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Olympic Coaching Excellence: A Quantitative Study of Psychological Aspects of Olympic Swimming Coaches

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Abstract

Objectives: Researchers investigating the psychological aspects of Olympic coaching have studied coaches as a homogenous group, and the effect of coaches' psychological characteristics on performance-related outcomes remains unclear. The objective of this research, therefore, was to examine whether psychological factors discriminate between world-leading (i.e., Olympic gold medal winning) and world-class (i.e., Olympic non-gold medal winning) coaches.

Method: Self-reported psychometric questionnaires were completed by 36 Olympic coaches who had collectively coached 169 swimmers to win 352 Olympic medals, of which 155 were gold medals. The questionnaires assessed 12 variables within the Big Five personality traits, the dark triad, and emotional intelligence, and the data was analyzed using three one-way multivariate analysis of variance and follow-up univariate F-tests.

Results: The results showed that the 21 world-leading coaches were significantly more agreeable, had greater perception of emotion, were better at managing their own emotion, and were less Machiavellian and narcissistic than the 15 world-class coaches. The groups of coaches showed no differences in levels of conscientiousness, openness to experience, extraversion, neuroticism, psychopathy, managing other emotion, or utilization of emotion.

Conclusions: Psychological factors discriminate between world-leading and world-class coaches. The implications of these differences are discussed for psychology researchers and practitioners operating in Olympic sport.

Keywords: coach; elite; high performance; psychosocial; sport

Olympic Coaching Excellence: A Quantitative Study of Psychological Aspects of Olympic Swimming Coaches

The Olympic Games are recognized as the most demanding and prestigious sporting competition in the world (Gould & Maynard, 2009) and winning an Olympic gold medal represents the pinnacle of sporting achievement (Haberl & Peterson, 2006). Olympic coaches play an essential role in athletes' success and are considered performers in their own right (Cook & Fletcher, 2017; Gould, Guinan, Greenleaf, & Chung, 2002). They are expected to operate optimally within highly pressurized environments and to personally manage a wide range of individual, team, and organizational issues (Rynne, Mallett, & Rabjohns, 2016). This has led researchers to argue that there is a need to examine the psychological factors underpinning coaching as well as the technical and tactical aspects (McCarthy & Giges, 2016). In a systematic review of psychosocial aspects of coaching in Olympic sport, Cook, Fletcher, and Carroll (2021) identified coach traits, states, and behaviors that were perceived to have a facilitative, debilitative, or non-categorized effect on athlete performance. However, the effect of coaches' psychological variables on different athlete performance-related outcomes remains unclear because the included studies investigated coaches as a homogenous group and did not use comparative designs.

Researching the factors that discriminate between coaches whose athletes have achieved different performance outcomes is an important step in advancing our understanding of successful Olympic coaching (Cook et al., 2021). O'Boyle and Aguinis (2012) remarked that a relatively small number of people account for most of the winning performances in their field, and argued that researchers should seek to differentiate and understand the psychology of these elite achievers at the tail end of the performance distribution curve: "Our work indicates that superstars exist, but does not address the motivations, behaviors and individual differences of the superstars" (p. 113). To understand

the psychological functioning of these eminent individuals, it is essential to use appropriate comparator groups to draw valid conclusions. Simonton (2014) argued that "the factors that distinguish athletes from non-athletes do not have to be equivalent to those that distinguish the rare competitors who won multiple gold medals from those in the same Olympic event who earned only a single bronze medal" (p. 478). In a similar vein, the variables that discriminate the coaches of Olympic gold medal winning athletes from the general population may not be the same variables as those that discriminate them from coaches whose athletes have won a silver or bronze medal. The salience of this observation has been underscored by recent work suggesting that psychological differences exist between athletes who have won Olympic medals in comparison with those who have not (Hardy et al., 2017), and it may be that psychological differences also exist between elite coaches whose athletes have achieved different performance outcomes.

The role of personality variables in athletes' and coaches' performance has been of interest to sport psychologists since the founding of the discipline (Griffith, 1925). Over the past decade, the relationship between the Big Five conceptualization of personality (Costa & McCrae, 2010) and coaching outcomes has gained attention (e.g., Allen, Greenlees, & Jones, 2013; Jackson, Dimmock, Gucciardi, & Grove, 2011; Yang, Jowett, & Chan, 2015). This conceptualization encompasses the personality traits of conscientiousness (e.g., organization, discipline, and hard work), openness to experience (e.g., imagination, tolerance of ambiguity, and preference for complexity), agreeableness (e.g., trust, cooperation, and care), extraversion (e.g., sociable, gregarious, and dominant), and neuroticism (e.g., tendency toward negative emotion). Cook et al. (2021) identified conscientiousness as the most examined trait across the Olympic sport coaching literature, and found a perceived facilitative effect on athlete performance. In a series of studies that used the Big Five model and its associated psychometric questionnaire, Mallet and colleagues found that serial medal

winning professional, Olympic and Paralympic coaches scored higher in comparison to general population norms on conscientiousness, openness, agreeableness, and extraversion, and lower on neuroticism (Mallett & Coulter, 2016; Mallet & Lara-Bercial, 2016). Although our understanding of Olympic and Paralympic coaches' personalities has advanced over recent years, little is known about the similarities and differences between the personalities of coaches operating at the highest level of sport.

Alongside the Big Five variables, other psychological factors contribute to an individual's distinctive pattern of feeling, thinking, and behaving (Cervone & Pervin, 2008). There is growing awareness of a 'darker side' of the human psyche, particularly following reports of some coaches' behaviors adversely affecting athletes, teams, and the wider organization (Grey-Thompson, 2017). Paulhus and Williams (2002) described the three traits of Machiavellianism, psychopathy, and narcissism as the "dark triad" of personality. Machiavellianism is the propensity to lie, manipulate, and exploit others (Christie & Geis, 1970), psychopathy is marked by low empathy, and a lack of remorse or guilt (Lilienfeld, Watts, & Smith, 2015), and narcissism is characterized by a grandiose sense of self, and a demand for admiration (Emmons, 1987). Narcissism has been shown to influence elite performance (Matosic, Ntoumanis, Boardley, & Sedikies, 2018; Matosic et al., 2017; Roberts, Woodman, & Sedikides, 2018), and research has demonstrated the strategic employment of dark traits by sport leaders and coaches (Fletcher & Arnold, 2011; Arnold, Fletcher, & Hobson, 2018; Cruickshank & Collins, 2015). Despite these empirical findings, no studies have investigated the effect of the dark triad in Olympic coaching (Cook et al., 2021).

Behaviors are driven by more than the Big Five and dark triad personality constructs, and it is important to consider wider concepts to develop a more complete understanding of the effect of psychological attributes on Olympic coaching. Emotional intelligence is an

individual's response to interpersonal or intrapersonal emotional information, comprising the identification, interpretation, expression, and regulation of both own and other emotions (Mayer, Roberts, & Barsade, 2008; Petrides, Pita, & Kokkinaki, 2007). Emotions convey a range of thoughts, feelings, and attitudes, and an athlete's expression of emotion is a critical source of knowledge for coaches (Chan & Mallett, 2011). Guiding an athlete to optimal outcomes is partly dependent on coaches' showing empathy and understanding as well as adapting to athletes' emotional needs (Laborde, Dosseville, & Allen, 2016). Despite this, Laborde et al.'s (2016) systematic review of the emotional intelligence literature observed that there was limited research within sport coaching. In the few studies exploring emotional intelligence in Olympic coaching, the evidence suggests that it positively influences coaches' perceptions of, and reactions to, events in training and competition (Hodgson, Butt, & Maynard, 2017; Mallett & Coulter, 2016; Olusoga, Maynard, Hays, & Butt, 2012), and it would be expected to influence whether a coach can successfully guide an athlete to win an Olympic gold medal.

Researchers investigating the psychological aspects of Olympic coaching have studied coaches as a homogenous group, and the effect of coaches' psychological characteristics on performance-related outcomes remains unclear. The objective of this research, therefore, was to examine whether psychological factors discriminate between world-leading and world-class coaches. Based on the existing Big Five literature, it was hypothesized that: (H1a) conscientiousness; (H1b) openness to experience; (H1c) agreeableness; and (H1d) extraversion would be higher; and (H1e) neuroticism would be lower in world-leading in comparison with world-class coaches. In relation to the dark triad, it was hypothesized that: (H2a) Machiavellianism; (H2b) psychopathy; and (H2c) narcissism would be lower in world-leading in comparison with world-class coaches. In addition, based on the emotional intelligence literature, it was hypothesized that: (H3a) perception of

emotion; (H3b) management of own emotion; (H3c) management of other emotion; and (H3d) utilization of emotion would be higher in world-leading in comparison with world-class coaches.

Method

The methods are reported in accordance with the American Psychological Association's reporting standards for quantitative research in psychology (Appelbaum et al., 2018) and comprise the following sections: Inclusion and exclusion, participant characteristics, participant selection, sample size and precision, measures, data collection, quality of measurements, instrumentation and psychometrics, conditions and design, data diagnostics, and analytic strategy.

Inclusion and Exclusion

Participants were required to be active coaches and to have been a swimmer's main coach for a minimum of two years immediately prior to competing at an Olympic Games.

Participant Characteristics

Participants were 36 coaches (33 male, 3 female) ranging in age from 32 to 79 years ($M = 49.6$, $SD = 9.04$). Fourteen of the participants coached in Great Britain, 13 in Australia, eight in America, and one in the Netherlands. Participants reported between six and 53 years of swimming coaching experience ($M = 25.90$, and $SD = 12.60$) and had coached at one to five Olympic Games. Collectively, the participants had coached 169 swimmers to win 352 Olympic medals, of which 90 swimmers had won 155 gold medals.

Participant Selection

A non-probability criterion sampling technique was used to select and group participants. Ninety percent of the individuals approached agreed to participate in the study. The world-leading group comprised 21 participants and the world-class group comprised 15 participants. The label world-leading was operationalized as coaches who had trained at least

one swimmer to win a minimum of one Olympic gold medal, and the label world-class was operationalized as coaches who had trained at least one swimmer to compete at an Olympic Games but had never trained a swimmer to win an Olympic gold medal. Athlete medal winning outcomes were used as the basis for the grouping of the coaches because of its salience in Olympic coaches' motives (Lara-Bercial & Mallett, 2016), its common use by elite sport funding agencies to judge Olympic coaches' job performance (De Bosscher, Shibli, & Weber, 2019), and its ability to discriminate between Olympic athletes' psychological characteristics (Hardy et al., 2017). Following approval from an institutional ethics committee, the data was collected in person across 16 cities in three continents.

Sample Size and Precision

Due to the specific and restrictive nature of the inclusion criteria, the potential sample size was limited. Given that high-level performers constitute a small sub-population of the general public, sample sizes for expertise research are typically very small (Bacchetti, Deeks, & McCune, 2011). Indeed, Simonton (2014) observed that "because the creators at the upper end are so terribly rare, the odds of obtaining even one person among the sample size typical of most research of this type can become essentially zero" (p. 477). Small sample sizes in ultra-rare populations are justified through the value of information approach (Ploutz-Synder, Fiedler, & Feiveson, 2014), with small-*n* research producing highly relevant knowledge (Bacchetti, 2013). The sample size of 36 was therefore deemed acceptable because these participants represent a large proportion of the population who are active Olympic swimming coaches, and it is consistent with sample sizes in previous research with this specialist group (e.g. Lara-Bercial & Mallett, 2016, Mallett & Lara-Berical, 2016).

Measures

Measures were the Big Five Inventory (John, Donahue, & Kentle, 1991), the Dirty Dozen (Jonason & Webster, 2010), and the Schutte Emotional Intelligence Scale (Schutte et

al., 1998). All of the measures used 5-point Likert scales ranging from 1 (disagree strongly) to 5 (agree strongly).

Data Collection

An initial trial of the questionnaires was undertaken with an international non-Olympic coach, and the presentation of the measures was finalized. Potential participants were approached, informed of the purpose of the study, and invited to participate. After providing written informed consent, participants were asked to complete demographic questions and the measures. When responding to each questionnaire item, participants were asked to reflect on their general motives and thoughts in coaching-related contexts, as opposed to their lives more broadly.

Quality of Measurements

To enhance the quality of measurements, all data was collected in person by the first author who is trained to postgraduate level in quantitative research methods.

Instrumentation and Psychometrics

Big Five personality traits. The Big Five personality traits were measured using the 44-item Big Five Inventory (BFI; John et al., 1991) which consists of five subscales assessing conscientiousness, openness, agreeableness, extraversion, and neuroticism. Using the stem "I am someone who…", participants were invited to respond to items such as: "perseveres until the task is finished," "is original, comes up with new ideas," "likes to cooperate with others," "is outgoing, sociable," and "is depressed, blue." The BFI has been used in studies with coaches (e.g., Jackson et al., 2011), and has demonstrated good reliability, test-retest reliability, factor structure, and convergent and discriminant validity in previous research (John & Srivastava, 1999). Cronbach's alpha in the present sample for conscientiousness was .81, openness was .70, agreeableness was .66, extraversion was .77, and neuroticism was .69.

Dark triad. The dark triad was assessed using the 12-item Dirty Dozen (Jonason & Webster, 2010) which consists of 3 subscales that measure Machiavellianism, psychopathy, and narcissism. Participants were invited to respond to items such as: "I tend to manipulate others to get my way," "I tend to lack remorse," and "I tend to seek prestige or status." This concise assessment tool has been used in previous studies (e.g., Landay, Harms, & Credé, 2019) and has demonstrated acceptable reliability and predicative validity (e.g., Spurk, Keller, & Hirschi, 2016; Wisse & Sleebos, 2016). Cronbach's alpha in the present sample for Machiavellianism was .78, psychopathy was .70, and narcissism was .76.

Emotional intelligence. Emotional intelligence was measured using the 33-item Schutte Emotional Intelligence Scale (EIS; Schutte et al., 1998) which consists of four subscales assessing perception of emotion, management of own emotion, management of other emotion, and utilization of emotion. Items included: "I know what other people are feeling just by looking at them," "I have control over my emotions," "I help other people feel better when they are down," and "when I experience a positive emotion, I know how to make it last." The EIS is the most utilized emotional intelligence questionnaire in sport (Laborde et al. 2016) and has demonstrated good reliability and validity in previous research (e.g., Marks et al., 2016; Schutte et al., 1998), with Van Rooy and Viswesvaran's (2004) meta-analysis indicating that the EIS has the highest predictive validity of all the included emotional intelligence measures. Cronbach's alpha in the present sample for perception of emotion was .77, management of own emotion was .72, management of other emotion was .65, and utilization of emotion was .62.

Conditions and Design

A nonexperimental correlational design was used with multiple-group comparisons.

Data Diagnostics

In line with recommendations for studies that include eminent individuals, outliers were not excluded and the data was not transformed (O'Boyle & Aguinis, 2012; Simonton, 2014). Contrary to the assumptions of normality in standard models, the distribution of eminent individuals is considered to be non-normal (Den Hartigh, Van Dijk, Steenbeek, & Van Geert, 2016; O'Boyle & Aguinis, 2012; Simonton, 2014). More specifically, research has demonstrated that eminent individuals produce a highly-skewed distribution, in which exceptional individuals are found in the right tail (Den Hartigh et al., 2016; Simonton, 2014; Simonton & Baumeister, 2005). These distributions do not follow a Gaussian distribution, but rather are governed by Parentian distributions (O'Boyle & Aguinis, 2012; Simonton, 2014). In contrast to a normal curve where a value exceeding three standard deviations from the mean is ordinarily considered an outlier, a Parentian distribution considers these values common and the elimination or transformation of such outliers antitheoretical (O'Boyle & Aguinis, 2012). As O'Boyle and Aguinis (2012) argued, "influential cases should be retained in the data set unless there is clear evidence that their value is incorrect (i.e. typographical error) or belong to a population to which the researcher does not wish to generalize" (p. 110).

Analytic Strategy

Due to the conceptual relationships among the dependent variables within the Big Five, dark triad, and emotional intelligence measures, three multivariate analysis of variances (MANOVAs) were used to test the hypotheses. MANOVAs are well-suited to this study because the aims are to test multiple hypotheses about differences between two groups (Finch & French, 2013), the sample size is sufficient as there are more cases within each group than dependent variables (Tabachnick & Fidell, 2014), and research indicates that using Wilks's lambda (λ) statistic with ordinal dependent variables controls the Type 1 error rate (Finch, 2016). Indeed, MANOVAs reduce the Type I error rate and improve power in comparison with multiple analysis of variances (ANOVAs) (Tabachnick & Fidell, 2014; Warne, 2014).

Results

The Statistical Package for Social Sciences (SPSS; Version 24.0) was used for all statistical analyses. Table 1 presents the means and standard deviations among the study variables for the world-leading (n = 21) and world-class (n = 15) groups, and the correlations among the theoretically related variables across the groups.

Big Five Personality Traits

A one-way MANOVA with one independent variable (world-leading vs. world-class) was conducted with the Big Five dependent variables of conscientiousness, openness, agreeableness, extraversion, and neuroticism (hypotheses H1a, H1b, H1c, H1d, and H1e). Variances and covariances were homogenous across these five dependent variables (Levene's and Box's test $p > 0.05$). A significant multivariate test statistic was obtained: Wilks's $\lambda = .676$, $F(5, 30) = 2.88$, $p = .031$, $\eta 2 = .324$, indicating a significant difference in the Big Five between the two groups, and a large effect size was found with respect to individual differences research (Gignac & Szodorai, 2016). Follow-up univariate F-tests identified significant group differences in agreeableness $F(1, 34) = 5.13$, $p = .030$, $\eta 2 = .131$, but not conscientiousness $F(1, 34) = .041$, $p > 0.05$, $\eta 2 = .134$, openness $F(1, 34) = 2.02$, $p > 0.05$, $\eta 2 = .056$, extraversion $F(1, 34) = 2.11$, $p > 0.05$, $\eta 2 = .058$, or neuroticism $F(1, 34) = 2.25$, $p > 0.05$, $\eta 2 = .062$. Mean scores revealed that world-leading coaches scored higher on agreeableness ($M = 4.14$) in comparison with world-class coaches ($M = 3.79$).

Dark Triad

A one-way MANOVA with one independent variable was conducted with the three dark triad dependent variables of Machiavellianism, psychopathy, and narcissism (hypotheses H2a, H2b, and H2c). Variances and covariances were homogenous across these three dependent variables (Levene's and Box's test $p > 0.05$). A significant multivariate test statistic was obtained: Wilks's $\lambda = .774$, $F(3, 32) = 3.11$, $p = .040$, $\eta 2 = .226$, indicating a

significant difference in the dark triad between the two groups, and a medium effect size was found with respect to individual differences research (Gignac & Szodorai, 2016). Follow-up univariate F-tests identified significant group differences in Machiavellianism, $F(1, 34) = 5.39$, $p = .026$, $\eta 2 = .137$, and narcissism, $F(1, 34) = 7.79$, $p = .009$, $\eta 2 = .186$, but not psychopathy, $F(1, 34) = 2.78$, $p > 0.05$, $\eta 2 = .076$. Mean scores revealed that world-leading coaches scored lower on Machiavellianism ($M = 13.81$) in comparison with world-class coaches ($M = 16.73$), and world-leading coaches scored lower on narcissism ($M = 13.57$) in comparison with world-class coaches ($M = 16.87$).

Emotional Intelligence

A one-way MANOVA with one independent variable was conducted with the four emotional intelligence dependent variables of perception of emotion, management of own emotion, management of other emotion, and utilization of emotion (hypotheses H3a, H3b, H3c, and H3d). Variances and covariances were homogenous across these four dependent variables (Levene's and Box's test $p > 0.05$). A significant multivariate test statistic was obtained: Wilks's $\lambda = .739$, $F(4, 31) = 2.74$, $p = .046$, $\eta 2 = .261$ indicating a significant difference in emotional intelligence between the two groups, and a medium effect size was found with respect to individual differences research (Gignac & Szodorai, 2016). Follow-up univariate F-tests identified significant group differences in perception of emotion, $F(1, 34) = 5.28$, $p = .028$, $\eta 2 = .134$, and managing own emotion, $F(1, 34) = 4.81$, $p = .035$, $\eta 2 = .124$, but not managing other emotion, $F(1, 34) = .131$, $p > 0.05$, $\eta 2 = .004$, or utilization of emotion, $F(1, 34) = 1.68$, $p > 0.05$, $\eta 2 = .047$. Mean scores revealed that world-leading coaches scored higher on perception of emotion ($M = 41.57$) in comparison with world-class coaches ($M = 38.00$), and world-leading coaches scored higher on managing own emotion ($M = 37.67$) in comparison with world-class coaches ($M = 34.60$).

Discussion

Using psychometric questionnaires, this study examined whether psychological factors discriminate between world-leading (i.e., Olympic gold medal winning) and world-class (i.e., Olympic non-gold medal winning) coaches across the Big Five personality traits, the dark triad, and emotional intelligence. Five of the 12 hypotheses were supported, with differences found between the groups on the Big Five trait of agreeableness, the two dark traits of Machiavellianism and narcissism, and the two emotional intelligence components of perceptions of emotion and management of own emotion. However, no differences were found between the groups across the Big Five traits of conscientiousness, extraversion, openness to experience, or neuroticism, the dark trait of psychopathy, or the emotional intelligence components of management of others emotion or utilization of emotion.

In terms of the significant findings, the world-leading coaches were found to be higher on agreeableness in comparison with the world-class coaches. This supports Mallett and Coulter's (2016) finding of high agreeableness in their case study of an Olympic coach, and extends it by demonstrating that agreeableness discriminates world-leading from world-class swimming coaches. Agreeableness is beneficial in a high-performance environment because it facilitates the required joint action and collaboration between coaches, athletes, and sport science support staff (Jowett & Cockerill, 2003). Within their 3 + 1Cs model of the coach-athlete relationship, Jowett and Shanmugam (2016) stated that closeness, which is manifested in mutual trust and respect, as well as interpersonal appreciation, are core elements of a high-quality coach-athlete relationship. These characteristics are reflective of agreeableness, and the communal motivation to get along rather than get ahead will enhance this pivotal sporting relationship. To illustrate, if a coach is highly agreeable, it is likely that an athlete will be able to commit more discretionary effort to their performance as they will not be diverting cognitive resources towards ruminating about previous disagreements or whether a decision was taken in their best interest. Taking these factors into account,

agreeableness contributes to forming and maintaining close and positive relationships (Judge, Piccolo, & Kosalka, 2009), and given that coaching requires high levels of interpersonal interaction, this trait will be beneficial towards coaching an athlete to win an Olympic gold medal.

The world-leading coaches were found to be lower on the trait of Machiavellianism in comparison with the world-class coaches. This represents an original finding as previous research has used qualitative approaches to explore elite leaders and coaches' dark behaviors (Arnold et al., 2018; Cruickshank & Collins, 2015; Fletcher & Arnold, 2011). Machiavellian individuals are social chameleons who are able to form genuinely adaptive and cooperative relationships with others when it aligns with their interests, and they are effective at using pro-social tactics to attain their goals (Judge et al., 2009). However, the benefits of Machiavellianism are often outweighed by the interpersonal risks of regularly manipulating another person, and if that individual suspects they are being manipulated, the relationship will be weakened (O'Boyle, Forsyth, Banks, & McDaniel, 2012). The world-leading coaches were found to have moderate levels of Machiavellianism in relation to population norms (Jonason & Webster, 2010), suggesting that these coaches can minimise many of the relationally damaging effects. Drawing on organizational psychology, Gardner, Fischer, and Hunt (2009) proposed that the regulation of behavior is important for follower satisfaction, and it may be that the world-leading coaches are able to attenuate and manage any Machiavellian tendencies to achieve gold medal winning outcomes.

The finding that the world-leading coaches were lower in narcissism in comparison with the world-class coaches is another original finding and indicates that high levels of narcissism is disadvantageous for coaching athletes to win an Olympic gold medal. The world-leading coaches expressed moderate levels of narcissism in relation to population norms (Jonason & Webster, 2010), therefore suggesting some narcissistic tendencies within

these coaches. One can speculate that narcissism may have a curvilinear or an inverted U-shaped relationship in high-performance coaching, such that the relationship is initially positive but becomes more negative as narcissism increases. This type of curvilinear relationship has been found between narcissism and organizational leadership, with moderate levels of narcissism being optimal for effectiveness (Grijalva, Harms, Newman, Gaddis, & Fraley, 2015). There are several advantageous components of narcissism, including assertiveness, an intense desire to succeed, and a supreme confidence, which, within the uncertain Olympic context, will likely enable coaches to provide a sense of direction to athletes. However, when possessed in excess, coaches will act in insensitive ways and put their own needs ahead of athletes' needs (Matosic et al., 2018; Matosic et al., 2017; Roberts et al., 2018), resulting in awkward interpersonal interactions and detracting from the coach-athlete relationship, which is instrumental in athlete success (Jowett & Shanmugam, 2016). In addition, other variables may temper the negative effects of narcissism. World-leading coaches may be able to attenuate their narcissism with agreeableness, and the empathy and modesty inherent in agreeableness may have a buffering effect on their narcissism. Although it may seem paradoxical that a coach can be both narcissistic and agreeable, possessing seemingly opposing traits is not in conflict with competing values theory (Cameron & Quinn, 2011) or behavioral motives research (Konrath, Bushman, & Grove, 2009) and the integration of incongruent traits may lead to positive outcomes.

Drawing on Potrac, Smith, and Nelson's (2017) observation that there is "a clear need to develop a greater understanding of coaching as an emotional practice" (p. 137), this is the first study within Olympic coaching to quantitatively examine emotional intelligence. The finding that world-leading coaches have higher perception of emotion in comparison with the world-class coaches builds on the qualitative findings of Olusoga et al. (2012) and Hodgson et al. (2017) who suggested that high-performance coaches use this component of emotional

intelligence to fully understand and respond to different events in training and competitions and to consistently act in an effective way. They will be able to recognize, for example, when they need to empathize with an athlete who is experiencing a problem, thus ensuring they can respond appropriately to the situation and adapt their communication or behavior. The accurate perception of emotion will enable the world-leading coaches to determine whether an athlete is expressing honest or dishonest feelings, allowing them to comprehend the reality of the situation and alter their actions as necessary. The combination of these factors will enable emotionally intelligent coaches to motivate and connect with their athletes as they will have a greater understanding and insight into their experiences.

The hypothesis that world-leading coaches would be higher on management of own emotion in comparison with world-class coaches was also confirmed. This propensity to regulate and manage emotions will be highly advantageous, particularly given that swimming has a limited off season and a highly demanding training schedule. Indeed, the world-leading coaches will be able to appropriately manage their own motivation, passion, and fatigue to ensure optimal and consistent performances throughout the season (Chan & Mallett, 2011). The importance of coaches managing their own emotions is particularly crucial within the draining Olympic competition environment and during challenging training sessions (Mallett & Coulter, 2016; Olusoga et al., 2012). Due to emotional contagion (Tee, 2015), a coach displaying positivity will help an athlete to remain in a similar state. Emotional contagion is an automatic, unintentional, and unassuming tendency to mimic or synchronize with another person (Tee, 2015). As coaches' positive emotions are passed onto athletes, the training environment will become more energized, with the positive emotions engendering higher optimism, creativity, cooperation, and motivation (Baas, De Dreu, & Nijstad, 2008). World-leading coaches may, therefore, be able to utilize intrapersonal emotional management

strategies and emotional contagion to transmit positive emotions to athletes, enhancing discretionary effort and leading to optimal outcomes.

In terms of the non-significant findings, no evidence was found to support the hypotheses that conscientiousness, extraversion, or openness to experience scores would be higher for the world-leading coaches, or that neuroticism scores would be lower for world-leading coaches in comparison with the world-class coaches. There were no differences in psychopathy, and no differences in utilization of emotion or management of others emotion between the two groups of coaches. The findings that the coaches do not differ on conscientiousness, openness, extraversion, or neuroticism suggests that these traits are similar in both groups, and are not discriminators between world-leading and world-class coaching. The lack of difference between the groups in conscientiousness is surprising given that serial medal winning coaches have been found to be high on this trait (Mallett & Coulter, 2016; Mallett & Lara-Bercial, 2016), and this is the most consistently related trait with leadership effectiveness (Judge et al., 2009; Judge & Zapata, 2015). Olympic environments require discipline, dutifulness, and competence, and it is therefore proposed that conscientiousness is an important prerequisite for all Olympic coaches. Psychopathy, characterized by a callous disregard for others (O'Boyle et al., 2012), makes it difficult for individuals to form the interpersonal relationships necessary to guide an athlete to the Olympic Games, let alone to win an Olympic gold medal, making it understandable that coaches were indistinguishable on this trait.

At this juncture, it is worth noting the strengths and limitations of this study and considering future research directions. The distinctive and significant nature of the sample represents a methodological strength. Indeed, psychological science can only benefit when stand-out performers are studied (Simonton, 2014). The use of a high level world-class comparator group to understand the psychological factors that discriminate the world-leading

coaches is unique within the Olympic coaching literature. Although insights have been gained from studying Olympic coaches as a homogeneous group, enhancing our understanding of the sub-set of world-leading coaches is pertinent because Olympic funding is often predicated on winning gold medals (Hardy et al., 2017). Further, the sample size, although small in comparison with typical quantitative studies, represents a strong sample of active Olympic gold medal winning coaches as there are very few individuals who fulfil the inclusion criteria (Bachetti et al., 2013). In line with recommendations that research should focus on single sports (Hodgson et al., 2017), an additional strength is that this study examined swimming coaches, generating context-specific results without any contamination from other sports (Cushion, 2010). Although the results may be transferable to other Olympic sports this should be researched with future sport specific studies. Turning to limitations, the participants were categorized based on swimmers' achievements. The difficulty inherent in this approach is that the contribution of the coaches to the athletes' performances cannot be clearly judged (Rynne et al., 2016). In order to minimise confounding variables, athletes could be theoretically randomly assigned to coaches, with a well-designed randomized experiment producing causal data. However, this trial design would be unrealistic in the competitive Olympic environment and it is therefore not surprising that publicly recognizable objective outcomes are the most common method of evaluating coaching success (Rynne et al., 2016). Another limitation is that this study was based exclusively on coach self-reports, which may be problematic as they may be prone to self-deception bias (Colbert, Judge, Choi, & Wang, 2012). Future research should seek to replicate and extend the findings with observer reports from athletes. As coaching is relational and dependent on others' perceptions, a coach's reputation and how they are perceived is as important as their own self-perceptions (Jowett & Shanmugam, 2016).

In terms of practical implications, the results suggest that it would be helpful for coach development programs to include emotional intelligence training, particularly emphasizing managing and expressing emotions as this is linked with world-leading coaching. Studies have found that emotional intelligence skills can be trained and enhanced, yielding positive effects on well-being, health, and employability (Nelis et al., 2011). In addition, enhancing coaches' self-awareness of their own personal characteristics such as overly Machiavellian or narcissistic tendencies will help to identify practical methods to alleviate the behaviors associated with these traits. Sport psychologists are encouraged to help coaches examine their own self-regulation mechanisms under conditions such as stress, fatigue, or other forms of ego-depletion that impact on the extent to which they can regulate their behavior. This would enable coaches to better understand their context-specific reactions, with sport psychologists supporting the implementation of proactive strategies to manage these situations as opposed to requiring reactive interventions in challenging circumstances. Coach development programs predominantly focus on technical and tactical aspects (Lefebvre, Evans, Turnnidge, Gainforth, & Côté, 2016), and extending them to include emotional intelligence and personality factors would enhance coaches' practice.

In conclusion, this study sought to understand the psychological factors that discriminate between world-leading and world-class coaches. This is the first published study that examines these discriminators to develop an understanding of the factors which may be advantageous for coaching an athlete to win an Olympic gold medal. Differences were found between coaches across the Big Five traits of agreeableness, dark triad components of Machiavellianism and narcissism, and the emotional intelligence constructs of perception of emotion, and management of own emotion. The results suggest that coaches' psychological attributes influence gold medal winning outcomes, and future research will help to enhance our understanding of factors that enable world-leading performance.

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Table 1

Means, Standard Deviations, and Correlations Among Study Variables

	Group															
	World-leading		World-class													
Variables	*M*	*SD*	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
The Big Five																
1. Conscientiousness	3.90	.649	3.95	.609	-											
2. Openness	4.00	.495	3.77	.495	-.03	-										
3. Agreeableness	4.14	.462	3.79	.434	.19	.13	-									
4. Extraversion	3.67	.608	3.98	.654	.13	.13	.09	-								
5. Neuroticism	1.99	.402	2.24	.590	-.36*	-.22	-.28	-.28	-							
The Dark Triad																
6. Machiavellianism	13.81	3.93	16.73	3.41						-						
7. Psychopathy	11.76	3.09	13.40	2.59						.53*	-					
8. Narcissism	13.57	3.87	16.87	2.88						.59*	.26	-				
Emotional Intelligence																
9. Perception of emotion	41.57	4.18	38.00	5.14									-			
10. Managing own emotion	37.67	3.73	34.60	4.66									.73*	-		
11. Managing other emotion	32.00	3.99	31.53	3.54									.51*	.51	-	
12. Utilization of emotion	21.90	3.66	23.33	2.58									.27	.21	.47*	-

Note. * $p < 0.05$