The Independent and Interactive Effects of the Big Five Personality Dimensions upon Dispositional Coping and Coping Effectiveness in Sport.

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Abstract

We examined the independent and interactive effects of the Big-Five personality traits on dispositional coping and coping effectiveness among athletes. Participants were 400 athletes (mean age 22.97, *s* =7.00) from the United Kingdom. The athletes completed measures of personality, dispositional coping, and coping effectiveness. The Big-Five personality traits independently predicted the use of higher-order coping dimensions. Extraversion, agreeableness, and openness positively predicted task-oriented coping. Neuroticism positively predicted distraction-oriented coping, whereas agreeableness, extraversion and conscientiousness were negative predictors. Both extraversion and neuroticism positively predicted disengagement-oriented coping, whereas agreeableness and conscientiousness were negative predictors. Only neuroticism predicted coping effectiveness, which emerged as a negative predictor. Findings also showed a two-way interaction effect for predicting task-oriented coping between neuroticism and openness, and between extraversion and neuroticism. A further two-way interaction effect for predicting distraction-oriented coping was found between agreeableness and conscientiousness. These findings reinforce the need to investigate not only independent, but also interactive effects of personality dimensions upon sport-related dispositional coping.

Keywords: Personality, Big-Five, Dispositional Coping, Coping Effectiveness, Sport.

The Independent and Interactive Effects of the Big Five Personality Dimensions upon Dispositional Coping and Coping Effectiveness in Sport

Coping is of interest to sport psychologists and sport psychology research, because it is associated with both athletic performance (Nicholls, Taylor, Carroll, & Perry, 2016b) and psychological well-being (Nicholls, Levy, Carson, Thompson, & Perry, 2016a). Indeed, many interventions in sport psychology are designed to maximize performance (see Brown & Fletcher, 2016 for a review of psychological and psychosocial interventions designed to enhance performance). As such, increasing our understanding of coping and factors that may influence coping (e.g., personality, gender, or age) has the potential to enhance both athletic performance and psychological well-being through the development of more sophisticated coping interventions. Lazarus and Folkman (1984) defined coping as conscious cognitive and behavioural efforts to manage internal or external demands. Coping can be assessed as a changing process in which the scholar examines how coping changes from one situation to another, or even within the same situation. It can also be assessed dispositionally, by examining how individuals normally cope with stressful situations (Lazarus & Folkman, 1984). Assessing coping as process allows scholars to accurately assess how an individual copes within a specific situation, but it does not allow researchers to accurately predict how an athlete would normally cope over an extended period of time (Fleeson, 2004). In order to do this, scholars could assess coping at the dispositional level (Fleeson, 2004; Nicholls, Perry, Jones, Morley, & Carson, 2013). Regardless of whether coping is assessed as a process or a trait, Gaudreau and Blondin (2004) proposed a three-factor classification of coping, which is widely used in the sport psychology literature (Nicholls et al., 2016b). These are *task-oriented coping* (i.e., strategies utilized to master stressful situations and include strategies such as as thought control and imagery), *distraction-oriented coping* (i.e., strategies that redirect the attention of an athlete to non-sport-related aspects, including distancing from the situation and mental distraction), and *disengagement-oriented coping* (i.e., strategies that involve athletes ceasing in their attemps to achieve personal goals).

A factor that is associated with process coping among athletes is personality (Allen, Frings, & Hunter, 2012; Allen, Greenlees, & Jones, 2011; Kaiseler, Polman, & Nicholls, 2012). Allport (1961) defined personality as "a dynamic organisation, inside the person, of psychophysical systems that create the person's characteristic patterns of behaviour, thoughts and feelings" (p. 28). Allport's conceptualization of personality has received the greatest research attention and support over the years (Larsen & Buss, 2008). Indeed, this theory implies that personality consists of a pattern of relatively stable traits. The pattern and distribution of these traits differs from one individual to the next (Carver & Scheier, 2008). Trait theorists tend to agree that there are five basic traits, or in other words a five-factor model (McCrae & Costa, 2003). The Big-Five factor model (McCrae & Costa) is a widely accepted broad-based taxonomy of personality traits, which arguably represents the minimum number of traits needed to describe personality (Costa & McCrae, 1985; David & Suls, 1999). The Big-Five factor model of personality is useful for understanding coping in non-sport contexts (Lee-Baggley, Preece, & DeLongis, 2005). This model suggests that the five personality dimensions (e.g., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) all include a number of specific traits. As an example, *neuroticism* is associated with the experience of negative emotions such as depression, anxiety, or anger. It is associated with impulsive and less emotionally stable feelings, thoughts, and behaviors (McCrae, 1992; McCrae & Costa, 1987). *Extraversion* is linked to positive emotions, sociability, warm, cheerful, energetic, and assertive behaviors (McCrae, 1992; McCrae & Costa, 1987). *Agreeableness* comprises a more trusting, helpful and unselfish way of thinking, feeling and behaving (McCrae, 1992; McCrae & Costa, 1987). *Openness* implies being creative, imaginative, psychologically minded, curious, and flexible in their way of thinking, feeling and behaving (Costa & McCrae, 1992). *Conscientiousness* implies a more organised, reliable, punctual, hardworking, determined, and self-disciplined approach (McCrae, 1992; McCrae & Costa, 1987).

Although a rapid growth in personality research has been seen over the past 30 years in non-sport psychology (John & Srivastava, 1999), sport psychology scholars are yet to give this

relationship sufficient attention (Allen, Greenless, & Jones, 2013). Particularly, when investigating the influence of the Big-Five factor in coping in sport. To our knowledge, scholars are yet to explore the relationship between dispositional coping and the Big-Five among competitive athletes. Even though coping with specific stressors is highly influenced by situational factors, such as nature and intensity of stressors, personality factors should better predict dispositional coping, or in other words typical responses to a broad variety of stressors (Connor-Smith & Flachsbart, 2007). Furthermore, an athlete's personality is likely to influence the type of events an individual chooses to engage with, which may consequently influence their dispositional coping (Bouchard, Guillemette, & Landry-Leger, 2004; Penley & Tomaka, 2002). In a meta-analysis investigating the relationship between personality and coping, Connor-Smith and Flachsbart (2007) concluded that coping focus analyses (comparing personality to coping correlations for dispositional versus situational coping), resulted in personality being a stronger predictor of dispositional than situational coping. Additionally, the authors found that coping focus was a significant moderator for 13 regressions between the Big-Five and coping strategies.

Following evidence from non-sport contexts that the Big-Five factor model influenced the stress and coping process (DeLongis & Holtzman, 2005), Kaiseler et al. (2012) explored whether the Big-Five factors influenced appraisal, coping, and perceived coping effectiveness among a sample of 482 athletes. These authors found that high levels of neuroticism were associated with a greater deployment of emotion-focused (i.e., strategies that reduce negative emotional responses) and avoidant coping strategies (i.e., strategies that avoid dealing with the stressor), but less problem-focused (i.e., strategies that remove the stressor) coping and lower coping effectiveness. Whereas the other four personality dimensions were associated with coping strategies perceived to be effective by athletes. Particularly, high extroversion, conscientiousness and openness were associated with more use of problem-focused coping strategies and these strategies were perceived as more effective, whereas high levels of agreeableness preferred using a combination of problem and emotion-focused strategies and rated these strategies as effective. Although this study shows

evidence of the influence of the Big-Five factor model on stress and coping process in sport, the Big-Five factors were analysed independently. As suggested by Carver and Conner-Smith (2010), research in this area should consider how personality traits interact in determining outcomes. Furthermore, the authors used the Modified Coping Inventory (MCOPE; Crocker & Graham, 1995) that provides an episode specific measure of coping in sport instead of a more general measure of coping, which may affect generalizations of the findings to other situations. In agreement with this, Nicholls et al. (2013) suggested that the assessment of coping during a specific episode of sport might not be reflective of how athletes would normally cope, and may result in an untruth view of coping. This is consistent with Lazarus and Folkman (1984) who acknowledged the importance of not only assessing coping from a situational perspective but also dispositional. Accordingly, recent developments have sought to establish a dispositional measure of coping that is context specific to sport (Hurst, Thompson, Visek, Fisher, & Gaudreau, 2011). One such advance has been the development of the Dispositional Coping Inventory for Competitive Sports (DCICS; Hurst et al., 2011). The DCICS uses the three-factor sport coping classification (i.e., task-oriented, distraction-oriented and disengagement-oriented coping) (Gaudreau & Blondin, 2004) to represent the general use of coping among athletes.

In addition to Kaiseler et al's findings, Allen et al. (2011) explored interactive effects, of the Big-Five factors on reported coping styles among 253 athletes. The authors found that extraverted athletes, who were more emotionally stable and open to new relationships used more problem-focused coping. Conscientious athletes, and athletes displaying higher levels of extraversion, openness, and agreeableness used more emotion-focused coping. Additionally, in this study the authors found that different personality traits were associated with higher or lower level athletes, between male and female and between team and individual sports. Furthermore, a study by Allen et al. (2012) investigated challenge and threat cardiovascular responses, personality, and coping. The authors reported that conscientious athletes used more problem-focused coping and athletes high on neuroticism and/or low on agreeableness and/or openness used more avoidance coping.

Although coping strategies are not universally effective or ineffective, task-oriented coping typically seems to predict better physical and mental outcomes and distraction-oriented and disengagement-oriented coping typically predicts poorer outcomes (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001) and sporting performance (Nicholls et al., 2016b). Coping effectiveness indicates the successfulness of a coping strategy in managing the demands of a situation (Lazarus & Folkman, 1984). As suggested by Bolger and Zuckerman (1995) and DeLongis and Holtzman (2005), personality traits may influence coping effectiveness, by certain strategies being more useful for some individuals and less useful or even harmful for those with different personality traits. Copping effectiveness in sport has shown to be associated with the Big-Five factor model (Kaiseler et al., 2012). Particularly, when rating the effectiveness of a particular coping strategy in a specific stress situation, athletes showing higher levels of neuroticism perceived their strategies as being less effective, whereas the other four dimensions of the Big-Five rated their coping strategies as more effective. However to date, more research is required to verify the relationship between perceptions of coping effectiveness and the Big-Five personality taxonomy.

The aim of this study, therefore, was to explore not only the independent but also the interaction effects of the Big-Five factor model on a sport specific dispositional coping taxonomy and coping effectiveness. Specifically we hypothesised that athletes high in neurotisicm will be less likely to cope effectively and use distraction and disengagement coping more frequently compared to task-oriented coping. In addition, we expected athletes high in extraversion, conscientiousness, openness and agreeableness to cope effectively and use task-oriented coping more frequently compared to distraction and disengagement coping. In view of the general lack of literature exploring Big-Five interaction effects it is not possible to offer any firm hypotheses.

Method

Participants

Participants were 400 UK student-athletes from two different UK institutions (male n = 237; female n = 163) aged between 18 to 48 years (mean age 22.97 years, s = 7.01), who were

completing a sport and exercise related undergraduate degree. Experience in their sport ranged from 1 to 33 years (mean 8.06, *s* = .41). The sample consisted of sports performers from team (*n* = 315) and individual (*n* = 85) sports, competing at beginners (*n* = 24), national (*n* = 30), county (*n* = 119), and club/university (*n* = 215) levels. All participants were actively involved in competitive sport and had participated competitively within the last 14 days.

Instruments

The Big Five. The 44-item Big Five Inventory (BFI; John, Donahue, & Kentle, 1991) measures The Big Five dimensions Conscientiousness, Agreeableness, Neuroticism, Openness, and Extraversion. Example items include "*I see myself as someone that has an assertive personality*" for extraversion, whereas "*I see myself has someone that worries a lot*" is an example of a neuroticism item. A five-point rating scale was used ranging from 1 = *disagree strongly* to 5 = *agree strongly*. Participants were advised that the questionnaire included a number of characteristics that may or may not apply to them and where asked to select the extent to which they agree or disagree with each statement. The BFI has been shown to have good psychometric properties with good reliability, retest reliability, factor structure and convergent and discriminant validity (John & Srivastava, 1999). The reliability for the five factors in the present study was satisfactory; .67 (Openess), .82 (Agreableness), .75 (Neuroticism), .84 (Conscientiousness), and .78 (Extraversion).

Coping Dispositional Scale. Coping was assessed using the Dispositional Coping Inventory for Competitive Sport (DCICS; Hurst et al., 2011). This instrument assesses three higher-order dispositional dimensions (e.g., distraction-oriented coping, disengagement-oriented coping, and task-oriented coping) based on 10 different dispositional coping strategies. These represent what athletes normally use to cope with stress in sport. An example of task-oriented question was "I mentally rehearse the execution of my movements" whereas "I entertain myself in order not to think about the competition" is an example of a distraction-oriented question. "I let myself feel hopeless and discouraged" is an example of a disengagement-oriented coping strategy. Athletes were asked to rate how they normally cope to competition on a 5-point Likert type scale, with 1 representing

Does not correspond to what I do or think to 5 representing *Corresponds very strongly to what I do or think.* Participants were instructed to circle the answers that best characterized what they generally do during competition in their sport. Hurst et al. did not report Cronbach alpha coefficients for three higher-order dimensions of the DCICS. Alternatively, the authors reported Cronbach alpha coefficients for the 10 dispositional strategies ranging from .60 to .80 from a sample of 596 athletes aged between 18 and 23 years of age. The reliability for the three factors in the current study was .85 for task-oriented coping, .78 distraction-oriented coping and .82 disengagement-oriented coping.

Coping Effectiveness. Coping effectiveness was assessed using the coping effectiveness scale (Gottlieb & Rooney, 2004). This instrument assessed how effectively the athletes were coping with the stressor that was causing them the most worry in sport. Items in this questionnaire include "The ways I try to cope with this problem are not working too well these days," "I am dealing with this stressor better that I used to" and "I can find more or different ways to cope with this stressor." The coping effectiveness scale is a 7-item scale, in which participants were asked to report the effectiveness of their coping with stress on a 4-point Likert-type scale, anchored at 1 representing *Strongly disagree* to 4 representing *Strongly agree.* Participants responded to questions in relation to a stressor/ demand (e.g., performance concerns, worries of injury, team selection, home-life worries, etc) that caused them the most worry in their sport recently. The coping effectiveness scale has been shown to have an acceptable internal reliability of .69 from a sample of 141 family caregivers (Gottlieb & Rooney, 2004) and was .60 in the current study.

Procedure

The study was approved by a University's Research Ethics Committee and participants provided informed consent prior to participating and were informed that all answers provided would remain anonymous. The study was advertised at the end of seminar sessions and interested students volunteering to participate, completed the questionnaires in class, ensuring a quiet environment. Trained researchers administered the questionnaires in the order described above to all participants.

Instructions about how to complete the questionnaire were provided orally and in written format and participants were encouraged to ask questions to the trained researchers. Questionnaires were completed in the presence of the researchers and approximately time for completion was 15 minutes.

Data Analysis

After screening for outliers and normality, Cronbach's alphas and descriptive statistics for all study variables were obtained. Multicollinearity was checked by calculating tolerance (1/VIF). Hierarchical multiple regressions were conducted for each coping subscale. At step one demographic variables (gender and age) were entered, at step two the independent Big-Five personality traits were added and at step three, two-way interaction Big-Five effects were included. All of the Big-Five predictor variables were mean centered (see Cohen, Cohen, West, & Aiken, 2003). Finally, to statistically adjust for the ten two-way interaction terms, we used the False Discovery Rate (FDR; Benjamini & Hotchberg, 1995).

Results

Table 1 illustrates the descriptive statistics of variables. There were no missing data, outliers, or issues with skewness <2, kurtosis <2, or multivariate normality <10. The FDR for the interaction terms was $p = .01$.

Table 2 shows the correlations between all variables. All Big-5 traits showed small-to-moderate positive correlations with one another, except neuroticism which showed moderate negative correlations with all other Big-5 traits. Extraversion, agreeableness, conscientiousness, and openness showed moderate -to-large positive correlations with the majority of task coping subscales. Extraversion, agreeableness, and conscientiousness showed moderate negative correlations with distraction coping subscales, whereas neuroticism showed moderate positive correlations. Extraversion, agreeableness, conscientiousness, and openness showed moderate -to-large negative correlations with the majority of disengagement coping subscales, whereas

neuroticism showed moderate positive correlations. Finally, neuroticism showed a small negative correlation with coping effectiveness.

Hierarchical regression revealed that both age and gender did not significantly predict task-oriented coping when entered in Step 1 (R^2 = .001, $F_{2,397}$ = .17, p = .84). In Step 2, the addition of the Big-Five independent personality traits produced a significant overall model accounting for 24.3% of the variance for predicting task-coping (R^2 = .24, $F_{7,392}$ = 17.95, p <.001). The additional Big-Five traits added in step 2 explained a significant increase of 24.2% of the variance (ΔR^2 = .24, $\Delta F_{5,392}$ = 25.04, p <.001). However, as evident from table 3, only extraversion (β = .17, p < .01), agreeableness (β = .21, p < .001) and openness (β = .20, p < .001) were statistically significant predictors of task-oriented coping. In Step 3, the addition of the Big-Five personality trait interactions produced a significant overall model accounting for 28.7% of the variance for predicting task-oriented coping (R^2 = .29, $F_{7,392}$ = 17.95, p < .001). After controlling for the Big-Five independent personality traits, the Big-Five interactions, added in Step 3, significantly explained an additional 4.4% of the variance (ΔR^2 = .04, $\Delta F_{10,382}$ = 2.35, p < .05). In Step 3, the independent Big-Five effects of extraversion (β = .18, p < .01), agreeableness (β = .21, p < .001) and openness (β = .22, p < .001) remained significant. In addition, as evident from Table 3, the interactive effect of extraversion and neuroticism (β = .-19, p < .001) alongside neuroticism and openness (β = .15, p < .01) became significant predictors of task-oriented coping. To examine the interaction effects, we conducted a simple slopes analysis following Aiken and West (1991) and plotted the interaction and examined the significance of the slopes. First, we examined the slopes of neuroticism (see Figure 1). Results showed that the slope of neuroticism was only significant at low levels of openness (t = -2.59, p = .01), but not at high levels of openness (t = 1.94, p = .05). Next, we examined the slopes of openness. Results showed that the slope of openness was significant at high levels of neuroticism (t = 4.78, p < .001), but not low levels of neuroticism (t = 0.189, p = .85).

Then, we examined the slopes of extraversion (see Figure 2). Results showed that the slope of extraversion was only significant at low levels of neuroticism (t = 5.22, p < .001), but not at high

levels of neuroticism (t = -1.09, p = .28). Next, we examined the slopes of neuroticism. Results showed that the slope of neuroticism was significant at high levels of extraversion (t = -.33, p < .001) and at low levels of extraversion (t = 2.72, p < .01).

For distraction-oriented coping, hierarchical regression indicated that both age and gender were not significant predictors in Step 1 (R^2 = .02, $F_{2,397}$ = 3.03, p = .05). In Step 2, the addition of the independent Big-Five personality traits produced a significant model, accounting for 36.3% of the variance for predicting distraction-oriented coping (R^2 = .36, $F_{7,392}$ = 31.97, p < .001). The additional independent Big-Five traits explained a significant increase of 34.8% variance in Step 2 (ΔR^2 = .35, $\Delta F_{5,392}$ = 42.91, p < .001). Extraversion (β = -.12, p < .01), agreeableness (β = -.33, p < .001), conscientiousness (β = -.20, p < .001) and neuroticism (β = .12, p < .05) were significant predictors of distraction-oriented coping (see Table 3). The Big-Five personality trait interactions added in Step 3 did display a significant overall model accounting for 40.6% of the variance for predicting distraction-oriented coping (R^2 = .41, $F_{17,382}$ = 15.38, p < .001). The remaining significant Big-Five independent personality traits, in step 3, were agreeableness (β = -.33, p < .001), conscientiousness (β = -.23, p < .001) and neuroticism (β = .11, p < .05). After controlling for these significant independent effects, a Big-Five trait interaction significantly explained an additional, 4.3% of the variance (ΔR^2 = .04, $\Delta F_{10,382}$ = 2.76, p = < .01). As evident from Table 3, agreeableness and conscientiousness (β = .20, p < .001) was the only interactive effect found. Again, we examined the interaction effect using simple slopes. First, we examined the slopes of agreeableness (see Figure 3). Results showed that the slope of agreeableness was only significant at low levels of conscientiousness (t = -6.86, p < .001), but not at high levels of conscientiousness (t = -1.09, p = .28). Next, we examined the slopes of conscientiousness. Results showed that the slope of conscientiousness was significant at low levels of agreeableness (t = -6.361, p < .001), but not high levels of agreeableness (t = -1.16, p = .25).

Hierarchical regression revealed that variables entered in Step 1, were not significant predictors of disengagement-oriented coping (R^2 = .02, $F_{2,397}$ = 2.93, p = .06). However, age did

demonstrate a significant independent predictor (β = -.12, $p < .05$). The addition of the Big-Five independent personality traits, in Step 2, revealed a significant overall model ($R^2 = .38$, $F_{7,392} = 34.70$, $p < .001$), which accounted for 38.3% of the variance for predicting disengagement-oriented coping. The additional variables in Step 2 explained a significant increase of 36.8% in explained variance ($\Delta R^2 = .37$, $\Delta F_{5,392} = 46.74$, $p < .001$). The Big-Five traits, extraversion (β = .13, $p < .01$), neuroticism (β = .27, $p < .001$), agreeableness (β = -.25, $p < .001$) and conscientiousness (β = .-24, $p < .001$) were independent predictors (see Table 3). Furthermore, age (β = -.003, $p = .94$) was no longer significant in Step 2, suggesting the aforementioned Big-Five traits were significant predictors of disengagement-oriented coping after controlling for the influence of age. In Step 3, the addition of the Big-Five personality trait interactions revealed a significant overall model accounting for 40.3% of the variance for predicting disengagement-oriented coping ($R^2 = .40$, $F_{17,382} = 15.16$, $p < .001$). The additional trait interactions added in Step 3, explained a non-significant increase of 2.0% explained variance ($\Delta R^2 = .02$, $F_{10,382} = 1.29$, $p = .23$). Moreover, the interaction of extraversion and neuroticism (β = .13, $p > .01$) was just short of the FDR adjusted significance level. In addition to the interaction effect, in Step 3, the independent effects of extraversion (β = .13, $p < .01$), neuroticism (β = .29, $p < .001$), agreeableness (β = -.23, $p < .001$) and conscientiousness (β = -.25, $p < .001$) remained significant.

For coping effectiveness, hierarchical regression indicated both age and gender were not significant predictors in Step 1 ($R^2 = .002$, $F_{2,397} = .34$, $p = .71$). In Step 2, the addition of the Big-Five independent traits produced a significant model, accounting for 10.2% of the variance for predicting coping effectiveness ($R^2 = .10$, $F_{7,392} = 6.37$, $p < .001$). The additional independent Big-Five traits included in Step 2 explained a significant increase of 8.6% of variance ($\Delta R^2 = .09$, $\Delta F_{5,392} = 8.76$, $p < .001$). Specifically, neuroticism (β = -.37, $p < .001$) and conscientiousness (β = -.13, $p < .05$) predicted coping effectiveness. In Step 3, the Big-Five personality traits interactions indicated a significant overall model accounting for 11.3% of variance for predicting coping effectiveness ($R^2 = .11$, $F_{17,382} = 2.87$, $p < .001$). However, the Big-Five interactions only explained

a non-significant additional increase of 1.1% variance ($\Delta R^2 = .01$, $\Delta F_{10,382} = .49$, $p = .90$). Although no significant interaction effects were found in Step 3, the independent effects of neuroticism ($\beta = -.35$, $p < .001$) remained significant, however, conscientiousness became non-significant ($\beta = -.14$, $p = .05$).

Discussion

The purpose of this study was to examine the independent and interactive effects of the Big-Five personality traits on higher order dispositional coping dimensions and coping effectiveness. Extraversion, agreeableness and openness predicted task-oriented coping, while neuroticism, extraversion, agreeableness and conscientiousness predicted distraction-oriented coping. Predictors of disengagement-oriented coping were agreeableness, conscientiousness, extraversion and neuroticism. The only predictor of coping effectiveness was neuroticism. In terms of interactive effects, the only three that emerged were in predicting task-oriented coping. Specifically, both neuroticism and openness, and extraversion and neuroticism predicted task-oriented coping. Agreeableness and conscientiousness predicted distraction-oriented coping.

Findings suggest that extraversion positively predicted the use of task-oriented coping. These findings support those by Allen et al. (2011) and Kaiseler et al. (2012) reinforcing the conclusion that athletes high in extraversion have a tendency towards using task-oriented coping. In addition to previous findings, our results suggest that agreeableness and openness were also positive predictors of task-oriented coping. Previous non-sport research reported that individuals who tend to be creative, imaginative, and curious (High O) are more likely to use more intellectual (Connor-Smith & Flachsbart, 2007) coping styles, such as task-oriented coping. In addition, trustful, compliant, and determined athletes (High A) are also likely to use task-oriented coping strategies, particularly in the form of perceived and received social support (Bowling, Beehr, & Swader, 2005; Tong, Bishop, Diong, Enkelman, Why, Ang et al., 2004).

Neuroticism has been associated with a Big-Five predictor of avoidance coping (Allen et al., 2011). Extending Allen and colleagues finding, we found that distraction-oriented coping was

positively predicted by neuroticism and negatively predicted by extraversion, agreeableness and conscientiousness. Accordingly, athletes who displayed tendencies to be independently neurotic were more likely to use distracton-oriented coping, while athletes who were independently extraverted, agreeable and conscientious were less likely to use distraction-oriented coping. Distraction has been found to be least desirable in the context of athletic performance (Hill & Shaw, 2013). As such, based on our current findings, athletes who have tendencies to be neurotic may be vulnerable to dysfunctional performance as a result of using distraction-oriented coping.

Disengagement-oriented coping negatively predicted agreeableness and conscientiousness. Athletes high on agreeableness may be less likely to engage in disengagement-oriented coping as these may be perceived of little use for improving their relationships with others. Accordingly, Connor-Smith and Flachsbart (2007) suggested that individuals high on agreableness tend to use less withdrawal ways of coping. Additionally, athletes who are organised, reliable and hardworking (High in C) are more likely to be involved in more task-oriented ways of coping (i.e., cognitive restructuring, problem solving) requiring the ability to plan and problem solve as opposed to disengagement ways of coping (Connor-Smith & Flachsbart, 2007). Additionally, disengagement-oriented coping was also predicted by high levels of extraversion and neuroticism. These findings suggest that athletes who are less emotionable stable (High N) tend to engage more in disengagement-oriented coping, supporting previous studies in sport (e.g., Allen et al., 2011; Kaiseler et al., 2012). In addition, athletes who tend to be more emotional positive, and sociable (High E) tend to use more disengagement-oriented coping. This particular finding contradicts previous research in non-athletic populations, which suggested that extroversion predicts more engagement ways of coping (Connor-Smith & Flachsbart, 2007). Considering that disengagement-oriented coping encompasses the venting of unpleasant emotions, it is possible, according to current findings, that athletes high on extraversion when performing under highly competitive sport environments may be prone, socially, to vent their emotions. Further research is warranted to confirm this assumption.

Scant research to date has explored the relationship between the Big-Five and coping effectiveness. The current study found neuroticism was the only Big-Five personality trait that predicted coping effectiveness. Specifically, those athletes prone to experiencing negative emotions, impulsivity, and self-conscientiousness (High N) were less likely to cope effectively. This finding supports Kaiseler et al. (2012) who found neuroticism was associated with lower levels of state reported coping effectiveness. Hence, there seems to be a clear need to design coping effectiveness interventions for athletes who are less emotionally stable (High N). Acknowledging that mindfulness was positively associated with coping effectiveness among athletes (see Kaiseler, Poolton, Backhouse, & Stanger, 2017), it is recommended that future research investigates the usefulness of mindfulness to improve coping effectiveness particularly among neurotic athletes.

To date, research investigating the Big-Five personality trait interactions and their effects upon dispositional coping is scarce. The current study found three significant two-way interactions unique to the sport psychology literature. First, we found a two-way interaction effect for neuroticism and openness predicted task-oriented coping. Specifically, neurotic athletes (High N) were less likely to adopt task-oriented coping if they were also not open to new experiences (Low O). As suggested by McCrae and Costa (1987) individuals higher on N have a tendency to experience negative emotions, therefore are more likely to align their coping resources towards managing negative emotions instead of engaging in task-oriented coping. Our findings support McCrae and Costa's assertion, but also suggest this may only be the case in sport when openness is relatively low. Conversely, our findings uniquely indicated that athletes who were open to new experiences (High O) in conjunction with being emotionally unstable (High N) were more likely to use task-oriented coping. It is possible that high levels of openness may protect athletes who have tendencies to be emotionally unstable. For example, high openness individuals can experience a diversity of emotions (McCrae, 1992) and are more likely to engage in positive re-appraisal (O'Brien & DeLongis, 1996) that may negate neurotic tendencies. Current findings suggest neurotic

athletes (High N) who are more creative, flexible and imaginative (High O), compared to their neurotic low openness counterparts, are able to adopt task-oriented coping.

Second, a two-way interaction for extraversion and neuroticism predicted task-oriented coping. That is, extraverted athletes (High N) were more likely to use task-oriented coping if they were emotionally stable (Low N). Previous literature in non-sport contexts (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007) have asserted the independent effects of being sociable and emotionally stable upon the use of engagement and problem-focused coping. Upon extending these findings to the sport context, the current study suggests athletes who are both sociable and prone to experience less negative emotions are likely to adopt task-oriented coping. Furthermore, our findings uniquely suggest emotionally stable athletes (Low N) were less likely to use task-oriented coping when socially inhibited (Low E). Despite previous non-sport research (Connor-Smith & Flachsbart, 2007) associating emotional stability (Low N) with engagement (or task-oriented) coping, our findings suggest this may not be the case for athletes when extraversion is relatively low. This is consistent with Vollrath and Torgersen (2000) who found the effects of extraversion on coping was dependent on alternative combinations of neuroticism.

Finally, a two-way interaction for agreeableness and conscientiousness predicted distraction-oriented coping. Notably, hostile and disagreeable athletes (Low A) were more likely to use distraction-oriented coping if they were less goal driven and undisciplined (Low C). To date, we are not aware of any research that has identified agreeableness as a combinable trait to significantly predict coping. Previous conscientiousness-related findings, however, have revealed high neuroticism and low conscientiousness predict dysfunctional coping in non-sport contexts (Conner-Smith & Flaschbart, 2007; Vollrath & Torgersen, 2000). The current study extends previous findings suggesting athletes with Low A and Low C demonstrate greatest use of distraction-oriented coping. Furthermore, our findings uniquely indicate that athletes who were hard working, organised and self-disciplined (High C) in combination with being confrontational, hostile and non-empathetic (Low A) were less likely to use distraction-oriented coping. Conscientious individuals have been

found to use positive re-appraisal, actively plan and problem solve (Lee-Baggly et al., 2005), which may not interfere with disagreeable tendencies. For example, it would seem reasonable that athletes can be conscientious (High C) about playing their sport and be ruthless and tough-minded (Low A) at the same time. Current findings, therefore, suggest conscientious athletes (High C) who are ruthless and tough-minded (Low A), compared to their less conscientious counterparts, are less likely to adopt distraction-oriented coping.

This study is the first to explore the relationship between the Big-Five, dispositional coping, and coping effectiveness in sport. The findings of this study, however, should be considered in light of some limitations associated with cross-sectional and self-report design, restricting causal inferences. Given the exploratory nature of our study, however, it is hoped that the findings will be able to inform future experimental research. A further limitation concerns the moderate alpha coefficient associated with the measurement of coping effectiveness. In view that the current study adopted a measure of coping effectiveness items developed from a non-sport context, future research may wish to consider the development of a coping effectiveness measure that contains items specific to sport. Furthermore, alphas for openness and distancing were marginal. However, in personality research it is not uncommon for trait measures to be below the .70 cut-off (McCrae, 2015). Furthermore, Cronbach and Shavelson (2004) urged caution against the arbitrary oversimplification of the .70 alpha cut-off value. Finally, questionnaires were completed in a fixed order due to concerns related with participants switching back and forth between personality and sport-specific measures what could potentially confuse them, impairing the validity of assessment. However, we do recognize that not counterbalancing questionnaires may cause possible order effects.

In conclusion, the current study offers two unique findings to our understanding of the relationship between the Big-Five and coping. First, the effects of neuroticism upon task-oriented coping was dependant on its combination with openness and extraversion. Unlike previous research to date, our study suggests neurotic athletes (High N) open to new experiences (High O) were more

likely to use task-coping, whereas less neurotic athletes (Low N) who were social inhibited (Low E) were less likely to use task-coping. Second, we found the interaction between agreeableness and conscientiousness predicted varying distraction-oriented coping. That is, disagreeable (Low A) and undisciplined (Low C) athletes were more likely to use distraction-oriented coping, whereas athletes that remained disagreeable (Low A) and self-disciplined (High C) were less likely to use distraction-oriented coping. As such, the effect of agreeableness upon distraction-oriented coping was dependent upon its combination with conscientiousness. These findings indicate the importance for conducting research investigating the interactive effects of the Big-Five upon coping in order to better understand the complex relationship between personality and coping in sport. Although the relationship between personality and athletic success in sport is often thought to be unidirectional, it is also possible that athletic success or failure experienced throughout an athletes career, and respective life changes may contribute to personality changes (Allen & Laborde, 2014). In support of this argument evidence (e.g., Allen, Vella, & Laborde, 2015a; Allen, Vella, & Laborde, 2015b) suggests that sport and exercise participation facilitate changes in personality. Hence, future longitudinal designs are required to explore the bidirectional associations of personality and coping in sport. Additionally, acknowledging that previous personality experimental research (e.g., Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012; Sander, Schmiedek, Brose, Wagner, & Specht, 2016) found support for changes on the Big-Five personality traits following cognitive training interventions, it is recommended that sport psychology practitioners and researchers dedicate further attention to the relevance of these methods within this field of study.

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Table 1: Descriptive statistics and reliability for the Big Five personality dimensions, dispositional coping and coping effectiveness

Subscale	Mean	SD	Alpha	Skewness	Kurtosis
Big-5					
Extraversion	3.55	0.73	0.78	-.07	-.64
Agreeableness	3.48	0.78	0.82	-.34	-.77
Conscientiousness	3.40	0.80	0.84	-.19	-.82
Neuroticism	2.87	0.75	0.75	-.07	-.37
Openness	3.16	0.62	0.66	-.24	.47
Task Coping					
Mental Imagery	12.13	4.50	0.83	-.24	-.99
Effort Expenditure	11.13	2.83	0.71	-.59	-.36
Thought Control	13.03	3.28	0.71	-.33	-.22
Seeking Support	12.25	3.66	0.72	-.14	-.28
Relaxation	11.35	3.52	0.70	.04	-.41
Logical Analysis	13.64	3.42	0.72	-.37	-.36
Distraction Coping					
Distancing	4.61	2.20	0.69	.50	-.74
Mental Distraction	10.56	4.16	0.78	.14	-1.00
Disengagement Coping					
Venting	12.87	4.00	0.79	-.11	-.56
Resignation	9.06	4.26	0.85	.67	-.61
Coping Effectiveness					
Coping effectiveness	18.51	3.35	0.60	-.05	-.03

Table 2. Bivariate correlations between Big-5, dispositional coping and coping effectiveness.

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1. Extraversion	-	.21**	.31**	-.32**	.25**	.31**	.32**	.28**	-.01	.06	.16	-.29**	-.21**	.11*	-.27**	.06
2. Agreeableness		-	.61**	-.49**	.33**	.57**	.58**	.35**	-.15**	-.09	.19**	-.46**	-.46	-.30**	-.56**	.07
3. Conscientiousness			-	-.44**	.32**	.54**	.58**	.36**	-.23**	-.08	.13**	-.32**	-.46**	-.25**	-.56**	.01
4. Neuroticism				-	-.27**	-.42**	-.35**	-.36**	.13**	.02	-.07	.31**	.38**	.23**	.54**	-.28**
5. Openness					-	.37**	.24**	.23**	.09	.14**	.25**	-.08	-.25	-.14	-.30**	.08
6. Mental Imagery						-	.62**	.55**	-.02	.17**	.42**	-.28**	-.41**	-.10*	-.54**	.04
7. Effort Expenditure							-	.46**	-.17**	-.01	.26**	-.36**	-.45**	-.09	-.56**	-.00
8. Thought Control								-	.14**	.31**	.38**	-.15**	-.21**	-.17**	-.42**	.12*
9. Seeking Support									-	.43**	.33**	.05	.27**	.08	.24**	.06
10. Relaxation										-	.38**	.12*	.14**	.03	.18**	-.01
11. Logical Analysis											-	-.14**	-.04	.15**	-.05	-.05
12. Distancing												-	.40**	.09	.46**	-.10*
13. Mental Distraction													-	.22**	.64**	-.14**
14. Venting														-	.37**	-.18**
15. Resignation															-	-.21**
16. Coping Effectiveness																-

1 *$p < .05$; **$p < .01$
2 *Note*. Correlations were considered small (.10), medium (.30), or large (.50) based on the criteria suggested by Cohen (1992).

Table 3. Unstandardised and Standardised regression coefficients with collinearity diagnostics.

	Task- Coping		**Distraction-Coping**		**Disengagement-Coping**		**Coping Effectiveness**		**Colinearity Statistics**	
	B	Beta	B	Beta	B	Beta	B	Beta	VIF	Tolerance
Step 1										
Gender	-.36	-.01	.63	.06	.23	.02	.06	.01	1.00	1.00
Age	.05	.03	-.08	-.11*	-.12	-.12*	-.02	-.04	1.00	1.00
Step2										
Extraversion (E)	3.10	.17**	-.88	-.12*	1.19	.13**	-.09	-.02	1.21	.83
Neuroticism (N)	-.34	-.02	.88	.12*	2.47	.27***	-1.64	-.37***	1.53	.66
Conscientiousness (C)	1.84	.11	-1.34	-.20***	-2.04	-.24***	-.56	-.13	1.93	.52
Agreeableness (A)	3.65	.21***	-2.39	-.35***	-2.17	-.25***	-.16	-.04	1.83	.55
Openness (O)	4.44	.20***	.12	.01	-.78	-.07	.23	.04	1.20	.88
Step 3										
E x N	-4.99	-.19***	-.52	-.05	-1.26	-.10*	.05	.01	1.35	.74
E x O	.87	.03	.60	.06	-.35	-.03	.16	.03	1.27	.79

E x A	-2.49	-.10	.58	.06	-.06	-.00	-.36	-.06	1.72	.58
E x C	-.1.48	-.06	-.84	-.08	-.26	-.02	.19	.03	1.49	.67
N x O	4.46	.15**	.21	.02	-.84	-.06	-.17	-.02	1.68	.60
N x A	-1.41	-.06	-.06	-.01	-.39	-.03	-.22	-.04	1.84	.55
N x C	2.09	.09	.88	.09	-.13	-.01	-.18	-.03	2.01	.50
O x A	3.12	.11	-.13	-.01	.65	.05	-.17	-.02	1.88	.53
O x C	-.48	-.02	-.64	-.06	-1.10	-.08	-.41	-.06	1.74	.58
A x C	.13	.01	1.62	.20***	.34	.03	.32	.06	1.89	.53

1 *$p < .05$; **$p < .01$; ***$p < .001$

2

Figure Captions

Figure 1: Result of the Big-5 interaction between neuroticism an openness upon task-oriented coping.

Figure 2: Result of the Big-5 interaction between extraversion and neuroticism upon task-oriented coping.

Figure 3: Result of the Big-5 interaction between agreeableness and conscientiousness upon distraction coping.

Figure 1.

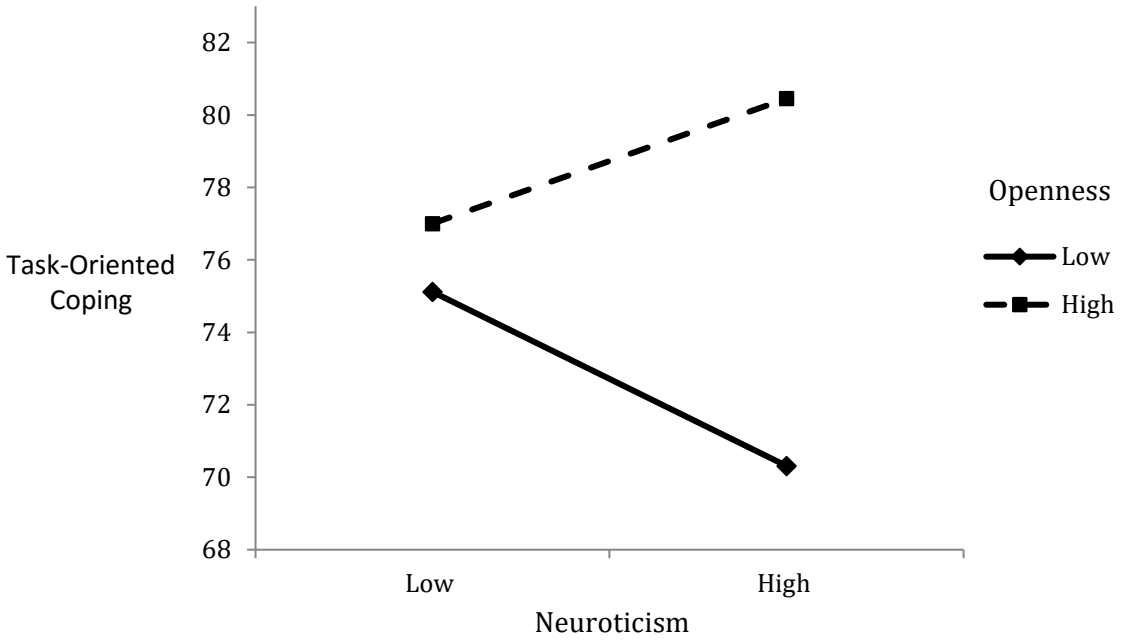

82
80
78
76
74
72
70
68
Task-Oriented Coping
Low
High
Neuroticism
Openness
Low
High

Figure 2.

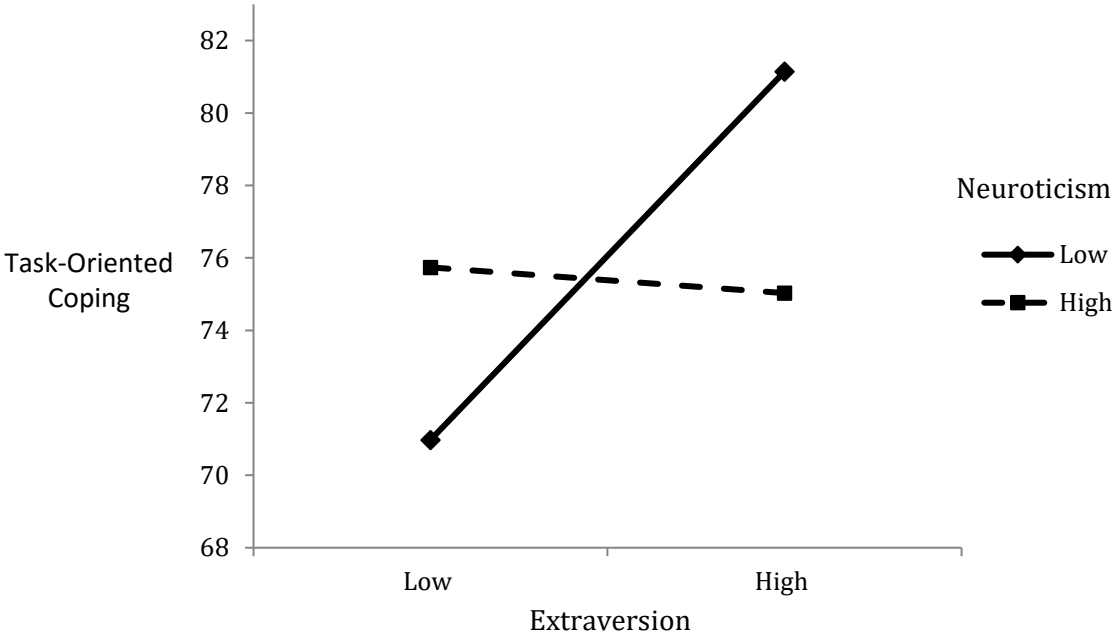
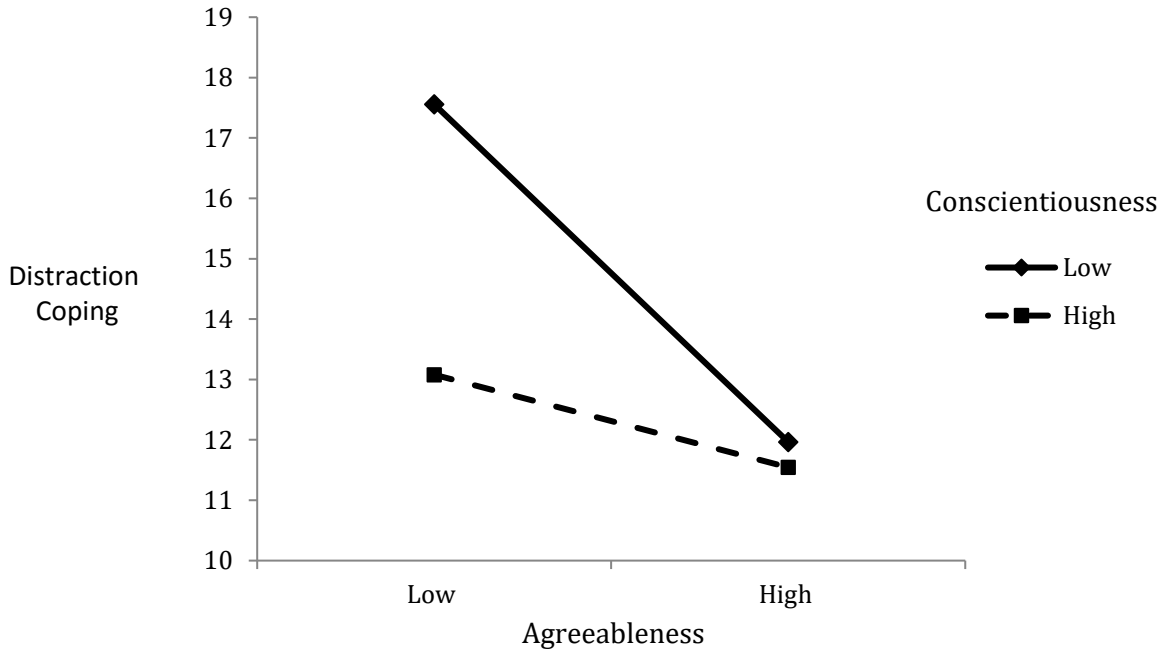

82
80
78
76
74
72
70
68
Task-Oriented Coping
Low
High
Extraversion
Neuroticism
Low
High

Figure 3.


19
18
17
16
15
14
13
12
11
10
Distraction Coping
Low
High
Agreeableness
Conscientiousness
Low
High

1

2