular creative product. Typically, a product must be assessed by judges to determine its level of creativity. Measuring recognition by experts has been suggested to be a valid and practical method for reporting individual accomplishment (Hennessey & Amabile, 1988). Additionally, Horn and Salvendy (2006) argued an individual's creativity may not be fully assessed without analyzing a creative product they have produced. However, the judgement of experts and judges is not enough to conclude the quality of a creative product (Kaufman & Baer, 2012). Using judges and experts to rate creative products also comes with a host of issues, such as level of expertise, personality influences, bias, discriminant power, and lack of agreement (Said-Metwaly et al., 2017). Carson, Peterson, and Higgins (2005) have suggested the public acclaim of a creative product may be used to measure its level of creativity. By expanding the rating of a creative product from only judges and experts to a plurality of members in a particular domain, a more inclusive judgment may be obtained. In all, the *product* aspect relies on outsiders' point of view to determine the level of creativity found in a particular product.

Testing Creativity

Tests have been created and developed to measure each of the 4 P's of creativity, however there are advantages and pitfalls to each. Through a systematic literature review, Said-Metwaly et al. (2017) analyzed tests found for each of the aspects and reported their assessments. For tests of *person*, the advantages were ease of use, high reliability, and standardized criteria for interpreting scores. The disadvantages were limited scope of measurement, low validity of self-reports, bias due to self-reporting, neglect of differences in creative personality across domains,

low sensitivity to training, and skewed scores. For tests of *process*, the advantages were widespread utility, high reliability, and standardized criteria for interpreting scores. The disadvantages were limited scope of measurement, conflicting evidence for validity, and bias due to scoring and sample size. For tests of *press*, the advantages were exploration of whether a work environment was supportive or inhibitive of creativity and evaluation of environmental improvement attempts and corrective actions. The disadvantages were limited scope of measurement, lack of research-based evidence, debate about “climate” meaning and measurement level, and individual differences in the conception of climate. Finally, for tests of *product*, the advantages were similarities to evaluating creativity in real life, high reliability, and high validity. The disadvantages were limited scope of measurement, difficulty in selecting judges, bias due to judges, expense and time consumption, and lack of standardized criteria. The following sections outline commonly used tests for measuring different aspects of creativity.

Creative Personality Scale. Gough (1979) derived the Creative Personality Scale (CPS) from several Adjective Check List (ACL) protocols, which appraised subjects’ views of the self. Through item analysis, previous ACL data was used to find adjectives that correlated with creative potential, which was determined by expert raters. Thirty adjectives were ultimately selected for the CPS. The adjectives were assigned a +1 or -1 value, which was determined from previous research that had demonstrated positive or negative correlations between each of the adjectives and creative achievement. Participants’ selected the adjectives they identified with and their scores were the cumulative total of their answers. Higher scores were presumed to mean greater creative potential. Gough (1979) concluded that the CPS was reliable and a moderately valid measure of creative potential.

Alternative Uses Test. The Alternative Uses Test (AUT) was a divergent thinking test asking participants to list as many as six uncommon uses for an ordinary object in a specified amount of time, developed by Guilford (1967). The participants' responses were graded by their fluency, originality, flexibility and elaboration, which were described previously. Specifically, fluency was measured by how many relevant responses were given, originality was measured by how responses compared to the total number of times the same response was given by other participants, flexibility was measured by the number of different categories covered by the responses, and elaboration was measured by the amount of detail given for each response. The presumption of the test was the higher the score for a participant, the greater their creative potential. Lastly, the AUT was split into two timed sections of five minutes with the task of listing uncommon uses for three ordinary objects in each.

Remote Associates Test. Mednick (1962) developed the Remote Associations Test (RAT), which required subjects to derive a mediating connective link for three associative, but disparate, elements provided. Specifically, three words were given for which the subject was tasked with finding a fourth word that tied them together. The fourth word was predetermined by the experimenters, allowing only one answer to be correct, which had to be strictly associative, i.e. not found through logic, concept formation, or problem solving. For example, if given the words "flower," "friend," and "scout," the correct reply was "girl." The material chosen was either nonsensical or common in society to avoid bias and ensure familiarity respectively. Thirty questions were included per test and the more correct answers provided by a participant, the greater their creative potential was anticipated.

Creative Climate Questionnaire. Ekvall (1996) developed the creative climate questionnaire (CCQ). A questionnaire consisting of 5 questions for each of the climate

dimensions mentioned previously. The questions were based on theory, field research, and experiences in organizational psychology, that asked participants how the collective members of an organization usually behaved and not how they perceived their own behavior in or feelings about the workplace. For example, a question for the dimension of idea support was, “People usually feel welcome when presenting new ideas here” (Isaksen, Lauer, & Ekvall, 1999). Of note, this question was found in the English translation of the CCQ, since the original version was in Swedish. The answers were graded along a 4-point Likert scale (0 = “Not at all applicable” to 3 = “Applicable to a high extent”) and averaged to determine a rating between 0 and 3 for each of the dimensions. The CCQ was administered to multiple participants within an organization and the mean scores discerned an organization’s potential for creative behavior amongst its members. Importantly, the CCQ was not intended to be used as a predictor of organizations’ member behavior. Ekvall (1996) noted the lack of applicability of the CCQ to every field and that it did not necessarily cover each aspect of the creative climate. In all, the CCQ was determined to be a reliable test for measuring the creative climate of an organization.

Creative Achievement Questionnaire. Carson et al. (2005) developed the Creative Achievement Questionnaire (CAQ) on the premise that past creative achievement may predict future creative achievement (Colangelo, Kerr, Hallowell, Huesman, & Gaeth, 1992). The CAQ utilized a self-report inventory consisting of 96 items divided into three parts. In part one, participants marked if they had above average talent or ability in 10 artistic and scientific domains, individual sports, team sports, and entrepreneurial ventures. In part two, participants marked items describing their achievements in terms of public acclaim for the 10 domains of artistic and scientific endeavor, i.e. visual arts, music, dance, creative writing, architectural design, humor, theater and film, culinary arts, inventions, and scientific inquiry. The metric of

public acclaim was chosen because of subjectivity from judges' ratings in single studies, the cost of using judges, and the implication of greater accomplishment from a broader range of experts. Each domain included eight ranked questions weighted with scores from 0 to 7. For example, in the "Architectural Design" section a score of 0 was equivalent to "I do not have training or recognized talent in this area" and a score of 7 was equivalent to "My architectural design has been recognized in a national publication". Additional space was provided for participants to list creative achievements in domains not listed. In part three, participants answered three questions indicating how others perceive their creative characteristics.

Carson et al. (2005) did admit that bias from self-rating could occur, in which subjects attempt to enhance their own image. However, the subjects used to trial the questionnaire were tested for self-enhancement bias and no significant amount of score inflation was found. Carson et al. (2005) also recommended the use of the CAQ as a measure of creativity because it was easy to administer and score. Finally, Carson et al. (2005) reported that the CAQ demonstrated solid convergent validity and significantly correlated with other measures of creativity.

Measuring the Creativity of Collegiate Sport Coaches

Sport coaches are problem solvers who must focus upon improving competitive advantage within a dynamic environment especially at the collegiate level. Sport coaches are also leaders to their athletes. Not only does creativity aid in the performance of their responsibilities, but it can encourage subsequent creative behavior in the athletes they look after. Sport is broadly influenced by creativity due its nature of containing constant unexpected challenges. In order to understand the creative behavior of sport coaches, the 4 P's model of creativity may be used for analysis. Specifically, the end goal of a creative *product* may be compared to the other aspects of *person*, *process*, and *press* to identify the underlying factors of sport coaches' creativity. In other

words, creative productivity may be compared to creative potential. As a result, this study set out to answer the following research question:

How do previously identified factors of creative potential relate to creative productivity in the context of collegiate sport coaching?

Chapter 3. Methods

In an attempt to better understand the relationship between coaching and creativity, this study used an online questionnaire, developed on Google Forms, to measure collegiate sport coaches' grades in different aspects of creativity. A creativity and sport researcher, and an additional sport researcher, were consulted when developing the questionnaire. A link to the questionnaire was distributed by email to 10,791 collegiate head coaches across the United States and the questionnaire remained open from September 9th to October 9th of 2019. The initial email was sent on September 9th, and reminder emails were sent on September 23rd and October 7th. The sports consisted of baseball, men and women's basketball, field hockey, football, men and women's lacrosse, men and women's soccer, softball, men and women's volleyball, men and women's ice hockey, men and women's water polo, and men and women's rugby. The coaches were either from Division I, II, or III in the NCAA or from the NAIA. The choice of team sport coaches was in partial because of team sports' complexity from interactions between players over the duration of time (Hristovski, Davids, Araujo, & Passos, 2011). Additionally, individual sports were excluded due to limited problem solving and creative behavior required during gameplay and greater reliance on the athletic abilities of the individual athlete over coaching ability. Participants were not required to answer every question in order to complete the questionnaire. IRB approval was obtained before administering the questionnaire and there was no monetary compensation for participation.

There were 140 respondents equating to a 1.3% response rate. The eventual sample size was 126 after accounting for participants who did not answer each of the pertinent sections of the questionnaire used for analysis. The sample was made up of 55 women and 71 men. There were 91 coaches for women's sports and 45 coaches for men's sports, with 10 participants who

coached two sports simultaneously. There were no respondents who coached either men's or women's ice hockey. Table 1 lists the number of participants who responded from each sport included in the questionnaire.

Table 1.

Number of Participants from Each Sport

Sport	Number of Participants
Baseball	8
Men's Basketball	8
Women's Basketball	19
Field Hockey	3
Football	7
Men's Lacrosse	7
Women's Lacrosse	12
Men's Soccer	10
Women's Soccer	17
Softball	16
Men's Volleyball	2
Women's Volleyball	21
Men's Ice Hockey	0
Women's Ice Hockey	0
Men's Water Polo	1
Women's Water Polo	1
Men's Rugby	2
Women's Rugby	2

The Questionnaire

In order to mitigate the disadvantages of testing only a single aspect of creativity and to provide a broader scope of sport coaches' creativity, this study's questionnaire was developed to measure each of the aspects described previously, i.e. *person*, *process*, *press*, and *product*. In fact, Said-Metwaly et al. (2017) suggested the dependence on a single instrument for studying

creativity may be insufficient. As a result, the AUT (Guilford, 1967), RAT (Mednick, 1962), CPS (Gough, 1979), CCQ (Ekvall, 1996), and CAQ (Carson et al., 2005) were chosen to influence the question selection, along with other measurements of creativity. The ease of administration and interpretation, and the low expense of conducting these tests, factored into their selection as the basis for the questionnaire. Questions were chosen and modified from the tests to fit the Google Forms' format and to increase the ease of use for the participants. The finalized questionnaire may be viewed in the Appendix. Ultimately, the questionnaire measured personality traits for *person*; ideational fluency, the ability to make remote associations, and years of coaching experience for *process*; work climate for *press*; and previous impact and current frequency of creative products for *product*. The following sections provide details about how these tests were modified for the questionnaire and the additional creativity measurements utilized.

Person

A modified version of the CPS was chosen to measure the *person* aspect of creativity for the participants. All but one of the adjectives, artificial, in the CPS were used for the questionnaire, which was due to the researcher's error in transferring the test to the online format. Using the CPS scoring rubric, each of the adjectives were assigned the same +1 or -1 values. For this questionnaire, participants selected adjectives they identified with and a cumulative score of the positive and negative values for the selected adjectives was calculated. A maximum score of 18 and a minimum score of -11 were achievable. The cumulative score approach was maintained from the CPS and the scores were used to determine a grade for the creative aspect of *person* for the participants.

Process

Divergent Thinking. While the AUT measures ideational *fluency, originality, flexibility* and *elaboration*, only ideational fluency, also referred to as the Utility Test by Guilford (1967), was measured for the questionnaire. Ideational fluency is an objective measurement of the number of responses given by a participant. Originality, flexibility, and elaboration are each subjectively determined by raters, which was deemed to be inappropriate for this researcher to conduct without proper training. The potential for novel synthesis of ideas is increased by having a store of different ideas about a topic (Snyder, Mitchell, Bossomaier, & Pallier, 2004). Furthermore, the objective measure of ideational fluency was used to determine the divergent thinking abilities of the participants, though this does not give a complete picture of an individual's divergent thinking capacity.

On the questionnaire, a participant's score was equal to the number of responses they provided, and participants were instructed to provide as many answers as possible. Notably, the AUT only permitted "relevant" answers, however, this study counted each response as viable. Runco, Noble, Reiter-Palmon, Acar, Ritchie, and Yurkovich (2011) similarly asked participants to list as many responses as possible and used the total number of different ideas listed as the measure of fluency when administering the ideational fluency task to college students to explore the genetic basis of creativity. Unlike the AUT, only one task was used on the questionnaire to reduce the time required of the participants. Specifically, the word "ball" was selected, since a familiar item may be used to ensure the AUT is independent of learning (see Snyder et al., 2004). As a final note, the limited time factor was also removed for the purposes of the questionnaire and participants were given unlimited time to complete the ideational fluency task. This was due to software limitations that disallowed timing features and because a previous study reported

participants ran out of new ideas after 5 minutes (Snyder et al., 2004), and so participants were anticipated to move on to the next section after exhausting their answers.

Convergent Thinking. The RAT section of the questionnaire utilized ten randomly selected questions from Bowden and Jung-Beeman's (2003) study compiling normative data for 144 remote association problems. Bowden and Jung-Beeman (2003) developed their own remote association questions to ensure the solution word would consistently relate to the other three words in the same way, i.e. the arrangement of a compound word. The original versions of the RAT utilized 30 questions (Mednick, 1968), but this questionnaire only used 10 questions with unlimited time to answer and grades were determined by the number of correct answers. This configuration, along with selecting questions from Bowden and Jung-Beeman's (2003) study, was used by Atchley, Strayer, and Atchley (2012) when administering remote association questions to analyze the effects of exposure to nature on cognitive function. Accordingly, the possible scores ranged from 0 to 10 and were used to determine the convergent thinking abilities of the participants.

Experience. Individual differences in creative achievement have been proclaimed to be related to expertise (Weisberg, 2006) and domain expertise has been included as a cognitive component for assessing creativity from a domain perspective (Sand, 2003). Therefore experience, measured by how many years participants had been coaching, was included in the *process* section for measuring participants' creativity.

Press

The CCQ was modified by not using the original five questions per category, to reduce time, and instead participants were asked to rate each of the 10 climate categories on a Likert scale ranging from 0 to 3. Notably, the scale of 0 to 3 for each climate category was maintained

from the CCQ's design. Instead of a series of questions determining scores for each of the categories, this questionnaire provided an explanation of the climate category, provided examples of what high and low ratings may be in a work climate, and then asked participants to choose an option from the above-mentioned Likert scale. The definitions for the high and low ratings of each dimension were derived from Ekvall's (1996) descriptions of supportive and non-supportive features for the dimensions. Importantly, the participants were asked to rate how the collective members of their organization behaved and not how they perceived their own behavior or feelings about their work climate, as was done for the CCQ. Additionally, the dimension of "conflict" was changed to "lack of conflict", to ease confusion for participants by having each of the dimension's Likert scales flow from negative to positive outlooks. Of note, only one organizational member was used to answer the questions, due to the method of distributing the questionnaire. Ekvall (1983) utilized a "global" score for a shortened version of the CCQ in order to compare climate to other variables in a previous study. Subsequently, a cumulative total score of the domain ratings was used to assess the creative potential of a participant's climate in this questionnaire.

Product

Impact. Parts one and three of the CAQ were not included to reduce time for the participants and because they were considered irrelevant for the purposes of the questionnaire. Instead of measuring creative achievement in many domains, as is done in part two of the CAQ, this questionnaire used two categories, "coaching" and "any field". "Coaching" was not a category used on the CAQ but was used on this questionnaire because of the pertinence to the topic. "Any field" was used as a catch-all domain with the intention of measuring the participants' creative contributions to fields outside of their main profession.

Creative achievement was denoted as creative product impact and was defined as the level of usage, i.e. by oneself to globally, of the most impactful creative product a participant had developed, similar to the CAQ's measurement of creative achievement. Level of usage was used as an adaptation from the "Scientific Discovery" field on the CAQ, which had a high score of "My work has been cited by other scientists in national publications". Furthermore, Spector (1992) argued existing scales may be utilized for the development of a new scale. "I have never developed a creative product in..." was also included as an option and the grades ranged from 0 to 8.

Considering individuals may evaluate their own creative productivity based on self-generated theories about creativity (Said-Metwaly et al., 2017), a definition for creative product was provided as well. Thus, creative product was identified as an idea, object, or process that is *novel* and *useful*, which are common characteristics for describing creativity (Zeng, Proctor, & Salvendy, 2009). Novel was defined as perceived as new to yourself or others and useful was defined as something that can be used for a practical purpose. Finally, participants were asked to indicate in what field their most impactful creative product was developed.

Frequency. As an additional measure for *product*, the participants' creative product frequency was included. Answers for frequency were scaled comparably to the creative product impact measurement on the questionnaire and ranged from 0 = "I have never developed a creative product..." to 6 = "daily". Simonton (2010) discussed how creative products can range from Big-C creativity to little-c creativity, in which Big-C creativity refers to monumental achievements with enduring effects on society and little-c creativity refers to everyday problem solving. The creative product impact measurement is a way to determine if a specific product is Big-C creativity, little-c creativity, or somewhere in between. Runco (2014) alternatively

suggested little-c creativity is inseparable from Big-C creativity because they involve the same processes and because little-c creativity may develop into Big-C creativity. Additionally, Simonton (2010) claimed, “The norm is for creators who produce the most works to also produce the most masterworks” (p. 181). Considering little-c creativity may evolve into Big-C creativity and greater volumes of works may lead to more masterworks, creative product frequency may be considered a relevant measurement when analyzing creative achievement. To avoid circumlocution, creative product impact will be referred to as impact, and similarly, creative product frequency will be referred to as frequency for the rest of this paper.

Analysis

Excel was used to perform frequency distributions, spearman correlations, and two-tailed t-distributions. Frequency distributions were carried out for each of the creativity measurements, gender, sport, personality traits, and climate dimensions. Spearman correlations were conducted between impact and frequency in the coaching domain and the other creativity aspects. Further correlations were conducted between impact and frequency in the coaching domain and the personality traits and climate dimensions listed on the questionnaire. A final correlation between impact in the coaching domain and frequency in the coaching was performed as well. Two-tailed t-distributions with an alpha level of .05 were used to determine the significance of the correlations. Evans’ (1996) table for correlation strengths was used to determine the strengths of relationships between the factors in the analysis – 00-.19 “very weak”, .20-.39 “weak”, .40-.59 “moderate”, .60-.79 “strong”, .80-1.0 “very strong”.

Chapter 4. Results

The following graphs and tables represent the frequency distributions for the creativity aspects (Figures 1-7), personality traits (Table 2), and climate dimensions (Figures 8-17).

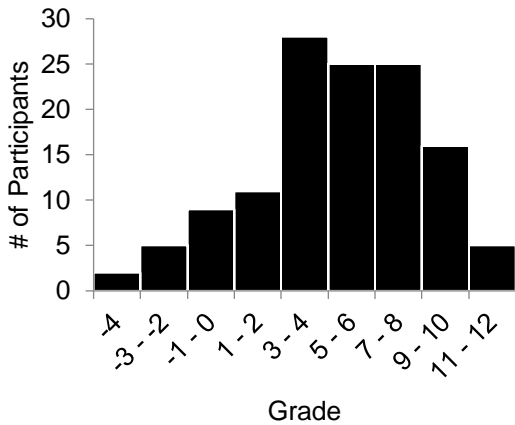


Figure 1. Grade frequencies for person

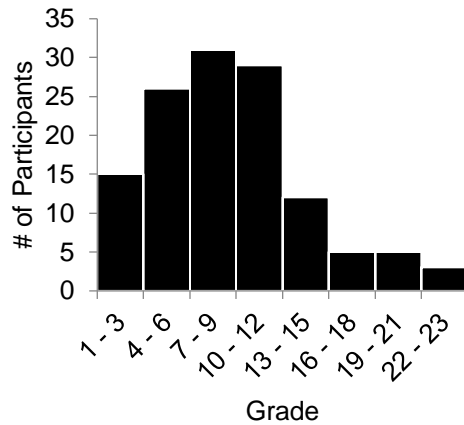


Figure 2. Grade frequencies for process: divergent thinking

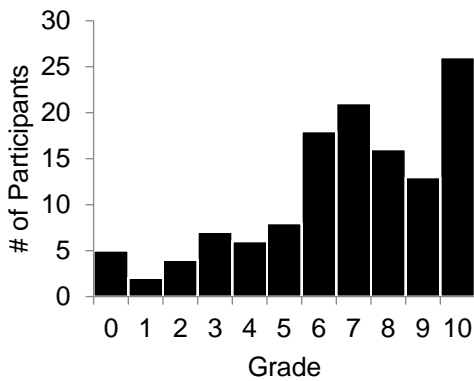


Figure 3. Grade frequencies for process: convergent thinking

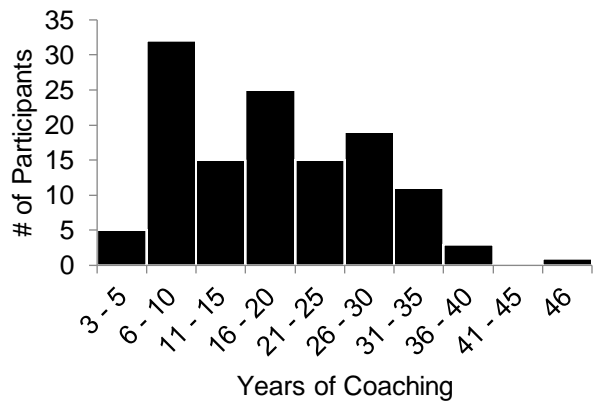


Figure 4. Years of coaching frequencies for process: experience

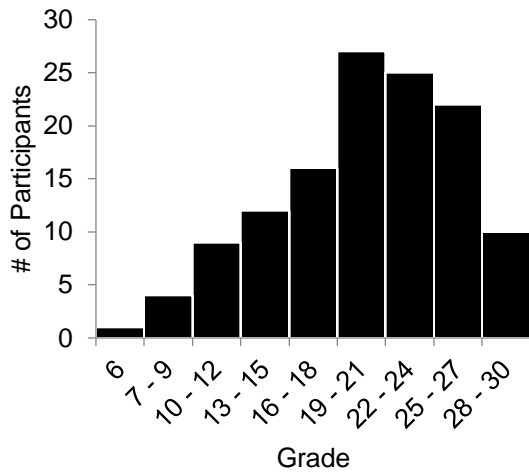


Figure 5. Grade frequencies for press

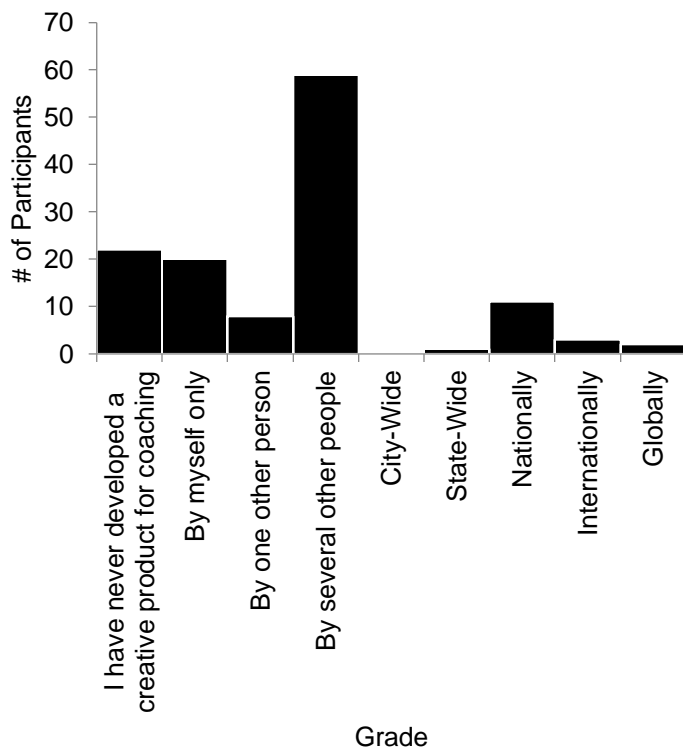


Figure 6. Grade frequencies for creative product impact in the coaching domain

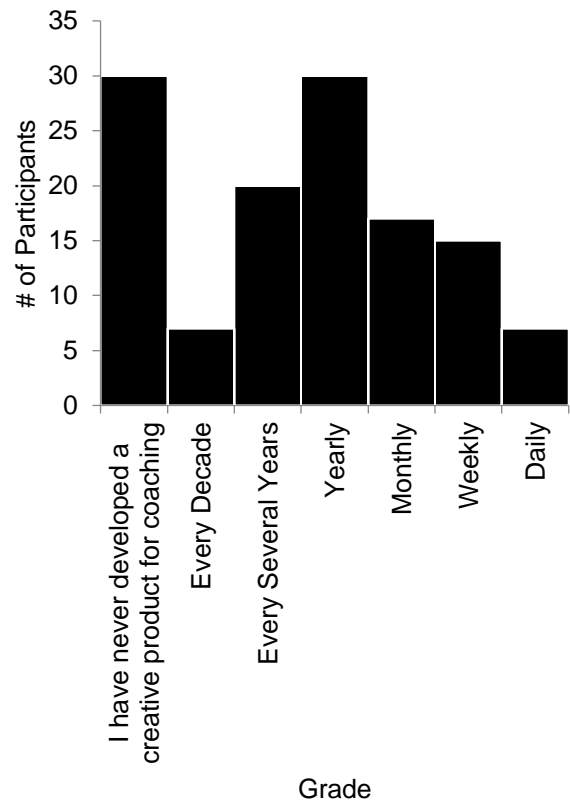


Figure 7. Grade frequencies for creative product frequency in the coaching domain

Table 2.

Frequencies and Percentages for Collegiate Sport Coaches' Personality Traits

	Identified With		Did Not Identify With	
	N	%	N	%
Capable	117	93%	9	7%
Clever	82	65%	44	35%
Cautious	70	56%	56	44%
Confident	98	78%	28	22%
Egotistical	11	9%	115	91%
Commonplace	9	7%	117	93%
Humorous	96	76%	30	24%
Conservative	62	49%	64	51%
Individualistic	49	39%	77	61%
Conventional	34	27%	92	73%
Informal	69	55%	57	45%
Dissatisfied	15	12%	111	88%
Insightful	83	66%	43	34%
Suspicious	32	25%	94	75%
Honest	114	90%	12	10%
Intelligent	92	73%	34	27%
Well-Mannered	95	75%	31	25%
Wide Interests	64	51%	62	49%
Inventive	47	37%	79	63%
Original	51	40%	75	60%
Narrow Interests	11	9%	115	91%
Reflective	80	63%	46	37%
Sincere	106	84%	20	16%
Resourceful	87	69%	39	31%
Self-Confident	87	69%	39	31%
Sexy	17	13%	109	87%
Submissive	6	5%	120	95%
Snobbish	3	2%	123	98%
Unconventional	43	34%	83	66%

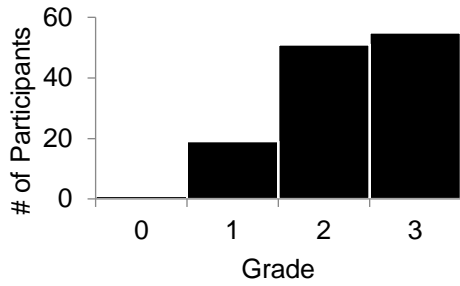


Figure 8. Grade frequencies for the “Challenge” dimension

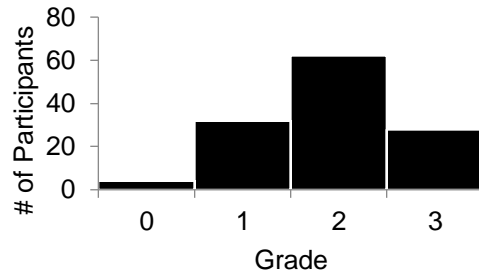


Figure 9. Grade frequencies for the “Dynamism and Liveliness” dimension

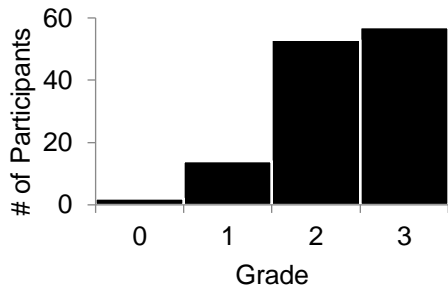


Figure 10. Grade frequencies for the “Playfulness and Humor” dimension

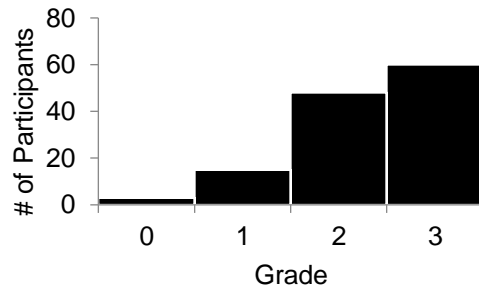


Figure 11. Grade frequencies for the “Freedom” dimension

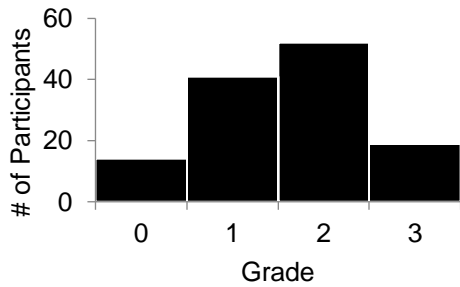


Figure 12. Grade frequencies for the “Risk Taking” dimension

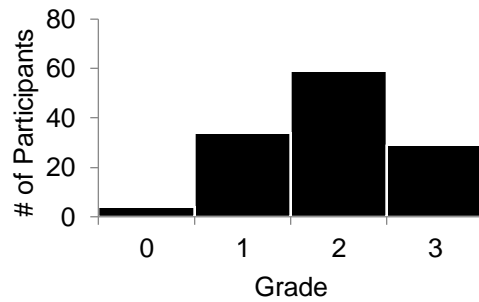


Figure 13. Grade frequencies for the “Idea Time” dimension

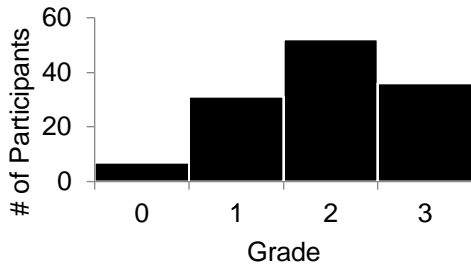


Figure 14. Grade frequencies for the “Idea Support” dimension

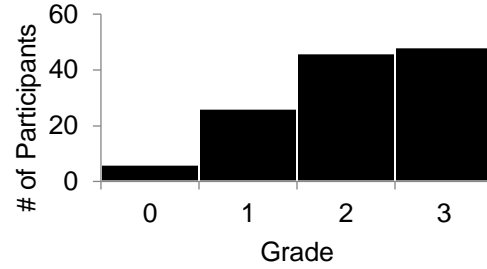


Figure 15. Grade frequencies for the “Trust and Openness” dimension

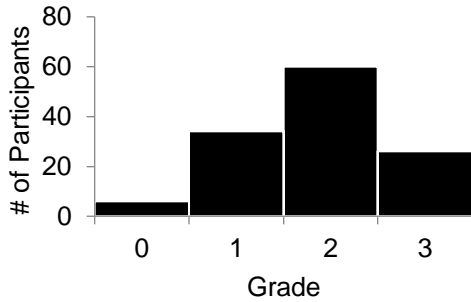


Figure 16. Grade frequencies for the “Debates” dimension

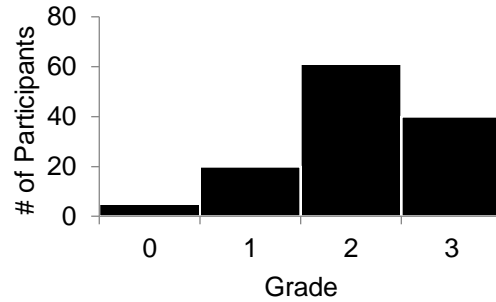


Figure 17. Grade frequencies for the “Lack of Conflicts” dimension

The creativity aspects that significantly correlated with impact in the coaching domain were *person* and *process*, specifically experience. The correlation between *person* and impact was positive and very weak ($r(124) = .19, p = .03$) and the correlation between experience and impact was positive and very weak ($r(124) = .19, p = .04$). The only creativity aspect to significantly correlate with frequency in the coaching domain was *person*. The correlation between *person* and frequency was positive and weak ($r(124) = .22, p = .02$). Table 3 provides all of the correlations between impact and frequency in the coaching domain and each of the other creativity aspects.

Table 3.

*Spearman Correlations Between Creative Product Impact and Frequency in the Coaching**Domain and Creativity Aspects*

	Impact		Frequency	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Person	.19	.03	.22	.02
Process: Divergent	.11	.22	.14	.13
Process: Convergent	.02	.85	-.01	.90
Process: Experience	.19	.04	-.04	.63
Press	.12	.20	-.01	.92

Note. $N = 126$ for all analyses.

There were two personality traits found to significantly correlate with impact or frequency in the coaching domain. Self-confident was positively and weakly correlated with impact ($r(124) = .20, p = .03$) and inventive was positively and very weakly correlated with frequency ($r(124) = .19, p = .03$). The correlations between impact and frequency in the coaching domain and personality traits may be found in Table 4. There were no significant correlations found between impact and frequency in the coaching domain and the climate dimensions. The correlations between impact and frequency in the coaching domain and climate dimensions may be found in Table 5. The correlation between impact in the coaching domain and frequency in the coaching domain was significantly positive and moderately correlated ($r(124) = .43, p < .001$). Discussion of the findings will be presented in the next section.

Table 4.

*Spearman Correlations Between Creative Product Impact and Frequency in the Coaching**Domain and Personality Traits*

	Impact		Frequency	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Capable	-.01	.94	.02	.78
Clever	.16	.08	.14	.12
Cautious	-.14	.11	-.05	.59
Confident	.09	.31	.10	.26
Egotistical	.07	.42	.05	.61
Commonplace	-.01	.93	-.08	.35
Humorous	.13	.15	.07	.46
Conservative	.01	.90	.04	.64
Individualistic	.05	.58	.03	.74
Conventional	-.01	.91	.08	.35
Informal	.05	.59	.08	.34
Dissatisfied	-.03	.71	-.03	.78
Insightful	.08	.39	.08	.36
Suspicious	.03	.77	.04	.65
Honest	.06	.50	.10	.27
Intelligent	.03	.73	.07	.44
Well-Mannered	.11	.23	.03	.72
Wide Interests	-.02	.83	.03	.77
Inventive	.14	.11	.19	.03
Original	.10	.27	.17	.06
Narrow Interests	-.03	.75	.03	.76
Reflective	.10	.25	.01	.89
Sincere	.07	.41	-.04	.62
Resourceful	.13	.14	.14	.12
Self-Confident	.20	.03	.11	.21
Sexy	.01	.93	.13	.15
Submissive	-.01	.90	.00	.97
Snobbish	-.04	.70	.01	.91
Unconventional	.10	.26	.08	.39

Table 5.

Spearman Correlations Between Creative Product Impact and Frequency in the Coaching

Domain and Climate Dimensions

	Impact		Frequency	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Challenge	.04	.67	.04	.67
Dynamism and Liveliness	.05	.57	-.01	.94
Playfulness and Humor	.04	.66	.01	.88
Freedom	.14	.12	.06	.53
Risk Taking	.16	.08	.06	.52
Idea Time	.17	.06	-.10	.28
Idea Support	.05	.56	.06	.53
Trust and Openness	.08	.36	-.01	.94
Debates	.11	.23	.02	.87
Lack of Conflicts	.01	.87	-.02	.81

Chapter 5. Discussion

When analyzing the data it is important to recognize the weaknesses of the correlation strengths with no creative potential factor exceeding $r = .22$. Bowers et al. (2014) suggested that due to the complexity of creativity and the multitude of variables that contribute to its manifestation, low levels of explained variance are a reasonable outcome when analyzing factors of creativity. Despite the weak correlations, the data may yet provide insight on factors affecting impact and frequency for sport coaches. Of note only impact and frequency in the coaching domain were analyzed for the *product* aspect. The intent of this particular paper was to understand the relationships of factors affecting creative products developed by participants in the coaching field. Discussion of the relationships between *person*, *process*, *press*, and impact and frequency in the coaching domain will follow.

Person

Sport coaches' engagement in creative behavior may be more tied to their personality than to their capacities to be creative, i.e. divergent and convergent thinking abilities, and work climate according to the results of this study. Personality traits are attributable to individuals' behavior similar to impact and frequency, which are indicators of past and present creative behavior respectively. Notably, collegiate sport coaches who possessed personality traits that were positively associated with creativity and who did not identify with personality traits that were negatively associated with creativity, as indicated by the modified CPS, tended to have more impactful creative products and developed creative products more frequently in this sample. The positively associated traits included on the questionnaire were capable, clever, confident, egotistical, humorous, individualistic, informal, insightful, intelligent, wide interests, inventive, original, reflective, resourceful, self-confident, sexy, snobbish, and unconventional.

The negatively associated traits on the questionnaire included cautious, commonplace, conservative, conventional, dissatisfied, suspicious, honest, well-mannered, narrow interests, sincere, submissive. Collegiate sport coaches who optimally possessed personality traits as indicated by the grading structure of the modified CPS tended to have greater creative productivity, which may be useful for identifying coaches who are more likely to engage in creative behaviors. Once again though, the correlations between *person* and impact in the coaching domain and *person* and frequency in the coaching domain were very weak and weak respectively.

Considering the modified CPS used for the *person* aspect was a test made up of individual factors, i.e. personality traits, further analysis was conducted to determine which specific personality traits were significantly correlated with impact or frequency in the coaching domain. Feist (1999) reported creative personalities differed between domains, and so discovering which personality traits for sport coaches may have had significant correlations with impact and frequency was worthwhile. From the results, it was determined that collegiate sport coaches who were self-confident tended to develop more impactful creative products. It was also determined that collegiate sport coaches who were inventive tended to develop creative products more frequently. Remember these correlations were weak and very weak respectively. Still, exploring these traits may be constructive in evaluating how they pertain to collegiate sport coaches' creative behaviors.

Self-Confident and Inventive. Self-confident was previously reported to be positively related to successful and creative leaders (Matthew, 2009). Perhaps successful collegiate sport coaches are more confident in their abilities and as a result put more trust in their creative efforts. Confidently standing by one's creative product could influence its level of usage amongst other

sport coaches by reassuring its effectiveness. Without self-confidence, collegiate sport coaches may be uncomfortable with distributing their creative products and may be more likely to keep their creative products to themselves, despite how functional they may be.

Inventive having a positive relationship with frequency in the coaching domain was not surprising, considering its direct link to creativity. Those who invent by definition must create something new and useful. Moreover, by identifying with the trait of inventive, one indicates that they are regularly engaging in creativity and developing new and useful products on a consistent basis. This ties directly to the measurement of creative product frequency, which alluded to how often participants developed creative products for a particular field. In all, self-confident and inventive may be traits that are more specifically related to collegiate sport coaches' creative productivity.

Process

Neither impact, nor frequency, in the coaching domain were found to correlate significantly with tests of divergent or convergent thinking skills. This is intriguing, considering previous studies suggested divergent thinking was positively related to leader performance (Matthew, 2009). A possible conclusion is that the capacity to be creative does not necessitate or incline an individual toward use of such potential. It is necessary to recognize that creativity is not always measured by its outcomes, and instead has been defined as a cognitive process (see Drazin, Glynn, & Kazanjian, 1999). As such, divergent and convergent thinking skills would likely have stronger relationships with tests measuring participants' creative processing abilities than their creative productivity.

Nonetheless, impact in the coaching domain was found to positively and very weakly correlate with experience, yet there are mixed reviews of the relationship between creativity and

experience in the literature. Memmert, Baker, and Bertsch (2010) reported that previous research indicated excessive domain specialization may diminish creative behavior, and creativity, at times, can have an inverted-U relationship with training. Meanwhile, Amabile (1988) contended that greater amounts of knowledge could lead to more effective creativity. Remember impact may be more indicative of past behavior, whereas frequency may be more indicative of present behavior. Considering impact was related to a participant's past creative products at any point in their career, it is unknown exactly when a participant's most impactful creative product was developed. A sport coach may have developed their most impactful creative product early in their career, but at the time of answering the questionnaire may have been much further along in their career. An opposite scenario could be true as well, in which a participant developed their most impactful creative product later in their career. It's uncertain when the participants had developed their most impactful creative product in this study. Ultimately, a positive correlation between impact in the coaching domain and experience may indicate that given more time, a collegiate sport coach will be more likely to have developed a creative product with greater impact.

Press

The lack of a significant correlation between *press* and *product*, may indicate that collegiate sport coaches are creative, or not creative, regardless of their work environment. The level of usage of a collegiate sport coaches most impactful creative product and the frequency at which collegiate sport coaches develop creative products, specifically, may have little influence from environmental factors. The climate dimensions on their own did not have significant correlations with either impact or frequency in the coaching domain as well. As mentioned previously, the same climate may affect individuals differently (Said-Metwaly et al., 2017), and

creative individuals may exist in a noncreative climate (Sosa, 2011). Other sport coaches within the same university as one of the participants may be more or less creative from the same climate or may deliberately engage in creativity with insensitivity to a creativity-discouraging environment. Interestingly, majority of participants scored at least a two or higher in each of the climate dimensions, indicating favorable work climates toward creativity for a plurality of the sample. Similar to the tests for divergent and convergent thinking processes, the measurement for *press* in this questionnaire may more so relate to the capacity for creativity than actual creative behavior.

Yet, it is still reasonable to consider that a collegiate sport coach's environment affects their creative behavior. Considering collegiate sport coaches are in leadership positions, they likely have a significant impact on their work climate. Subsequently, if a collegiate sport coach values creativity they may shape their work climate to encourage their own engagement in creativity and vice versa. Conceivably the autonomy of collegiate sport coaches may diminish the effects of climate on their creative behavior.

The Difficulties of Measuring Creativity

The divergent and convergent tests for the *process* aspect, and the climate questionnaire for the *press* aspect, did not have correlations with either impact or frequency in the coaching domain. The modifications of the tests used for these sections may have factored into this result. One consideration is that the divergent and convergent thinking tests were only in the semantic categories, which was due to its convenient usage for an online questionnaire and limitations of the questionnaire software chosen. Perhaps divergent and convergent thinking tests in a different category could elicit a different response from sport coaches. For instance, a test for the *process* aspect in the visual-figural category may be more applicable to team sport coaches, since their

profession requires processing information pertaining to athletes out in the field of play. This is primarily visual data that a team sport coach must analyze and produce creative solutions for, and so the visual-figural category of creativity may be more pertinent to sport coaching.

Additionally, the nature of the modified CCQ section on the questionnaire may have had an influence on measuring the *press* aspect of the results. The original CCQ tested multiple participants within a work climate to allow broader input for rating the creativity disposition of an environment. However, the questionnaire used in this study only had the perspective of the participant. Without participants' fellow employees' input and the effect of a sport coach's leadership on their environment, the modified CCQ may not be an optimal representation of *press*. Still, it did provide some measure of the participants' work climate.

The nature of this online questionnaire relying on self-report measures from the participants likely had an impact on the results as well. Social desirability to report in a favorable manner, respondents attempting to appear consistent in their answers, the state of a participant's mood at the time of answering a questionnaire, and implicit theories about the concept of creativity (Said-Metwaly et al., 2017) are all factors that could have affected the self-reporting used on the questionnaire in this study.

Sport Coaches' Creative Productivity

Analyzing the frequency distributions for impact and frequency may also be useful. The selection with the highest response for impact in the coaching domain was "by several other people" with 59, or 49% of, respondents choosing this option. This could suggest that a large portion of collegiate sport coaches at some point in their careers have developed creative products, which were used by individuals other than themselves. Whether these other users were sport coaches within the same university or located externally, the creative products were

distributed and not withheld from others. The second most selected option for impact in the coaching domain was “I have never developed a creative product for coaching” with 22, or 17% of, respondents selecting this response. This may indicate that a considerable segment of the collegiate sport coaches in this sample do not engage in creative behavior as part of their work.

From a frequency standpoint, there was a tie between “I have never developed a creative product for coaching” and “yearly” for the highest count with 30, or 24% of, respondents selecting each of these options in the coaching domain. Seemingly, there was a substantial amount of collegiate sport coaches in this sample who lacked creative product frequency. This may be due to sport coaching traditionally being results driven and outcome based (Hughes et al., 2009), in which a focus on winning leads to using tried and true methods over more creative solutions. Although creativity is an advantageous asset for sport coaches, these results demonstrated limited creative productivity amongst the sample and likely collegiate sport coaches across the United States. Understanding which factors are related to impact and frequency may be useful for improving the creative behavior of sport coaches.

The Relationship Between Impact and Frequency. This study was intended to analyze the relationship between factors of creative potential and creative productivity. However, an additional analysis of the relationship between impact and frequency in the coaching domain was conducted considering Simonton’s (2010) claim that those who create the most works, will also create the most masterworks. The correlation between impact and frequency in the coaching domain for this sample was positive and moderate, indicating a substantial relationship between the two variables. In other words, this study provided support for the notion that collegiate sport coaches who develop creative products more frequently tend to develop more impactful creative products as well.

Chapter 6. Conclusion

This study analyzed the results of a questionnaire featuring several modified creativity tests to identify the relationships between creative product, in the forms of impact and frequency, and the creative aspects of *person*, *process*, and *press* amongst head collegiate team sport coaches. While each of the tests were previously reported to relate to creativity, only a modified CPS grade, which measured personality traits, was found to positively correlate with impact and frequency in the coaching domain. Outside of the creativity tests, experience, as part of the *process* aspect and expressed in years of coaching, was found to positively correlate with impact in the coaching domain as well.

Expanding on the correlations between *person* and creative productivity in the coaching domain, further analysis of the relationships between the individual personality traits measured and impact and frequency in the coaching domain was conducted. As a result, impact in the coaching domain was found to positively correlate with self-confident and frequency in the coaching domain was found to positively correlate with inventive. Of note, none of the significant correlations between factors of creative potential and creative productivity reported were above a weak strength. However, the relationship between impact and frequency in the coaching domain was determined to be positive and moderately correlated, providing support for the concept of sport coaches who develop creative products more frequently tend to develop more impactful creative products. Furthermore, implications based on the results may be useful for collegiate sport coaches striving to solve problems in new and useful ways.

Implications

Although a new and useful approach may not be necessary for every coaching scenario, it does provide a means to innovate and improve upon current practices, and has the potential to

generate better coaching outcomes. Considering the positive relationship found between *person* and both impact and frequency in the coaching domain, a collegiate sport coach may focus on making changes to their personality to enhance the positively related traits and diminish the negatively related traits to creativity mentioned in the discussion. Specifically focusing on the traits of self-confident for impact in the coaching domain and inventive for frequency in the coaching domain. Understandably, making changes to one's personality may seem easier said than done, however instruction has been shown to effectively transform individuals' attitudinal and motivational factors related to creativity (Runco & Sakamoto, 1999). Surrounding oneself with creative role models has also been shown to increase individuals' creative behaviors (Bandura, 1986). While suggesting for sport coaches to make changes in order to increase creative productivity may seem a worthy endeavor, there may be drawbacks as well. For instance, Tierney and Farmer (2011) found increased requirements for creativity in the workplace actually decreased the efficacy of employee's creative productivity.

Additionally, acquiring more years of experience in the field may be beneficial for collegiate sport coaches' development of more impactful creative products, with regard to the positive relationship found between experience and impact in the coaching domain. Markedly, the significant correlations between the creative potential factors and creative productivity were weak or very weak in this study, leaving much to be desired in the identification of creative potential factors related to creative productivity. Barring this, the moderately positive relationship between impact and frequency in the coaching domain may suggest collegiate sport coaches should strive to develop creative products more frequently, so they are more likely to develop a creative product with greater impact. Whether a collegiate sport coach can change to be more creative remains to be seen but hiring those who demonstrate creative productivity

would be worthwhile for universities. Collegiate sport coaches who engage in creative behaviors is an advantageous asset to be sought after.

Limitations

Limitations for this study included sample size, the modification of creativity tests, and self-report bias. Considering the low response rate, the results of this study would have been stronger with a greater sample size. The lack of responses could be due to several factors, such as the distribution emails being regarded as spam. The sport coaches may have lacked time to answer the questionnaire because the response period was during the fall semester, and a portion of the coaches would have been in the middle of their seasons, an especially busy time of year.

The usage of particular creativity tests proposed challenges that required their modification for the purpose of adapting to an online questionnaire format and the skill level of the researcher. Without proper training, the AUT could not be completed with the additional flexibility, originality, and elaboration criteria, which may have generated a more accurate depiction of participants' divergent thinking capabilities. Using a divergent thinking test that does not pertain to the semantic category may be more appropriate for the sport coaching domain as well. Participants also had the ability to look up answers to the remote association questions while taking the questionnaire, due to the online nature of the questionnaire and unlimited time, which could have skewed results. Lastly, the modified CCQ section of the questionnaire only gathered input from a single participant, whereas its original intent was to gain the perspective of multiple members in a specific work climate. Without access to the participants' fellow employees, the modified CCQ grades may not as accurately represented the participants' work climates. Also, the CCQ measured participants' current work climate at the time of taking the questionnaire. Considering collegiate sport coaches may move to and from different universities

throughout their career, their work climates may change. When considering impact, a sport coach may have developed their most impactful creative product at a previous university where their creativity was encouraged, while at their current university there were no incentives for creative behavior. This potential scenario points out a possible flaw in the analysis of the relationship between *press* and impact.

Finally, self-report bias may have affected the responses of the participants. Social desirability, consistency motive, mood state, and implicit theories are all possible sources of self-report bias regarding creativity tests as mentioned previously (see Said-Metwaly, 2017).

Although thorough explanations were provided for each section of the questionnaire, especially for the definition of a creative product, the participants may have lacked an understanding of the tasks. This would have been a source of error and certainly affected the results. Despite the limitations presented, this study was still able to gather useful insight on the relationships between sport coaches' creativity productivity and factors of creative potential. Overall, the assessment of creativity is a difficult undertaking and inconsistent definitions complicate the measurement of creativity (Batey, Chamorro-Premuzic, & Furnham, 2010). The validity of the questionnaire may be questioned, though the theories and questions were derived from previous literature, e.g., previous tests were modified to varying degrees. Reliability has not been established, but the questionnaire may be exactly repeated in the future.

Future Research

Future research may take a closer look at the relationship between collegiate sport coaches' creativity and essential aspects of their profession, such as win/loss percentage. Further exploration of the identified factors related to impact and frequency in the coaching domain may also be conducted. An aim to test if the modified CPS, self-confident, inventive, and years of

experience are consistently found to relate to creative productivity in the coaching domain could be an objective. The productivity of creative behavior is only one perspective for analyzing creativity. Understanding the processes through which sport coaches engage in creativity would be a different avenue for examining the relationship between sport coaching and creativity. Intervention studies focused on encouraging participants to enhance personality traits positively related to creativity, especially self-confidence and inventiveness, may provide valuable feedback as well. Whether or not sport coaches could manipulate their personality traits to increase creative productivity would be an intriguing experiment. Lastly, despite the modified divergent and convergent thinking tests for the *process* aspect and the modified CCQ for the *press* aspect not significantly correlating with impact or frequency in the coaching domain, further research analyzing these aspects and how they relate to creative productivity should be conducted. The utilization of different tests for measuring each of the creativity aspects is also recommended. Concluding, sport coaching is seemingly tied to creativity, whether explicitly stated in the literature or not. A continued effort to analyze this relationship and understand its benefits and disadvantages may be an invaluable asset to the sport coaching profession.

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APPENDIX: Questionnaire

The following exercise requires you to list as many uses as you can think of for an object. Please separate each answer with a semicolon.

List the uses for a "ball."

This exercise requires you to read three cue words and come up with a fourth word that links them together. For example, the three cue words "night," "wrist," and "stop" are linked by the word "watch" ("night watch," "wristwatch," and "stopwatch").

Cottage / Swiss / Cake

Opera / Hand / Dish

Dew / Comb / Bee

Stick / Maker / Point

River / Note / Account

Right / Cat / Carbon

Fish / Mine / Rush

Fence / Card / Master

Sense / Courtesy / Place

Wise / Work / Tower

The following section provides a list of adjectives. Please check all that apply to you.

Capable

Humorous

Insightful

Clever

Conservative

Suspicious

Cautious

Individualistic

Honest

Confident

Conventional

Intelligent

Egotistical

Informal

Well-Mannered

Commonplace

Dissatisfied

Snobbish

Wide Interests

Sincere

Unconventional

Inventive

Resourceful

Original

Self-Confident

Narrow Interests

Sexy

Reflective

Submissive

The following terms refer to the climate of a workplace. Please rate each of them as they apply to your work environment. After reading the definition of a term, determine whether your organization's climate strongly exhibits the characteristic (a "3" rating on the scale) or weakly exhibits the characteristic (a "0" rating on the scale). If your organization's climate does not exhibit the characteristic in a strong or weak way, determine if it slightly favors (a "2" rating on the scale) or slightly disfavors (a "1" rating on the scale) the characteristic.

Challenge

The emotional involvement of members in the operations and goals.

HIGH: When people are experiencing joy and meaningfulness in their job, and therefore invest much energy into their work.

LOW: People have feelings of alienation and indifference; the common sentiment and attitude is apathy and lack of interest for the job and the organization.

	0	1	2	3	
Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High

Dynamism and Liveliness

The eventfulness of the work environment.

HIGH: New things are happening all the time and alterations between ways of thinking about and handling issues often occur. There is a kind of psychological turbulence which is described as "full speed", "go", "breakneck", or "maelstrom".

LOW: Comparable to a slow jog-trot with no surprises. There are no new projects; no different plans. Everything goes its usual way.

	0	1	2	3	
Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High

Playfulness and Humor

The spontaneity and ease that is displayed.

HIGH: A relaxed atmosphere with jokes and laughter.

LOW: The atmosphere is stiff, gloomy, and cumbrous and characterized by gravity and seriousness. Jokes and laughter are regarded as improper.

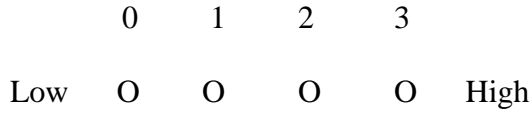
	0	1	2	3	
Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High

Freedom

The independence in behavior exerted by members.

HIGH: People make contacts and give and receive information; discuss problems and alternatives; plan and take initiatives of different kinds; and make decisions.

LOW: People are passive, rule-bound and anxious to stay inside established boundaries.

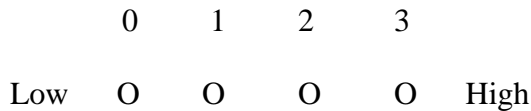


Risk Taking

The tolerance of uncertainty.

HIGH: Decisions and actions are prompt and rapid, arising opportunities are taken and concrete experimentation is preferred to detailed investigation and analysis.

LOW: There is a cautious, hesitant mentality. People try to be on the "safe side". They decide "to sleep on the matter". They set up committees and they cover themselves in many ways before making a decision.

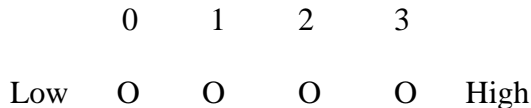


Idea Time

The amount of time people can use (and do use) for elaborating new ideas.

HIGH: The possibilities exist to discuss and test impulses and fresh suggestions that are not planned or included in the task assignment; and people tend to use these possibilities.

LOW: Every minute is booked and specified. The time pressure makes thinking outside the instructions and planned routines impossible.

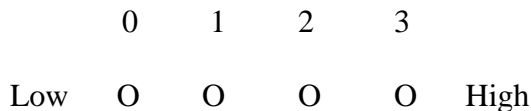


Idea Support

The way new ideas are treated.

HIGH: Ideas and suggestions are received in an attentive and supportive way by bosses and workmates. People listen to each other and encourage initiatives. Possibilities for trying out new ideas are created. The atmosphere is constructive and positive.

LOW: The reflexive "no" prevails. Every suggestion is immediately refuted by a counterargument. Fault finding and obstacle raising are the usual styles of responding to ideas.



Trust and Openness

The emotional safety in relationships.

HIGH: Everyone in the organization dares to put forward ideas and opinions. Initiatives can be taken without fear of reprisal and ridicule in case of failure. Communication is open and straightforward.

LOW: People are suspicious of each other and are wary of making expensive mistakes. They also are afraid of being exploited and robbed of their good ideas.

	0	1	2	3	
Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High

Debates

The occurrence of encounters and clashes between viewpoints, ideas, and differing experiences and knowledge.

HIGH: Many voices are heard, and people are keen on putting forward their ideas.

LOW: People follow authoritarian patterns without questioning.

	0	1	2	3	
Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High

Lack of Conflicts

The lack of personal, interpersonal, or emotional tensions.

HIGH: People behave in a more mature manner; they have psychological insight and control of impulses.

LOW: Groups and individuals dislike each other, and the climate can be characterized by “warfare”. Plots and traps are usual elements. There is gossip and slander.

	0	1	2	3	
Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High

This section will refer to creative products you have developed in your lifetime. A creative product is an idea, object or process that is NOVEL (perceived as new to yourself or others) and USEFUL (something that can be used for a practical purpose). Examples of creative products for coaching are accelerometers for athletes to wear in order to track their activity; an offensive strategy for the team to execute; or a social media policy for players that reduces inappropriate posting.

The most impactful creative product I have developed for coaching is used...

I have never developed a creative product for coaching	City-Wide
By myself only	State-Wide
By one other person	Nationally
By several other people	Internationally
	Globally

I develop creative products for coaching...

I have never developed a creative product for coaching	Yearly
Every decade	Monthly
Every several years	Weekly
	Daily

The most impactful creative product I have developed in ANY field is used...

I have never developed a creative product in any field	City-Wide
By myself only	State-Wide
By one other person	Nationally
By several other people	Internationally
	Globally

What field did you develop this creative product for?

I develop creative products in ANY field...

I have never developed a creative product for coaching	Yearly
Every decade	Monthly
Every several years	Weekly
	Daily

VITA

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