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**Zhang, S., Beattie, S., Pitkethly, A., & Dempsey, C. (*in press*). Lead me to train better: Transformational leadership moderates the negative relationship between athlete personality and training behaviours. *The Sport Psychologist*.**

**Abstract**

High-quality training environments are essential for athletic peak performance. However, recent research highlighted that athletes' personality characteristics could undermine effective training. The current set of studies aimed to examine whether specific transformational leadership characteristics displayed by the coach would moderate the potential negative impacts of two personality traits (i.e., extraversion and neuroticism) on training behaviours. In study 1, ninety-nine university athletes completed questionnaires assessing personality, transformational leadership, and training behaviours. In study 2, eighty-four high-level athletes completed the same personality and transformational leadership questionnaires. However, in study 2 the head coaches assessed athletes' training behaviours. Both studies showed that coach high-performance expectations moderated the extraversion-distractibility relationship. Further, both studies also demonstrated that the relationship between neuroticism and coping with adversity was moderated by coach's inspirational motivation. Our findings highlight that extraversion and neuroticism can negatively relate to training behaviours, but such effects can be moderated by certain transformational leadership behaviours.

*Keywords*: personality, transformational leadership, training behaviours, high-quality training

# Lead me to train better: Transformational leadership moderates the negative relationship between athlete personality and training behaviours

The ultimate goal of any competitive athlete is to strive for peak performance in competitive environments (Cohn, 2009). Research has shown that most elite athletes either train for at least ten years or accumulate at least 4,000 actual practising hours to achieve their desired level of expertise (Rees et al., 2016). Despite the essential time in building expertise, the quantity of training itself cannot distinguish world-leading serial medalling athletes from their less successful (non-medalling) counterparts (Hardy et al., 2017). However, recent research has shown self-regulated training behaviours have direct positive impacts on coach ratings of mentally tough behaviour (Beattie, Alqallaf, Hardy, & Ntoumanis, 2018) that benefit elite performance (Bell, Hardy, & Beattie, 2013). Therefore, it is even more important that the quality rather than the quantity of training in the preparation for peak performance states are examined.

Recently, Woodman, Zourbanos, Hardy, Beattie, and McQuillan, (2010) developed the Quality of Training Inventory (QTI) to assess how well athletes train in their own environment. Woodman et al. developed their inventory on three essential training behaviours of distractibility (Nideffer, 1993; Paulhus, Aks, & Coren, 1990), coping with adversity (Gould, Finch, & Jackson, 1993; Poczwardowski & Conroy, 2002; Smith & Christensen, 1995), and quality of preparation for upcoming competition (Bull, Albinson, & Shambrook, 1996; Orlick & Partington, 1988). Further, Woodman and colleagues hypothesised that certain personality traits displayed by the athlete might be incongruent to training environments. However, these relationships may be mitigated if the athlete had a set of well-developed psychological strategies. That is, Woodman et al. found that athletes who had high levels of emotional stability coped better with adversity only when emotional control was high (study 1). Further, high levels of extraversion were related to higher levels of

distractibility, but this relationship was mitigated when athletes engaged with high levels of goal setting in training (study 2).

Although Woodman et al.'s (2010) findings advance existing training-focused research, they only examined the athlete's perspective via single source data (i.e., self-report personality, self-report performance strategies and self-report training behaviours) thereby ignoring the potential role of the coach. Considering the importance of coach-athlete dyads in athletic training (Jackson, Knapp, & Beauchamp, 2009; Jowett & Chaundy, 2004), we propose that coaches' leadership behaviours will also moderate the potential negative relationship between athlete personality and training behaviours shown by Woodman et al. (2010). One relevant leadership theory that attracts our attention is that of transformational leadership (Bass, 1985).

Transformational leadership is of interest due to its "inspiring, developing and empowering" properties (Yukl, 2006, p. 289). It involves building good relationships and inspiring followers to reach their fullest potential (Bass, 1985). In the field of sport and athletic training, transformational leadership behaviours have been shown to improve coach-athlete relationships (Jowett & Chaundy, 2004), enhance athletes' perceived self-development (Vella, Oades, & Crowe, 2013), increase task cohesion (Callow, Smith, Hardy, Arthur, & Hardy, 2009), boost athletes' intrinsic motivation (Charbonneau, Barling, & Kelloway, 2001) and can lead to athletes exerting extra effort in training (Arthur, Woodman, Ong, Hardy, & Ntoumanis, 2011). Therefore, it is apparent that transformational leadership behaviours contribute to a range of desirable athlete outcomes that also extends to athlete quality of training (Arthur et al., 2011). Further, as it is the training environment where the coach and the athlete spend much of their time together, this environment is an ideal setting to examine whether coach transformational leadership behaviours moderate the relationship between athlete personality and quality of training. For example, with reference to Woodman et al.'s

study, an athlete with low levels of emotional stability may cope better with adversity if his or her coach interacts with him or her in a specific transformational manner. We set out such hypotheses below.

In assessing transformational leadership behaviours in sport, Callow et al. (2009) proposed a framework containing six transformational leadership behaviours that have been widely used (e.g., Arthur et al., 2011; Hardy et al., 2010; Smith, Arthur, Hardy, Callow, & Williams, 2013; Vella, Oades, & Crowe, 2012; Vella et al., 2013). These were termed as high performance expectations (refers to the coaches strict high standards of the athletes' performance that does not accept second best); individual consideration (refers to the coach's consideration of the athlete's condition and capacity in making specific plans and strategies); inspirational motivation (refers to the coach's optimal thinking and encouraging words towards athletes); intellectual stimulation (refers to the coach's use of open communication to boosts athlete's self-regulation and self-realization); fostering acceptance of group goals and promoting teamwork (refers to the coach's action in promoting teamwork and cohesion); and appropriate role model (refers to the coach's action in not only teaching backstage but also leading from the front).

To extend Woodman et al.'s (2010) findings that certain personality traits can impair training behaviours, the present research considered the possible interactive effects between athletes' personality and their perception of their coach's transformational leadership upon training behaviours. Specifically, our current approach allows us to examine the replicability of Woodman et al.'s initial findings that extraversion and neuroticism may impair athletes' training behaviours. We are then able to examine further if specific transformational leadership rather than performance strategies (as tested in Woodman et al.'s work) may mitigate the adverse effect of personality on training.

We identified three transformational leadership behaviours from Callow et al.'s (2009) framework (i.e., high performance expectations, inspirational motivation, and individual consideration) that might be particularly helpful in buffering the harmful effects of extraversion and neuroticism on training behaviours. Typically, although all six transformational leadership behaviours in Callow et al.'s framework may improve training, it is our aforementioned three candidates (i.e., high performance expectations, inspirational motivation, and individual consideration) that might be exclusively beneficial to athletes high in extraversion and neuroticism regarding their training.

Our first hypothesis was based on Eysenck and Eysenck's (1985) theorising on extraversion and Woodman et al.'s (2010) reports on the relationship between extraversion and distractibility in training. Since extraverts tend to enjoy interpersonal interactions, are likely to be enthusiastic and talkative, and always seek high arousal or stimulus (Eysenck & Eysenck, 1985), we hypothesise that extraverts would report higher levels of distractibility in training (replicating Woodman et al. 2010). However, as individuals high in extraversion seek high arousal (e.g., challenges, threats), coach's exceptional performance standards namely high performance expectations (HPE) may provide such opportunity for these athletes to challenge themselves in training (i.e., satisfying the needs for high arousal). That is, when performance expectation levels are low, training may be perceived as less challenging or threatening. Thus, athletes high in extraversion may be more easily distracted by task-irrelevant thoughts or training-irrelevant stimuli. However, when performance expectation levels are high, the challenging or threatening environment (e.g., the coach does not accept second best) may encourage those athletes high in extraversion (i.e., with the tendency to be easily distracted) to try to live up to the coach's exceptional standards. Therefore, we expected that HPE would moderate the relationship between extraversion and distractibility in training.

Our second hypothesis was based on Costa and McCrae's (1985) theorising on neuroticism and Woodman et al.'s (2010) reports on the relationship between emotional stability and coping with adversity. Since neuroticism reflects emotional instability, negativity and maladjustment (Costa & McCrae, 1985), we hypothesise a negative relationship between neuroticism and coping with adversity would occur. That is, as individuals high in neuroticism are particularly susceptible to anxious states (Barlow, Ellard, Sauer-Zavala, Bullis, & Carl, 2014), such athletes may suffer from adversity-induced emotional instability or anxiety. This in turn, occupies their attention making them unable to cope effectively (Sarason, 1988). However, by creating an optimal and encouraging atmosphere and always talking optimistically (IM), the maladaptive emotions of athletes high in neuroticism when facing adversity in training might be minimised by the coach. Consequently, we hypothesised IM would moderate the relationship between neuroticism and coping with adversity.

Our third hypothesis was also based on Costa and McCrae's (1985) theorising on neurotics. Since individuals high in neuroticism invest more effort but cope less effectively under challenging situations (Bolger & Zuckerman, 1995), understanding individual needs and providing exceptional care and individual consideration (IC) might help individuals high in neuroticism to cope better in difficult situations. For example, as high anxiety experienced by those high in neuroticism under adversity pre-empt cognitive resources (Sarason, 1984), it is likely that the lack of resources contributes to the failure of effective coping. However, the coach's delivery of individualised consideration may provide athletes who are high in neuroticism with extra resources (e.g., individualised strategies, self-confidence) to effectively deal with adversity. Therefore, we hypothesised that IC would moderate the relationship between neuroticism on coping with adversity.

Our final hypothesis was grounded on the non-significant relationship between extraversion and preparation for upcoming competition (Woodman et al., 2010). Since the non-significant relationship between extraversion and preparation for upcoming competition may be confounded due to unexplored moderators, it is possible that extraverts may be at risk of inadequate preparation for upcoming competition under specific situations. For example, when there is a lack of performance expectations, individuals high in extraversion may invest less effort in preparation since preparation in itself cannot provide the high arousal that these extroverts seek. However, if the coach provides high levels of HPE, then these expectations may help those individuals high in extroversion to prepare adequately for upcoming competition due to the satisfaction of extroverts' high arousal needs (e.g., challenges). Therefore, we expected that HPE would moderate the relationship between extraversion and preparation for upcoming competition.

## Study 1

### Method

#### *Participants*

To have adequate power (.80) to detect a small-to-medium effect size to reflect considerable practical values, i.e., a Cohen's $f^2 = .10$, we need a minimum sample of eighty-one participants (G Power 3.1; American Statistical Association, 2017). To be more conservative regarding our sample estimation, we recruited ninety-nine male University athletes from five sports teams in the UK to take part in the study (*M age* = 20.60, *SD* = 2.70). The five team sports included basketball (n = 21), soccer (n = 21), handball (n = 13), hockey (n = 22), and lacrosse (n = 22). Participants had an average of 7.05 years (*SD* = 4.70) formal training in their respecting sport.

### Measures

***Training behaviours***. We used Woodman et al.'s (2010) Quality of Training Inventory (QTI) to assess athletes' training behaviours. The QTI assesses three core training behaviours including distractibility (e.g., "I am easily distracted by other people in training"), coping with adversity (e.g., "When my training session isn't going well, I try to overcome the problem") and quality of preparation (e.g., "I always have a competition plan that covers all eventualities"). The QTI is scored on a Likert scale from 1 *(strongly disagree*) to 9 (*strongly agree*) and has demonstrated good construct validity (Woodman et al., 2010). In the present study, Cronbach alpha coefficients ranged from .73 to .80 (See Table 1), reflecting acceptable-to-good levels of internal consistency (Bland & Altman, 1997).

***Personality***. In order to replicate the findings of Woodman et al. (2010) we used Gosling, Rentfrow and Swann (2003) Ten-Item Personality Inventory (TIPI) which is based on the Big-Five Model of personality traits (Costa & McCrae, 1985). For the current study, we examined the traits of extraversion (two items; e.g., "I see myself as someone extraverted and enthusiastic") and neuroticism (two items; e.g., "I see myself as someone anxious and easily upset"). The inventory is assessed on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach alpha ranged from .63 to .67 (see Table 1), reflecting acceptable levels of internal consistency given the low numbers of items (i.e., two) in each subscale (Bland & Altman, 1997; Tavakol & Dennick, 2011).

***Transformational leadership***. We assessed the coach's transformational leadership using the Differentiated Transformational Leadership Inventory (DTLI, Callow et al., 2009). The DTLI uses a Likert scale format with ratings from 1 (*not at all*) to 5 (*all the time*). The inventory contains six transformational leadership behaviours and one transactional behaviour. However, for the purposes of the present study, we only used the subscales of high performance expectations (HPE, five items; e.g., "My coach will not accept second best"), individual considerations (IC, four items; e.g., "My coach recognizes that different athletes

have different needs"), and inspirational motivation (IM, four items; e.g., "My coach talks in a way that makes me believe I can succeed"). The Cronbach alpha coefficients ranged from .78 to .87 (see Table 1), reflecting good levels of internal consistency (Bland & Altman, 1997).

### *Procedure*

With institution ethical approval, we contacted coaches from various sports teams via email providing them with detailed information about the study. Once contact was made, the coaches were asked whether they were willing to arrange a post-training meeting to brief details of the study to their athletes and to recruit volunteers to take part in the study. All participants were provided with a questionnaire pack, consent forms and information sheets. We were also on hand to answer any questions they raised. It took approximately 20 minutes for each athlete to complete the questionnaire pack. All questionnaire packs were collected at the end of the session.

## Results

### *Preliminary analysis*

Means, standard deviations, correlations and Cronbach's alpha for the variables measured in study 1 are reported in Table 1.

### *Main analyses*

We used moderated hierarchical regression to examine the hypothesised personality x leadership interactions on training behaviours. We tested our hypotheses using PROCESS (Hayes, 2013). PROCESS allows us to conduct moderation analyses without manually creating the product term for the interaction and provides statistics of the interaction term with the results of simple slope analysis to interpret any interactions (Cohen, Cohen, West, & Aiken, 2003). In order to control for potential team effects, we followed Jaccard and Turrisi's (2003) suggestion using z-score transformation to standardise all variables at the team level.

Simple slopes were analysed and plotted at *Mean ± 1SD.* Lower and upper bound 95% confidence intervals (CI) that do not encompass zero indicate significance at the .05 level. Alpha was set at .05 for all analyses. As substantial differences in the degree and direction of changes in personality occur across adolescence till early adulthood (Borghuis et al., 2017), we controlled athletes' age in all our analyses. Further, to remove any possible confounds that training experience may have upon training behaviours, we also controlled athletes' training experience (i.e., years of receiving formal training). Such an approach (i.e., controlling both age and training experience in all subsequent analyses) also allows the comparison of results across different samples that differ in age and training experience. Neither age nor years receiving formal training in the university athlete sample were significantly related to any of the dependent variables.

***Distractibility***. Entering extraversion as the independent variable and HPE as the moderator, the model accounted for 49.8% of the variance in distractibility ($F_{5, 93}$ = 6.15, $p$ < .001). Extraversion had a positive and significant relationship with distractibility (β = .35, $p$ < .001, 95% CI [.16, .54]) whereas HPE (β = - .43, $p$ < .001, 95% CI [-.62, -.24]) showed a significant negative relationship with distractibility. Further, a significant extraversion x HPE interaction was revealed (β = -.19, $\Delta R^2 = .04$, $F_{1,93} = 4.45$, $p$ = .038, 95% CI [-.36, -.01]). Simple slope analysis indicated a significant positive relationship between extraversion and distractibility when HPE was low (β = .54, $p$ < .001, 95% CI [.27, .80]) but no significant relationship when HPE was high (β = .17, $p$ = .18, 95% CI [-.08, .42]). Figure 1 (top) displays the nature of the interaction.

***Coping with adversity***. Entering neuroticism as the independent variable and IM as the moderator, the model accounted for 54.8% of the variance in coping with adversity ($F_{5,93}$ = 7.98, $p$ < .001). Both Neuroticism (β = .21, $p$ = .024, 95% CI [.03, .39]) and IM (β = .32, $p$ < .001, 95% CI [.13, .50]) had a significant positive relationship with coping with adversity.

Further, a significant neuroticism x IM interaction was revealed (β = .29, $\Delta R^2 = .07$, $F_{1,93} = 8.99$, $p$ = .004, 95% CI [.10, .49]). Simple slope analysis indicated a significant positive relationship between neuroticism and coping with adversity when IM was high (β = .49, $p$ < .001, 95% CI [.27, .72]) but no significant relationship when IM was low (β = -.07, $p$ = .61, 95% CI [-.37, .22]). Figure 2 (top) illustrates the nature of this interaction.

Entering neuroticism as the independent variable and IC as the moderator, the model accounted for 49.9% of the variance in coping with adversity ($F_{3,95} = 6.17$, $p$ < .001). Both neuroticism (β = .24, $p$ = .015, 95% CI [.05, .42]) and IC (β = .33, $p$ = .001, 95% CI [.13, .52]) had a significant positive relationship with coping with adversity. However, the neuroticism x IC interaction on coping with adversity was marginally not significant (β = .20, $\Delta R^2 = .03$, $F_{1,93} = 3.65$, $p$ = .06, 95% CI [-.01, .40]).

***Quality of preparation***. Entering extraversion as the independent variable and HPE as the moderator, the regression model accounted for 48.9% of the variance in quality of preparation ($F_{3,95} = 5.84$, $p$ < .001). Extraversion (β = .16, $p$ = .10, 95% CI [-.03, .34]) was not significantly related to quality of preparation but HPE (β = .29, $p$ = .003, 95% CI [.10, .48]) had a positive and significant relationship. Further, a significant extraversion x HPE interaction was revealed (β = .26, $\Delta R^2 = .07$, $F_{1,93} = 8.34$, $p$ = .005, 95% CI [.08, .44]). Simple slope analysis indicated a significant positive relationship between extraversion and quality of preparation when HPE was high (β = .41, $p$ = .002, 95% CI [.16, .66]) but no significant relationship when HPE was low (β = -.10, $p$ = .47, 95% CI [-.36, .17]). Figure 1 (bottom) displays the nature of this interaction.

## Discussion

The present study aimed to examine if transformational leadership behaviours would moderate the potential impairing effects of extraversion and neuroticism on training behaviours (Woodman et al., 2010). Consistent with our hypotheses HPE moderated the

relationship between extraversion and distractibility and between extraversion and quality of preparation. IM also moderated the relationship between neuroticism and coping with adversity. The purpose of study 2 was to replicate and extend the above findings in a sample of higher-level athletes compared to the university-level athletes. We also wanted to avoid the use of single-source data. Therefore, we used an informant rating of training behaviours via the coach's perspective. While retaining all the hypotheses in study 1, we further expected that the higher-level athlete sample would show higher levels of extraversion, lower neuroticism, less distractibility, better coping with adversity, and improved preparation for upcoming competition compared to the university sample.

## Study 2

### Method

#### *Participants*

With institutional approval, we recruited 84 high-level athletes (*M age* = 16.61, *SD* = 3.47). The participants were from three national-level sports teams, two county-level sports teams, and one professional league team in the UK and had on average 8.70 years (*SD* = 3.57) training in their respecting sport. These participating teams included one national-level U15s male football team (n = 14), two national-level U17s male cricket teams (n = 13 and 12), one county-level U18s female netball team (n = 19), one county-level U17s male cricket team (n = 12), and one professional league female football team (n = 14). Head coaches (*M age* = 32.40, *SD* = 7.50; *M years of coaching* = 12.20, *SD* = 6.50) of these participating teams also voluntary took part in this study.

#### *Measures*

***Coach-rated training behaviours***. In a similar fashion to study 1, we assessed athletes' training behaviours using the Quality of Training Inventory (QTI, Woodman et al., 2010). However, we asked the head coach of each participating athlete to rate their athletes'

298 training behaviours separately. This required some minor adaptations to the original self-
299 report QTI scale. For example, we changed the initial item for distractibility "I am easily
300 distracted by other people in training" to "(Name) is easily distracted by other people in
301 training". In the present study, the Cronbach's alpha of three subscales (i.e., distractibility,
302 coping with adversity, quality of preparation) ranged from .84 to .90 (see Table 2), reflecting
303 good-to-excellent levels of internal consistency (Bland & Altman, 1997).

304 ***Personality***. We used the Ten Item Personality Inventory (TIPI, Gosling et al., 2003)
305 as described in study 1 to measure athletes' personality. The Cronbach's alpha in the present
306 study ranged from .62 and .64 (see Table 2), reflecting acceptable levels of internal
307 consistency given the low number of items in each subscale (Bland & Altman, 1997; Tavakol
308 & Dennick, 2011).

309 ***Transformational leadership***. We used the Differentiated Transformational
310 Leadership Inventory (DTLI, Callow et al., 2009) as described in study 1. Cronbach's alpha
311 in the present study ranged from .70 to .72 (see Table 2), reflecting acceptable levels of
312 internal consistency (Bland & Altman, 1997).

313 ***Procedure***

314 With institutional approval, we contacted coaches or team managers from different
315 potential sports teams in the UK by email, providing detailed information about our research.
316 We proceeded only when the coach agreed to take part in our research. Once consent was
317 given by the coach to approach their athletes, we asked them to arrange a post-training
318 session for us to brief them and to ask them to complete the survey. All participants (athletes
319 and coaches) were provided with a questionnaire pack containing all questionnaires, consent
320 forms and information sheets. We were also on hand to answer any questions they raised. All
321 questionnaire packs were collected at the end of the session.

322 **Results**

***Preliminary analysis***

Means, standard deviations, correlations and Cronbach's alpha for the variables measured in study 2 are reported in Table 2.

***Main analyses***

We used the same statistical programme and method as described in study 1. As discussed in study 1, we controlled for age and years of receiving formal training in all subsequent analyses. Consequently, the results we obtained from our analyses are independent of athletes' age and training experience. Neither age nor years receiving formal training in the high-level sample were significantly related to any of the dependent variables.

***Distractibility***. Entering extraversion as the independent variable and HPE as the moderator, the regression model accounted for 58.4% of the variance in distractibility ($F_{5,78}$ = 8.05, $p$ < .001). Extraversion had a significant and positive relationship with distractibility (β = .38, $p$ = .002, 95% CI [.19, .57]) whereas, HPE had a significant negative relationship (β = -.47, $p$ < .001, 95% CI [-.66, -.29]). Further, a significant extraversion x HPE interaction was revealed (β = -.18, $\Delta R^2 = .03$, $F_{1,78} = 4.07$, $p$ = .047, 95% CI [-.36, -.01]). Simple slope analysis indicated a significant positive relationship between extraversion and distractibility when HPE was low (β = .55, $p$ < .001, 95% CI [.27, .84]) but no significant relationship occurred when HPE was high (β = .20, $p$ = .085, 95% CI [-.03, .43])[1]. The above results replicate those from study 1 that extraversion was related to increased distractibility only when HPE was low but not when HPE was high.

***Coping with adversity***. Entering neuroticism as the independent variable and IM as the moderator, the regression model accounted for 31.9% of the variance in coping with adversity, ($F_{5,78}$ = 1.77, $p$ = .128). Neither neuroticism (β = -.07, $p$ = .567, 95% CI [-.31, .17]) or IM (β = .16, $p$ = .188, 95% CI [-.08, .40]) were significantly related to coping

[1] Due to the interaction being identical to that of study 1 we do not plot it.

with adversity. However, a significant neuroticism x IM interaction was revealed (β = .33, $\Delta R^2 = .08$, $F_{1,78} = 7.15$, $p$ = .009, 95% CI [.08, .58]). Simple slope analysis revealed a non-significant relationship between neuroticism and coping with adversity when IM was high (β = .25, $p$ = .08, 95% CI [-.03, .54]) and a significant negative relationship when IM was low (β = -.39, $p$ = .046, 95% CI [-.77, -.01]). Figure 2 (bottom) illustrates the nature of this interaction. The above results somewhat replicate the findings from study 1 that individuals high in neuroticism improved in coping with adversity when their coaches demonstrated high compared to low levels of IM.

Entering neuroticism as the independent variable and IC as the moderator, the regression model accounted for 29.8% of the variance in coping with adversity, ($F_{5,78}$ = 1.51, $p$ = .195). Neuroticism was not significantly related to coping with adversity (β = .01, $p$ = .901, 95% CI [-.21, .24]), but IC had a significant and positive relationship (β = .28, $p$ = .013, 95% CI [.06, .50]). However, the neuroticism x IC interaction was not significant (β = .11, $\Delta R^2 = .01$, $F_{1,78} = .86$, $p$ = .35, 95% CI [-.13, .36]).

***Quality of preparation***. Entering extraversion as the independent variable and HPE as moderator, the regression model accounted for 25.6% of the variance in quality of preparation, ($F_{5,78}$ = 1.09, $p$ = .37). Neither extraversion (β = .12, $p$ = .281, 95% CI [-.10, .35]) or HPE (β = .18, $p$ = .112, 95% CI [-.04, .40]) had a significant relationship with quality of preparation. The extraversion x HPE interaction also failed to reach significance (β = -.03, $\Delta R^2 < .01$, $F_{1,78} = .05$, $p$ = .827, 95% CI [-.24, .19]). These results do not replicate those of study 1.

## General Discussion

The current set of studies aimed to test the potential moderating effects of transformational leadership behaviours on the negative relationship between athletes' personality and training behaviours. Our data from two different athletic samples

372 demonstrated that when coach transformational leadership behaviours (i.e., HPE and IM)
373 were perceived high, potential maladaptive personality types to training contexts (i.e.,
374 extraversion and neuroticism) were associated with less distractibility and improved coping
375 with adversity. These findings provide the first evidence that leadership behaviours can buffer
376 the impairing effect of extraversion and neuroticism on athletic training. Results replicated
377 Woodman et al.'s (2010) findings that higher-level athletes demonstrated less distractibility,
378 better coping with adversity, and improved competition preparation. Further, results also
379 supported previous research in that higher-level athletes possess higher levels of extraversion
380 and lower levels of neuroticism traits (see Allen, Greenlees, & Jones, 2013; see Table 1 and
381 Table 2).

382 Across both samples, a near identical interaction occurred between extraversion and
383 HPE upon distractibility. Extraversion was associated with an increase in distractibility in
384 training e.g. poor concentration (replicating Woodman et al., 2010), but only when HPE were
385 low. In other words, athletes whose coach held strict high standards of performance and did
386 not accept second best were less distracted in training. Given that HPE leads to the increased
387 leader-inspired effort in training (Arthur et al., 2011), it is possible that coach HPE
388 contributed to reducing athletes' distractibility in training through increased effort in training
389 on the athlete's part. Typically, due to extraverts' enjoying interpersonal events and
390 willingness to seek high arousal (Eysenck & Eysenck, 1985), they may not exert great effort
391 in training if coach performance expectation is low. However, if coach performance
392 expectations are high, such challenging or threatening standards may encourage the athlete to
393 exert more effort and be more attentive in training, thus reducing their distractibility.

394 Data from the two different samples also supported our second hypothesis that IM
395 would moderate the relationship between neuroticism and coping with adversity. In the
396 university-level sample (study 1), the relationship between neuroticism and coping with

adversity was significant and positive when IM was high but not significant when IM was low. In the high-level sample (study 2), the relationship between neuroticism and coping with adversity was not significant when IM was high but was significant and negative when IM was low. Two considerations are relevant to the different neuroticism x IM interactions demonstrated across studies. First, the level of sports participation differed across the two samples. Since sports participation in higher- compared to lower-level settings have more threats and consequences for poor performance (Allender, Cowburn, & Foster, 2006; Bell et al., 2013), it is possible that athletes with high levels of neuroticism in study 2 sample may suffer from higher levels of adversity and thus are less able to cope with it. Second, despite higher levels of sports participation, the sample in study 2 was younger than study 1. Since neuroticism in general decreases gradually with age (Allen et al., 2013), if IM protects against the adverse effect of neuroticism on coping with adversity as our results suggest, it may play a more critical role among younger athletes. However, regardless of the differences between our samples, findings are consistent that athletes high in neuroticism are more likely to cope better with adversity when the coach displays high levels of IM.

Our third hypothesis stated that neuroticism would be negatively related to coping with adversity and IC would be positively related to coping with adversity. However, contrary to our hypothesis IC did not moderate the relationship between neuroticism and coping with adversity in either of our samples. The main effects revealed that neuroticism was positively related to coping with adversity in study 1 but not significantly related to coping with adversity in study 2. These results seem to support the suggestion that lower level athletes face significantly less adversity than the higher-level athletes do. Further, IC was positively related to coping with adversity across both studies. When facing adversity, individuals will experience unpleasant emotions that in turn may harm their subsequent coping and performance (Janelle, Fawver, & Beatty, 2018). It is also generally agreed that maladaptive

emotions experienced under adversity can cause cognitive interference (Sarason, 1984, 1988) which leads to poorer coping. However, when coaches show high levels of IC when their athlete's face adversity, the athlete may have more resources at their disposal (e.g., individualised strategies, self-confidence) enabling them to cope better. Importantly, the non-significant neuroticism x IC interaction in coping with adversity does not undervalue the critical role of delivering IC in athletic training, as there was a consistent main effect of IC positively relating to coping with adversity across both studies. Therefore, our results highlight that coaches who optimise individual consideration during their contact with athletes are likely to help their athletes cope better with adversity.

Our final hypothesis stated that HPE would moderate the relationship between extraversion and quality of preparation. Across both studies, there was no significant relationship between extraversion and quality of preparation for upcoming competition thereby replicating Woodman et al. (2010). The interaction was significant in study 1 only (university sample). Perhaps in the high-level sports settings, athletes create their own high-performance expectations and rely less on the coach for that source of information regarding competition preparation.

While our findings that transformational leadership behaviours (i.e., HPE, IM) moderate the negative influence of athletes' personality (i.e., extraversion, neuroticism) on training behaviours are novel, it is not the first time that the interaction between athletes' personality and coach's leadership has been examined. For example, Arthur et al. (2011) argued that the personality trait of narcissism would moderate the influence of certain transformational leadership such as fostering acceptance of group goals (FAGG) and HPE on the leader-inspired extra effort. These researchers found that leadership characteristics of FAGG and HPE were less likely to motivate athletes who are high in narcissism to exert more effort in training. Based on those findings, Arthur et al.'s seminal work called for

consideration of athlete characteristics such as narcissism when assessing a coach's impact on athlete engagement in training.

Both Arthur et al.'s (2011) work and the current research highlight important interactions between the athlete's personality and coach leadership upon training. That is, while our results demonstrated that coach delivery of HPE and IM could mitigate the adverse effect of extraversion and neuroticism on concentration and coping with adversity, the other perspective is that certain personality types (i.e., narcissism) could limit any potential positive effects of coach leadership upon athlete training behaviours. Both seem to be essential take-home messages.

***Practical implications***

The current sets of studies show that HPE mitigates the extraversion-distractibility relationship regardless of athlete level or age. However, previous research has shown that high-level athletes and team sports athletes tend to possess higher levels of extraversion than lower-level athletes and athletes who compete in individual sports (see Allen et al., 2013). As the current study and previous research (Woodman et al., 2010) confirm that higher-level extraversion is related to increased distractibility in training (Woodman et al., 2010), the benefit of providing HPE may be more prominent in higher-level athletes than the current set of studies examined. Indeed, providing HPE to challenge athletes physically and mentally are salient aspects of motivation that can drive athletes to strive in training (Newland, Newton, Podlog, Legg, & Tanner, 2015). However, it is important that the delivery of HPE is not limited to setting challenging goals or exclusive performance standards. That is, HPE can also refer to the coach exerting high standards regarding issues that do not directly relate to performance/training (such as being cleanly shaven for competitive matches; Smith, Young, Figgins, & Arthur, 2017).

Our data also found that high levels of IM protects or buffers against the adverse effects of neuroticism and coping with adversity. Since female and younger athletes on average tend to be higher in neuroticism compared to male and older athletes (see Allen et al., 2013), optimising IM to help these groups cope with adversity seems a worthwhile strategy. Further, as high-level sports settings provide substantial threats and challenges (Bell et al., 2013), athletes with high levels of neuroticism in high-level sports settings may not particularly cope well with adversity. These athletes are likely to benefit from their coach optimising IM in order to eliminate or buffer the adverse relationship between neuroticism and coping with adversity. Regarding the delivery of IM, literature has identified the importance of communication between the coach and the athlete (Smith et al., 2017). It is also important that creating an encouraging atmosphere is not only limited to positive encouragement but that coaches should also develop, articulate, and inspire their athletes with an optimal vision for the future (Callow et al., 2009).

Further, across both studies, our data suggest that individualised strategies to meet athletes' different needs (IC) contribute to increased athletes' ability to cope with adversity in training. Importantly, IC seems to be equally beneficial to athletes regardless of their level of neuroticism and level of sporting experience. Regarding the delivery of IC, it is vital that coaches need not only provide athletes with individualised technical and tactical advice and support but also offer individual esteem-related support regarding their specific roles played within the team (Smith et al., 2017).

Our research highlights the importance of an individualised approach in delivering transformational leadership. In a team sport setting, a relevant concern is that while it is common for a coach to apply the same practices towards the whole team in a training session, such practice may not be equally beneficial to each player in the team (Roberts, Woodman, Lofthouse, & Williams, 2014). For example, our data showed that HPE and IM had a weaker

relationship with distractibility and coping with adversity in athletes with low levels of extraversion and neuroticism. The coach may have to find other ways to help such individuals.

Finally, an anonymous reviewer suggested that intellectual stimulation (IS) could also moderate the extraversion-distractibility relationship (as well as HPE), because challenging followers to intellectually solve complex problems may satisfy the extraverts' needs for high arousal. However, this may not be as simple as it first sounds. For example, the delivery of IS may provide support for openness and autonomy (e.g., my coach shows me how to look at difficulties from a new angle or my coach gets me to re-think the way I do things) rather than directly challenging the athletes via HPE (e.g., my coach will not settle for the second best). Indeed, Callow et al.'s (2009) data showed that the correlation between HPE and IS was the weakest among the correlations of all possible pairs of sub-dimensions of transformational leadership, reflecting that HPE and IS are quite different constructs. Therefore, we don't think there is a strong rationale for IS to moderate the extraversion-distractibility relationship. In support of this view, further analyses did not show any significant moderating relationships. However, we agree that IS and its relationship to athletes' quality of training is worthy of future research.

***Limitations and future directions***

There are some limitations to the current set of studies. First, as our participants are team sports athletes, results may not entirely generalise to individual sports. For example, direct interactions and emphatic accuracy tend to be stronger between athletes and coaches in individual settings (Lorimer & Jowett, 2009). Therefore, less distractibility in training may be observed in individual sports settings due to the coach's strict one-to-one monitoring. Second, it is not clear whether the difference in results across studies occurred due to the change of athlete participation level (university vs high-level athletes) and age (elder vs

younger), or whether the results were influenced by the coach (rather than the athlete) rating training behaviours in study 2. We could speculate that the level of sports participation or the level of perceived challenges in training and the age of athletes may be potential moderators. Third, to replicate the findings from Woodman et al. (2010), we used the TIPI (Gosling et al., 2003) to assess extraversion and neuroticism, with only two items in each subscale. Despite improved feasibility for data collection, such an approach may risk researchers missing important characteristics of a given construct.

Another limitation regards the use of single source data in study 1. For example, Arthur, Bastardoz, and Eklund (2017) argued that majority of transformational leadership research has also used single-source data sets leading to concerns regarding causality (see also van Knippenberg & Sitkin, 2013). In addressing this, in study 2 we obtained objective data from the coaches regarding the athletes' training behaviours. In using this approach, we were relatively able to replicate results across studies.

Finally, there may be other personality traits that are potentially harmful to training behaviours. One such candidate could be narcissism. Although the sports context naturally provides opportunities for glory (e.g., being the exceptional performer) that are typically attractive to athletes high in narcissism (Roberts, Woodman, & Sedikides, 2018), training probably offers much less. For example, it may be that coaches who show high levels of HPE would provide a training environment that is more conducive for the narcissist. Future research would do well to further explore other personality types and their effects upon training behaviours. However, given the correlational nature of our research, our data may not provide in-depth practical guidelines. Based on our novel findings, future intervention and qualitative studies should consider how best to implement different transformational leadership behaviours to meet the needs of individual athletes.

***Conclusion***

Our data provide the first evidence that the use of transformational leadership can moderate the potential impairing effect of extraversion and neuroticism on athletes' training behaviours. It may be that the level of the athlete or whether the coach or the athlete completes the training behaviour questionnaire mediates such relationships. However, the current set of provisional findings should guide future research in this area.

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692

Table 1

*Descriptive statistics and correlations between study variables (n = 99)*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| **(1) Extraversion** | - | | | | | | | |
| **(2) Neuroticism** | .08 | - | | | | | | |
| **(3) HPE** | .26** | .15 | - | | | | | |
| **(4) IC** | -.10 | .04 | .35** | - | | | | |
| **(5) IM** | .21* | -.05 | .59** | .50** | - | | | |
| **(6) Distractibility** | .25* | -.09 | -.29** | -.18 | -.23* | - | | |
| **(7) CwA** | .30* | .24* | .37** | .15 | .38** | -.21* | - | |
| **(8) QoP** | .23* | .22* | .27** | -.04 | .17 | -.27** | .48** | - |
| **Mean** | 4.96 | 3.65 | 3.97 | 4.18 | 4.11 | 4.83 | 6.04 | 5.32 |
| **SD** | 1.53 | 1.68 | .83 | 1.54 | .70 | 1.15 | 1.24 | 1.42 |
| **Range** | 0-7 | 0-7 | 0-5 | 0-5 | 0-5 | 0-9 | 0-9 | 0-9 |
| **Alpha** | .67 | .63 | .87 | .79 | .78 | .73 | .76 | .80 |

*Note*. HPE = High Performance Expectations; IC = Individual Considerations; IM = Inspiring Motivation; CwA = Coping with Adversity; QoP = Quality of Preparation.

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

Table 2

*Descriptive statistics and correlations between study variables (n = 84)*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| **(1) Extraversion** | - | | | | | | | |
| **(2) Neuroticism** | - .05 | - | | | | | | |
| **(3) HPE** | .18 | .22* | - | | | | | |
| **(4) IC** | .12 | .16 | .49** | - | | | | |
| **(5) IM** | .06 | .38** | .41** | .61** | - | | | |
| **(6) Distractibility** | .26* | -.12 | -.24* | -.17 | -.12 | - | | |
| **(7) CwA** | -.01 | .02 | .15 | .19 | .04 | -.58* | - | |
| **(8) QoP** | -.04 | .24* | .14 | .14 | .01 | -.56** | .67** | - |
| **Mean** | 5.39 | 3.00 | 4.40 | 4.25 | 4.24 | 3.83 | 6.25 | 6.04 |
| **SD** | 1.31 | 1.41 | .51 | .55 | .58 | 1.88 | 1.79 | 1.60 |
| **Range** | 0-7 | 0-7 | 0-5 | 0-5 | 0-5 | 0-9 | 0-9 | 0-9 |
| **Alpha** | .64 | .62 | .71 | .70 | .72 | .90 | .84 | .86 |

*Note*. HPE = High Performance Expectations; IC = Individual Considerations; IM = Inspiring Motivation; CwA = Coping with Adversity; QoP = Quality of Preparation.

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

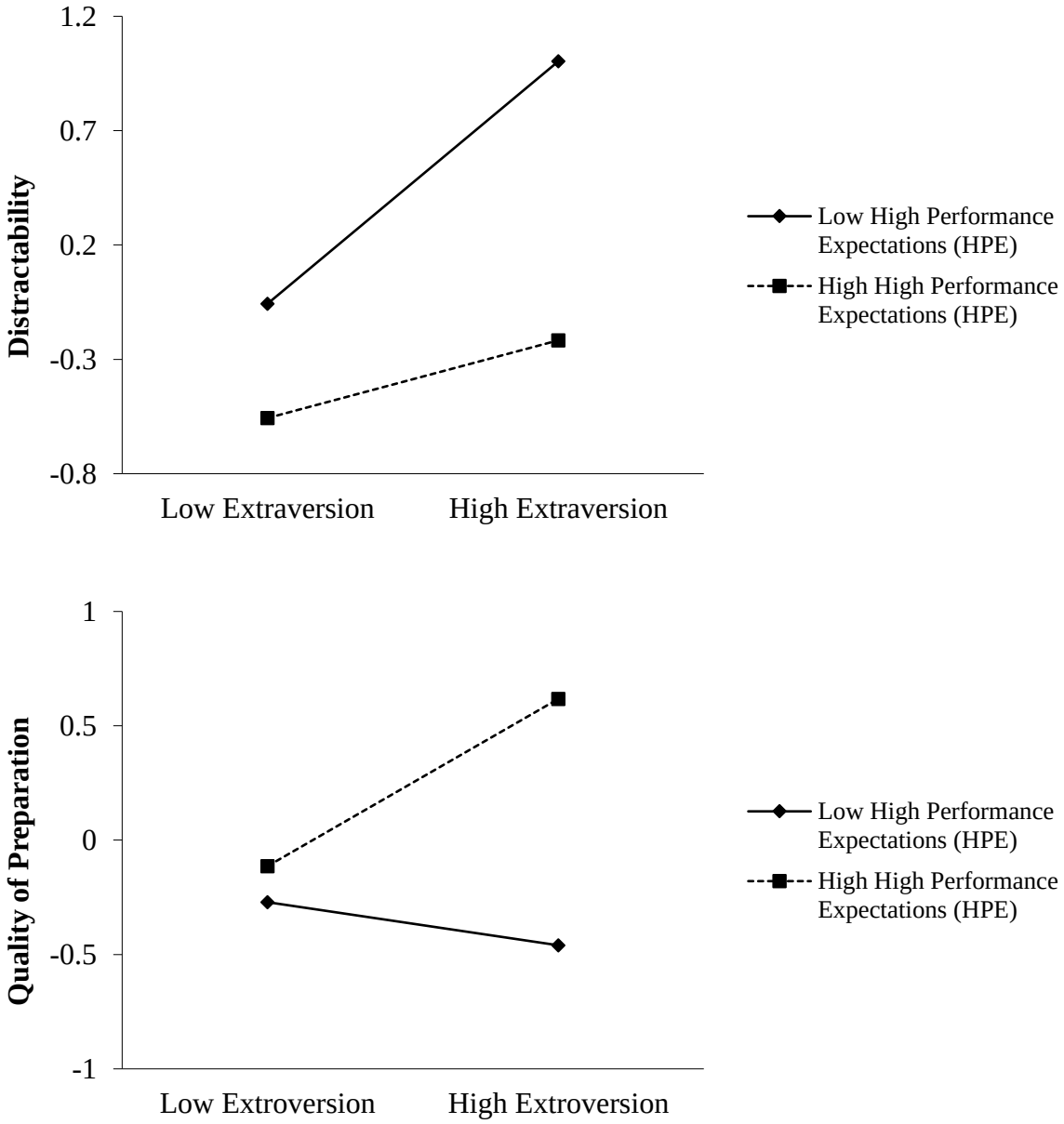


*Figure 1*. The significant interactions between extraversion and HPE on distractibility (top) and quality of preparation (bottom), in University athletes. Regression slopes were derived from regression equations with hypothetical individuals who are one standard deviation below the mean (low) or one standard deviation above the mean (high). All variables were standardised at the team level.

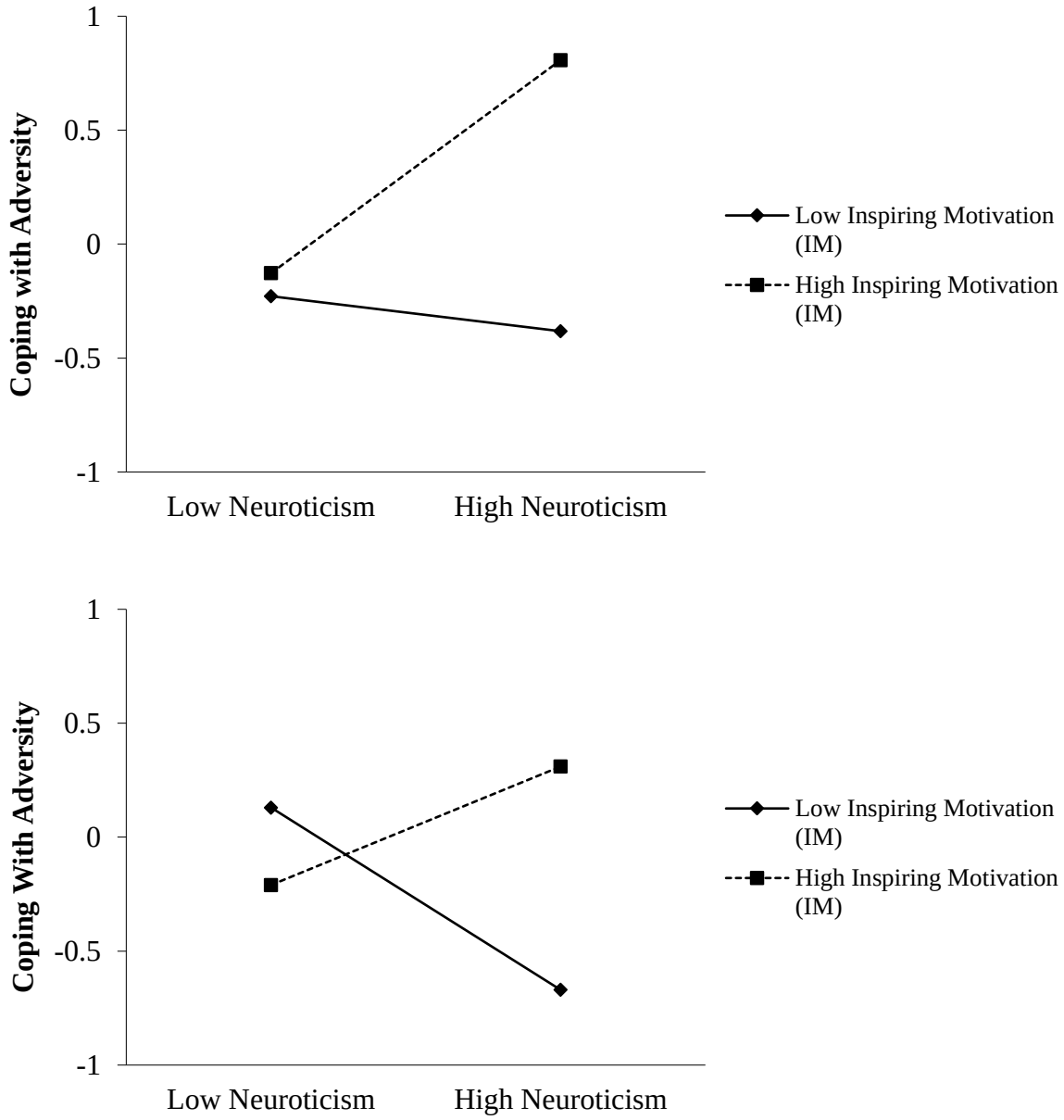


*Figure 2*. The significant interaction between neuroticism and IM on coping with adversity, in University athletes (top) and high-level athletes (bottom). Regression slopes were derived from regression equations with hypothetical individuals who are one standard deviation below the mean (low) or one standard deviation above the mean (high). All variables were standardised at the team level.