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2   Antecedents of Perceived Coach Interpersonal Behaviors: The Coaching Environment and

3   Coach Psychological Well- and Ill-Being

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Abstract

Embedded in the self-determination theory (Deci & Ryan, 2000) framework, we obtained self-report data from 418 paid and voluntary coaches from a variety of sports and competitive levels with the aim of exploring potential antecedents of coaches' perceived autonomy supportive and controlling behaviors. Controlling for socially desirable responses, structural equation modeling revealed that greater job security and opportunities for professional development, and lower work-life conflict were associated with psychological need satisfaction, which, in turn, was related to an adaptive process of psychological well-being and perceived autonomy support towards athletes. In contrast, higher work-life conflict and fewer opportunities for development were associated with a distinct maladaptive process of thwarted psychological needs, psychological ill-being, and perceived controlling interpersonal behavior. The results highlight how the coaching context may impact upon coaches' psychological health and their interpersonal behavior towards athletes. Moreover, evidence is provided for the independence of adaptive and maladaptive processes within the self-determination theory paradigm.

Keywords: Job pressures, occupational health, affect, vitality, emotional and physical exhaustion

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3   The sports coach occupies a central and influential role in the youth sport environment and

4   may affect the quality of an athlete's sport experience through the interpersonal interactions

5   that occur (Amorose, 2007). Athlete-based correlates of coaching behavior have been the

6   focus of considerable research, some of which has utilized self-determination theory (SDT;

7   Deci & Ryan, 2000) as a guiding framework. SDT distinguishes between autonomy

8   supportive and controlling interpersonal styles. An autonomy supportive environment is

9   created when coaches acknowledge their athletes' feelings and perspectives, and provide

10   athletes with opportunities for input and decision-making (Mageau & Vallerand, 2003).

11   Contrastingly, a controlling environment is created when coaches intimidate athletes through

12   verbal abuse and punishment, issue criticism and task-contingent rewards, and pressure

13   athletes into thinking and behaving in certain ways (Bartholomew, Ntoumanis, & Thøgersen-

14   Ntoumani, 2010). Although debated in the wider literature (cf. Soenens, Vansteenkiste, &

15   Sierens, 2009, who suggested that parent promotion of volitional functioning stands in

16   opposition to parental control), sport-based research has found autonomy supportive and

17   controlling coaching styles to be relatively independent (e.g., Pelletier, Fortier, Vallerand, &

18   Brière, 2001). That is, coaches can engage in autonomy supportive and controlling strategies

19   simultaneously, or create an environment which is neither autonomy supportive nor

20   controlling (e.g., a neutral style; Bartholomew et al., 2010). Research is therefore required to

21   examine these interpersonal styles concurrently.

22   A wealth of SDT-based research has documented many beneficial effects of

23   autonomy supportive coaches, as well as deleterious effects of controlling coaches. For

24   instance, athletes who perceive their coach to be autonomy supportive may benefit from

25   enhanced psychological well-being and self-determined motivation (see Amorose, 2007, for a

1   review). Consequences for athletes who perceive their coach as controlling, however, include

2   poor quality motivation and increased likelihood of dropping out (Pelletier, et al., 2001).

3   This evidence suggests that an autonomy supportive coaching style should be

4   promoted and controlling coaching styles diminished, however, scant research addresses

5   potential reasons why coaches employ these contrasting interpersonal styles. Such attention is

6   necessary so that interventions aimed at manipulating coach behavior can target these

7   antecedents. The present study aimed to achieve this by testing a theoretically informed

8   model of potential antecedents of perceived coach interpersonal behavior. Specifically, we

9   examined whether coaches' perceptions of their working environment were associated with

10   their perceived provision of autonomy support or control towards their athletes. Further, we

11   examined coaches' fundamental psychological need fulfillment and frustration, and well- and

12   ill-being as potentially distinct mechanisms that may explain these relationships.

13   **The Social Context and Basic Psychological Needs**

14   A major tenet of SDT is that in order for humans to develop and function optimally,

15   the social context must support their basic psychological needs for competence, autonomy,

16   and relatedness. The need for competence is satisfied when individuals perceive a sense of

17   mastery through effectively interacting with their environment and demonstrating their

18   capabilities. The need for autonomy refers to the desire to feel volitional in the regulation of

19   one's behavior. Last, the need for relatedness concerns the desire to experience a sense of

20   belonging and connection with significant others (Deci & Ryan, 2000). Advocates of SDT

21   suggest that certain social-contextual conditions have the potential to fulfill an individual's

22   basic psychological needs, whereas other conditions may actively undermine their

23   psychological needs (Deci & Ryan, 2000). This proposal is also supported by empirical

24   research. For example, Taylor, Ntoumanis, and Standage (2008) reported that perceived job

25   pressures and perceptions of students' motivation were related to physical education teachers'

1 psychological need satisfaction. Similarly, athletes' psychological needs have been shown to

2 be explicitly thwarted when coaches create a pressurized and controlling training

3 environment (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011).

4 However, scarce research in sport settings has investigated how elements of the coaching

5 context may contribute to the satisfaction or thwarting of coaches' psychological needs. We

6 aimed to fill this void by exploring three salient contextual factors that have the potential to

7 impact upon coaches' psychological needs.

8   In accordance with Schaufeli and Bakker's (2004) Job Demands-Resources model

9 (JD-R model), we aimed to investigate both the favorable (i.e., resources) and unfavorable

10 (i.e., demands) elements of the work-context. Job resources refer to aspects of a job that

11 stimulate personal growth and development, and have been shown to be associated with

12 psychological need satisfaction (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008).

13 As such, we sought to investigate coaches' opportunities for professional development as a

14 job resource. In an interview study with high performance coaches, Allen and Shaw (2009)

15 highlighted that the existence of formalized coaching accreditation pathways, training

16 courses, and informal mentoring initiatives may support coaches' psychological needs and

17 allow them to thrive. Conversely, coaches who experienced a lack of these opportunities felt

18 that their needs were frustrated, and that they were not able to develop professionally. These

19 findings suggest that opportunities for professional development (or lack thereof) have the

20 potential to satisfy (or thwart) coaches' psychological needs.

21   Job security has also been highlighted as a job resource (Bakker & Demerouti, 2007),

22 and the beneficial effects of job security on employees' psychological health have been

23 demonstrated (e.g., Probst, 2003). On the other hand, low job security has been highlighted in

24 the sport literature as a significant source of stress for coaches (Olusoga, Butt, Hays, &

Maynard, 2009). Adopting a SDT perspective, psychological need satisfaction and thwarting may mediate these relationships.

Contrastingly, job demands are defined within the JD-R model as those aspects of the work context that tax employees' personal capacities and are, therefore, associated with detriments in psychological health. Work-life conflict may be such a demand as it has also been cited as a significant strain on coaches (Olusoga et al., 2009). In the organizational psychology literature, work-family conflict has been positively related to depression (Major, Klein, & Ehrhart, 2002) and work-home interference, as part of a composite factor measuring job demands, has been negatively linked to psychological need satisfaction in a sample of work employees (Van den Broeck, et al., 2008).

Despite our speculations that these contextual factors may satisfy or thwart coaches' psychological needs, these relationships have yet to be formally tested. Filling this gap may provide insight into the social-contextual conditions that are required for coaches to thrive within sport.

Basic Psychological Needs and Psychological Well- and Ill-Being

Basic psychological needs theory (BPNT; Deci & Ryan, 2000), a sub-theory of the wider SDT framework, considers the fulfillment of competence, autonomy, and relatedness to be essential in the development and maintenance of psychological well-being. From the SDT point of view, psychological well-being is often conceptualized as the experience of pleasure and happiness (i.e., positive affect), in conjunction with a state of positive, internal energy known as subjective vitality (Ryan & Frederick, 1997). Research in the sporting domain, including a sample of sports coaches, has demonstrated a positive relationship between psychological need satisfaction and indices of psychological well-being at both the daily and general levels (e.g., Gagné, Ryan, & Bargmann, 2003; Stebbings, Taylor, & Spray, 2011). In contrast, the undermining effects of psychological need thwarting will result in costs for

psychological health (Deci & Ryan, 2000). However, psychological ill-being is not merely

reflected in the absence of positive affect or vitality, but in the presence of negative affect and

explicit psychological malfunction, such as emotional and physical exhaustion (Maslach &

Leiter, 1997; Watson, Tellegen, & Clark, 1988). Thus, psychological well-being and ill-being

represent distinct concepts.

Despite the hypothesis that need thwarting is associated with psychological

malfunction, links between low need satisfaction and indices of ill-being have been

unsubstantiated in several instances (e.g., Gagné et al., 2003; Quested & Duda, 2010). Recent

conceptual advancements which define psychological need thwarting as conceptually distinct

from low need satisfaction may explain this lack of significant association. Specifically, low

need satisfaction is posited to reflect an individual's dissatisfaction with the extent to which

their needs are being met (e.g., a person struggles to develop meaningful relationships with

his or her teammates), whereas need thwarting reflects the overt frustration of an individual's

needs (e.g., a person feels actively rejected by his or her teammates; Bartholomew

Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Weak negative correlations between need

thwarting and need satisfaction subscales (between $r = -.21$ to $-.27$) as well as exploratory

factor analyses support the contention that need thwarting and need satisfaction represent

different concepts (Bartholomew Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011).

Psychological need thwarting has been shown to be more strongly associated with

psychological ill-being at both the general and daily levels, compared to low psychological

need satisfaction (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011).

Overall, the independence of need satisfaction and thwarting, combined with the

independence of psychological well-being and ill-being, suggests that two distinct processes

may exist. On the one hand, satisfaction of individuals' psychological needs may lead to

enhanced psychological health and optimal functioning. In contrast, ill-being and

psychological malfunction are likely to occur if one's needs are explicitly thwarted.

Psychological Well- and Ill-Being and Interpersonal Behavior

A substantial body of evidence details the links between a positive affective and

energized state and numerous interpersonal behaviors, including spontaneous interactions

with others, helping and altruism, bargaining, negotiating, persuasive communication, and

positive teaching behaviors in classroom settings (see Forgas, 2002, for a review; Klussman,

Kunter, Trautwein, Lüdtke, & Baumert; 2008). Coaching-based work by Stebbings et al.

(2011) demonstrated a strong positive relationship between a coach's sense of psychological

well-being and perceived autonomy supportive coaching style, yet a much weaker, negative

relationship between psychological well-being and their perceived use of a controlling

interpersonal style. This suggests that other constructs may be more salient than well-being in

predicting controlling behavior and the differentiation between well- and ill-being detailed

above may help in solving this issue.

Within the healthcare context, evidence exists that physicians' experience of burnout

impaired the quality of interactions with their patients, including less understanding of the

individual needs of patients, and being less courteous, caring and attentive to patients,

compared to physicians with low levels of burnout (Shirom, Nirel, & Vinokur, 2006).

Similarly, teachers' emotional exhaustion has been associated with their use of

psychologically controlling teaching strategies (Soenens, Sierens, Vansteenkiste, Dochy &

Goossens, in press). In light of this evidence, it is possible that a coach's controlling

interpersonal style is better predicted by psychological ill-being, compared to well-being,

however, research has yet to explicitly test this relationship in any domain.

Summary and Hypotheses

1   A considerable amount of SDT-based research has explored how coaches'

2   interpersonal behavior can influence athletes' psychological experiences in sport, however,

3   scant research has considered potential antecedents of coaches' interpersonal style,

4   particularly with regards to the coaching environment. As an exception, Stebbings and

5   colleagues (2011) found that coaches' autonomy and competence need satisfaction was

6   related to their psychological well-being, which, in turn predicted their perceived

7   interpersonal behavior towards their athletes. The present study extends this work in several

8   ways. First, we investigated how elements of the coaching context can satisfy versus frustrate

9   coaches' basic psychological needs. Second, the current study examines whether autonomy

10   supportive and controlling interpersonal styles have distinct antecedents, by examining both

11   psychological need satisfaction and thwarting, and psychological well- and ill-being,

12   concurrently. Last, the present research proposes that when coaches function within an

13   adaptive environment, this will indirectly lead coaches to create a healthy interpersonal

14   climate for their athletes; a process that has yet to be addressed.

15   We hypothesized that greater perceived opportunities for professional development

16   and job security, as well as lower work-life conflict, would be associated with higher

17   psychological need satisfaction and lower psychological need thwarting. Second, based upon

18   BPNT-based research (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Stebbings,

19   et al., 2011), it was hypothesized that following these antecedents, two distinct processes

20   would ensue. We proposed that coaches' psychological need satisfaction would positively

21   predict their psychological well-being, whereas psychological need thwarting would

22   positively predict their psychological ill-being. In line with Bartholomew and colleagues, we

23   also predicted that psychological need satisfaction and need thwarting would be correlated. In

24   turn, psychological well-being was proposed to positively predict coaches' perceptions of

25   their autonomy support towards their athletes, whereas psychological ill-being was

hypothesized to positively predict perceptions of their controlling behavior. Existing research

has demonstrated a moderate negative correlation between coach autonomy supportive and

controlling behavior (Stebbings et al., 2011), hence, we hypothesized a similar relationship.

We also included a measure of social desirability to control for coaches' tendency to respond

to items about their behaviors towards others in a socially desirable manner.

To fully explore the processes outlined in our hypothesized model, we also examined

the indirect relationships between the social-contextual factors and perceived coaching styles.

As such, we aimed to offer initial, cross-sectional substantiation that creating an adaptive

environment for coaches (in which they can enjoy a sense of job security, opportunities for

professional development, and a stable work-life balance) may lead coaches to create an

adaptive interpersonal environment for their athletes because they psychologically thrive.

Last, consistent with recommendations by Stebbings et al. (2011), we examined the

invariance of the proposed model across competitive level.

Method

Participants and Procedures

Following approval from a university ethics committee, the study was conducted

according to APA guidelines. Coaches who consented to participate responded to a multi-

section online questionnaire that took approximately 25 minutes to complete. The sample

comprised 418 coaches (306 male, 112 female; M age = 43.68 years, SD = 14.41, range = 18-

78 years), recruited via national governing bodies and sports club websites. Coaches were

involved at the recreational ($n = 66$), club ($n = 187$), county ($n = 86$), national ($n = 51$), and

international/professional ($n = 28$) levels, and represented one of 32 sports. Coaches had, on

average, 13.60 ($SD = 10.79$) years of coaching experience, and spent 10.14 ($SD = 10.68$)

hours per week coaching. Coaches reported their job status as either paid in a full-time role (n

= 60), paid in a part-time role (*n* = 132), full-time volunteer (*n* = 12), part-time volunteer (*n* = 173), or other (a combination of paid and voluntary work, *n* = 41).

Measures

The coaching context. Due to the lack of existing measures that assesses the relevant contextual factors within coaching settings, a 12-item scale was compiled for the purpose of this study following a review of the coaching and organizational literature. Four items were created to assess opportunities for professional development based on the types of opportunities that have been reported as pertinent to sport coaches (Allen & Shaw, 2009; e.g., "I am provided with ongoing training in coaching techniques"). Job security was assessed using the two-item job security subscale of Chelladurai and Ogasawara's (2003) Coach Satisfaction Questionnaire, which was supplemented with two additional created items (e.g., "I am satisfied with my job security"). Four items assessing work-life conflict were adapted from the Work-Family Conflict Scale (Netemeyer, Boles, & McMurrian, 1996) to reflect general sources of conflict, as opposed to referring to those pertaining to the family, specifically (e.g., "The demands of coaching interfere with my other roles in life"). Participants were asked to reflect on their coaching environment over the last month, and rate the extent to which each statement was true on a seven-point scale anchored by 1 (*not at all true*) and 7 (*very true*).

Psychological need satisfaction. Satisfaction of competence, autonomy, and relatedness was measured using the Basic Need Satisfaction at Work Scale (BNSAW; Deci et al., 2001) adapted to the coaching context. In line with modifications suggested by Ntoumanis (2005), only the 12 positively worded items were used. Competence was assessed using three items (e.g., "I have been able to learn interesting new skills through coaching"), autonomy was assessed using four items (e.g., "I feel like I can make a lot of inputs into deciding how my coaching gets done"), and relatedness was assessed using five items (e.g.,

1   "People I interact with in my coaching role care about me"). Coaches were asked to consider

2   their coaching experiences over the last month and rate the extent to which they agreed with

3   each of the statements on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

4   Previous research has found the positively-worded BNSAW items to possess adequate

5   factorial validity and internal consistency in a sample of secondary school students

6   (Ntoumanis, 2005).

7   **Psychological need thwarting.** The 12-item Psychological Need Thwarting Scale

8   (PNTS; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) was adapted to the

9   coaching context to measure the thwarting of coaches' psychological needs. Competence,

10   autonomy, and relatedness were each assessed using four items, for example, "In my

11   coaching role, there are times when I am told things that make me feel incompetent", "I feel

12   pushed to coach in certain ways", and "In my coaching role, I feel rejected by those around

13   me", respectively. Coaches were asked to rate the extent to which they agreed with each of

14   the statements for their coaching experiences over the last month, on a scale ranging from 1

15   (*strongly disagree*) to 7 (*strongly agree*). Bartholomew and co-workers reported good

16   internal reliability, factorial validity and predictive validity in a sample of adolescent athletes.

17   **Psychological well-being.** Items assessing coaches' positive affect and subjective

18   vitality were used to measure coaches' psychological well-being. Positive affect was

19   measured using the 10-item positive affect subscale from the Positive And Negative Affect

20   Scale (PANAS; Watson et al., 1988). Coaches indicated the extent to which they had

21   experienced positive emotions (e.g., "Excited", "Determined", and "Enthusiastic") whilst

22   coaching during the last month on a five-point scale ranging from 1 (*not at all or very*

23   *slightly*) to 5 (*extremely*). Watson et al. (1988) reported acceptable factorial validity and

24   internal consistency of the subscale.

1   Coaches' subjective vitality was measured using the seven-item Subjective Vitality

2   Scale (Ryan & Frederick, 1997), which assessed the degree to which participants felt

3   psychologically vigorous and energized whilst coaching during the last month. Items were

4   preceded by the stem, "When I am coaching…" (e.g., "When I am coaching, I nearly always

5   feel alert and awake"), and required coaches to rate their experiences on a seven-point scale

6   ranging from 1 (*not at all true*) to 7 (*very true*). Ryan & Frederick (1997) found the scale to

7   have good internal consistency and factorial structure.

8   **Psychological ill-being.** Items assessing coaches' negative affect and emotional and

9   physical exhaustion were used to measure coaches' psychological ill-being. Negative affect

10   was measured using the 10-item negative affect subscale from the PANAS. Coaches

11   indicated the extent to which they had experienced negative emotions (e.g., "Distressed",

12   "Irritable", and "Upset") whilst coaching during the last month, on a five-point scale ranging

13   from 1 (*not at all or very slightly*) to 5 (*extremely*). Watson et al. (1988) reported acceptable

14   factorial validity and internal consistency of the subscale.

15   Coaches' emotional and physical exhaustion was assessed using the respective five-

16   item subscale of the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001), adapted

17   to the coaching context. Coaches were asked to rate the extent to which they had experienced

18   each of the statements (e.g., "I am exhausted by the mental and physical demands of

19   coaching") over the past month, on a five-point scale ranging from 1 (*almost never*) to 5

20   (*almost always*). Raedeke and Smith (2001) reported that the subscale possesses adequate

21   factorial structure and internal reliability.

22   **Coach autonomy supportive style.** The six-item version of the Health Care Climate

23   Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996) adapted to the sport

24   context was used to assess coaches' perceptions of their autonomy supportive behavior.

25   Coaches were asked to reflect on their coaching practices over the last month and rate the

1 extent to which they agreed with each of the items (e.g., "I encourage my athletes to ask

2 questions") on a seven-point scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*).

3 Previous research has similarly adapted the HCCQ items and found them to have acceptable

4 internal consistency and factorial validity (Stebbings et al., 2011).

5   **Coach controlling style.** Coaches' perceptions of their controlling interpersonal style

6 were assessed using the 15-item Controlling Coach Behaviors Scale (CCBS; Bartholomew, et

7 al., 2010), which was modified to reflect a coach's perspective. The measure assesses four

8 types of controlling behaviors, including coaches' controlling use of rewards (e.g., "I only

9 reward/praise my athlete(s) to make them train harder"), negative conditional regard (e.g., "I

10 pay my athletes less attention if they displease me"), intimidation (e.g., "I embarrass my

11 athletes in front of others if they do not do certain things"), and excessive personal control

12 (e.g., "I try to control what my athletes do during their free time"). Coaches were asked to

13 rate the extent to which they agreed with each of the statements for their coaching practices

14 over the last month, on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

15 Stebbings et al. (2011) similarly adapted the CCBS and reported acceptable factorial validity

16 and internal consistency.

17   **Social desirability.** A short form of the Marlowe-Crowne social desirability scale

18 (Strahan & Gerbasi, 1972) was administered to assess participants' tendency to respond to

19 questions in a socially desirable manner. Coaches were required to rate 10 items as either true

20 or false. A socially desirable response carried a weighting of one, with a non-socially

21 desirable answer scoring zero. The scores were then summed to produce a social desirability

22 score for each participant. Reynolds (1982) demonstrated acceptable validity of the scale.

23   **Results**

24 **Preliminary Analyses**

1   There were no missing data as the online questionnaire program automatically

2   prompted participants to complete a missed item. The univariate skewness values of the study

3   variables ranged from -.08 to 1.37, and the univariate kurtosis values ranged from .10 to 5.02,

4   suggesting that all variables were within acceptable ranges (e.g., skewness <3.0 and kurtosis

5   <10.0; Kline, 2010).

6   Data were analysed via structural equation modeling using EQS software (version 6.1;

7   Bentler, 2003). A combination of fit indices were examined to evaluate the degree of model

8   fit, including the Satorra-Bentler Chi Square Statistic (S-Bχ^2), the standardized root mean

9   square residual (SRMR), the robust comparative fit index (CFI), and the robust root mean

10   square error of approximation (RMSEA). Hu and Bentler (1999) proposed that excellent fit of

11   a hypothesized model to the data is indicated when the primary SRMR fit index is below .08,

12   and supplementary indices, such as the CFI and RMSEA, are close to .95 and .06,

13   respectively. For more complex models, such as the one in the present study, these criteria

14   have been highlighted as harsh and restrictive (Marsh, Hau, & Wen, 2004), and therefore CFI

15   values of above .90, and SRMR and RMSEA values of below .08 are typically recognized as

16   acceptable.

17   Before examination of the full structural model, confirmatory factor analysis (CFA)

18   was carried out to determine the factor structure of the scales utilized. The scale assessing

19   perceptions of the coaching context showed some degree of misfit to the data: S-Bχ^2 (54) =

20   172.08, $p < .001$; SRMR = .14; CFI = .94; RMSEA = .07 (90% Confidence Interval [CI] =

21   .06-.08), however, inspection of the Lagrange Multiplier (LM) modification indices

22   suggested that the addition of a covariance pathway between opportunities for professional

23   development and job security would reduce the level of misspecification. This pathway was

24   added because it is plausible that a coach may feel more secure in his or her job when offered

25   opportunities for professional development. Similarly, coaches who enjoy a sense of job

1   security may look to strengthen or further their position by seeking out opportunities for

2   professional development. The revised factor structure showed improved fit: S-Bχ^2 (53) =

3   81.11, $p < .001$; SRMR = .04; CFI = .99; RMSEA = .04 (CI = .02-.05).

4   The BNSAW also demonstrated inadequate factor structure: S-Bχ^2 (51) =143. 99, $p <$

5   .001; SRMR = .06; CFI = .89; RMSEA = .07 (CI = .05-.08). Examination of the standardized

6   loadings and standardized residuals revealed two problematic items from the relatedness

7   subscale ("I get along with people in my coaching role" and "I consider the people I interact

8   with in my coaching role to be friends"), hence, these items were removed from the analysis.

9   The revised BNSAW showed good factor structure: S-Bχ^2 (32) = 69.07, $p < .001$; SRMR =

10   .04; CFI = .94; RMSEA = .05 (CI = .04-.07). Similarly, the CFA for psychological ill-being

11   revealed poor factor structure: S-Bχ^2 (89) = 318.49, $p < .001$; SRMR = .08; CFI = .88;

12   RMSEA = .08 (CI = .07-.09). Removal of one item ("Scared") from the negative affect scale

13   led to acceptable factor structure: S-Bχ^2 (76) = 204.96, $p < .001$; SRMR = .07; CFI = .92;

14   RMSEA = .06 (CI = .05-.07). Variable reduction procedures of this nature are justified

15   because the original factor structure is retained, whilst using only the best performing

16   indicators (Hofmann, 1995).

17   The CFA for psychological well-being demonstrated satisfactory factor structure: S-

18   Bχ^2 (118) = 266.11, $p < .001$; SRMR = .05; CFI = .92; RMSEA = .06 (CI = .05-.06), as did

19   the scales assessing psychological need thwarting: S-Bχ^2 (51) = 95.55, $p < .001$; SRMR =

20   .05; CFI = .95; RMSEA = .05 (CI = .03-.06), coach autonomy support: S-Bχ^2 (9) = 27.44, $p <$

21   .001; SRMR = .04; CFI = .93; RMSEA = .07 (CI = .04-.10), coach control: S-Bχ^2 (86) =

22   126.90, $p < .001$; SRMR = .05; CFI = .97; RMSEA = .03 (CI = .02-.05), and social

23   desirability: S-Bχ^2 (35) = 65.16, $p < .001$; SRMR = .05; CFI = .90; RMSEA = .05 (CI = .03-

24   .06).

25   **Descriptive Statistics and Scale Reliabilities**

1   Cronbach's alpha coefficients were calculated for each subscale and are presented in

2 Table 1. All subscales demonstrated acceptable ($\alpha \geq .66$) reliability, except for the

3 competence need satisfaction subscale ($\alpha = .53$) and the excessive personal control subscale (α

4 $= .60$). This may be attributable to the low number of items to measure the constructs (3 items

5 in each subscale; Cortina, 1993), therefore, we retained these subscales because all the

6 observed items loaded strongly onto their corresponding latent factors (i.e., $> .40$; Ford,

7 MacCallum, & Tait, 1986). Further, these items were used to calculate average competence

8 need satisfaction and excessive personal control scores, which were subsequently used as

9 indicators of the psychological need satisfaction and controlling behavior latent factors,

10 respectively. Means and standard deviations of all study variables are presented in Table 1.

11 Paid coaches were marginally more autonomy supportive than voluntary coaches (paid

12 coaches, $M = 5.83$, $SD = .73$; voluntary coaches, $M = 5.57$, $SD = .88$; $p < .05$), however, there

13 were no significant differences between the two groups in controlling behaviors (paid

14 coaches, $M = 2.14$, $SD = .80$; voluntary coaches, $M = 2.10$, $SD = .83$; $p > .05$). Bivariate

15 correlations among latent factors (Table 2) are provided for information only as they do not

16 relate to the study hypotheses. Nonetheless, it is worth noting that there was no evidence of

17 multicollinearity, as all correlations were below .70 (Tabachnick & Fidell, 1996).

18 **A Structural Model of Antecedents of Perceived Coach Behaviors**

19   In order to maintain an acceptable ratio of participants per estimated parameter, the

20 number of indicators in the model was reduced where applicable (Bentler & Chou, 1987).

21 The items measuring opportunities for professional development, job security, and work-life

22 conflict were retained as indicators of these three latent factors. The competence, autonomy,

23 and relatedness need satisfaction and need thwarting subscales were used as indicators of

24 overall need satisfaction and need thwarting latent factors, respectively. The positive affect

25 and vitality subscales were used as indicators of a psychological well-being factor, whereas

1   the negative affect and emotional and physical exhaustion subscales were used as indicators

2   of a psychological ill-being factor. The six items from the HCCQ were parcelled to create

3   three indicators of an autonomy support latent factor, and the four subscale mean scores of

4   the CCBS were used as indicators of coaches' perceived controlling style. Finally, social

5   desirability was represented by a single observed variable in the interest of model parsimony,

6   and because it was not part of the primary study hypotheses.

7   The proposed model was tested using the robust maximum likelihood estimation

8   method (Mardia's normalized estimate of multivariate kurtosis = 28.60). Model indices

9   demonstrated that the fit of the hypothesized model was marginally unsatisfactory: $S\text{-}B\chi^2$

10     $(391) = 853.39$, $p < .001$; SRMR = .07; CFI = .89; RMSEA = .05 (CI = .05-.06). Examination

11   of the LM modification indices suggested the addition of one direct pathway from work-life

12   conflict directly to ill-being. This pathway was subsequently included because previous

13   research has demonstrated similar relationships (although the mediational properties of

14   psychological need thwarting were not tested; Major et al., 2002). With the addition of this

15   pathway, model fit indices demonstrated an acceptable fit to the data (see Figure 1): $S\text{-}B\chi^2$

16     $(390) = 811.67$, $p < .001$; SRMR = .07; CFI = .90; RMSEA = .05 (CI = .05-.06).

17   Standardized factor loadings of the indicators in the revised structural model ranged from .41

18   to .90 (median loading $\beta = .72$).[1,2]

19   Coaches reported greater psychological need satisfaction when they perceived that

20   opportunities for professional development existed, their job was secure, and coaching did

21   not conflict with other roles. Conversely, coaches reported greater psychological need

22   thwarting when opportunities for development were not perceived to exist, and when

23   coaching conflicted with other responsibilities. The relationship between job security and

24   psychological need thwarting was non-significant. As discussed above, work-life conflict was

25   also a direct positive predictor of psychological ill-being. Coaches who perceived their

psychological needs to be satisfied experienced enhanced psychological well-being, which, in

turn, predicted coaches' perceived use of autonomy support. Similarly, coaches who

perceived their psychological needs to be actively thwarted experienced greater psychological

ill-being, which, in turn, predicted coaches' perceived use of control. Moderate negative

associations were observed between psychological need satisfaction and need thwarting, and

autonomy support and control, respectively. Lastly, social desirability demonstrated a

moderate positive association with perceived autonomy support and a moderate negative

association with a controlling interpersonal style.

The three coaching contextual factors accounted for 32% and 18% of the variance in

coaches' need satisfaction and need thwarting, respectively. Coaches' need satisfaction

accounted for 71% of the variance in psychological well-being, and need thwarting, in

conjunction with work-life conflict, accounted for 71% of the variance in psychological ill-

being. Finally, psychological well-being and ill-being accounted for 55% and 36% of the

variance in coaches' perceived autonomy support and control, respectively.

Indirect Effects

To calculate indirect effects, bootstrapping analyses were performed. Bootstrapping

techniques treat the sample as a pseudopopulation from which multiple samples are drawn

(Kline, 2010). To obtain the standardized indirect path coefficients and associated 95%

confidence intervals (CI), parameter estimates derived from 1000 bootstrap samples were

examined. When the bootstrap-generated 95% CI does not contain zero, the indirect effect is

deemed to be significant (Shrout & Bolger, 2002).

Opportunities for professional development positively predicted perceived autonomy

support through psychological need satisfaction and well-being ($\beta = .18$, 95% CI = .09 to

.27), and negatively predicted perceived control through psychological need thwarting and

ill-being ($\beta = -.06$, 95% CI = -.11 to -.02). Job security positively predicted autonomy support

1 through psychological need satisfaction and well-being (β = .19, 95% CI = .10 to .29), yet did

2 not predict perceived control (β = -.03, 95% CI = -.07 to .01). Work-life conflict negatively

3 predicted perceived autonomy support through psychological need satisfaction and well-

4 being (β = -.08, 95% CI = -.14 to -.01), and positively predicted perceived control through

5 psychological need thwarting and ill-being (β = .10, 95% CI = .06 to .16).

6 **Invariance Across Competitive Levels**

7 Using the procedures outlined by Byrne (2006), multi-sample structural equation

8 modeling was employed to examine the equality of the model across coaches working at

9 different competitive levels (lower level = recreational and club; higher level = regional,

10 national, and international/professional). This involved constructing separate baseline models

11 for each group and an unconstrained baseline multigroup model, followed by three

12 increasingly constrained models in which the factor loadings, factor variances and

13 covariances, and structural paths were constrained to be equal. As the pathway between job

14 security and psychological need thwarting was not significant in the full model, this was

15 excluded from the following analyses. The baseline model for lower competitive levels

16 revealed that the structural pathway between work-life conflict and psychological need

17 satisfaction was non-significant. The multigroup baseline model showed acceptable fit to the

18 data: S-Bχ^2 (782) = 1194.73, p < .001; SRMR = .07; CFI = .90; RMSEA = .03 (CI = .03-.04).

19 After constraining the factor loadings to be equal, five were found to vary across groups

20 (these loadings were associated with the work-life conflict, psychological need satisfaction,

21 and need thwarting factors). Nonetheless, the equality constraints placed on the factor

22 variances, covariances and structural pathways were all upheld. An equality constraint was

23 not placed on the structural pathway between work-life conflict and psychological need

24 satisfaction, due to its non-significance for lower level coaches. Unstandardized parameter

25 coefficients (Hair, Anderson, Tatham, & Black, 1998) were b = -.02, and b = -.09, for lower

1 and higher level coaches, respectively. The fit of the most restrictive model was acceptable:

2 S-Bχ^2 (816) = 1227.40, p < .001; SRMR = .08; CFI = .90; RMSEA = .03 (CI = .03-.04) and

3 the decrease in CFI value compared to the unconstrained multigroup model was less than .01,

4 which is considered to be indicative of model invariance (Cheung & Rensvold, 2002).

5 **Discussion**

6 The purpose of the current study was to test a BPNT-based model of potential

7 antecedents of perceived coach interpersonal behavior. Controlling for socially desirable

8 responses, the results suggest that perceived opportunities for professional development, job

9 security, and work-life conflict may satisfy and thwart coaches' psychological needs. In turn,

10 the results demonstrate the existence of two distinct pathways, in which psychological need

11 satisfaction was associated with psychological well-being and an adaptive interpersonal style,

12 whereas psychological need satisfaction was associated with psychological ill-being and a

13 maladaptive interpersonal style. These relationships were also found to be largely invariant

14 across competitive level. In their entirety, the current results enhance the prevailing literature

15 by suggesting that two distinct processes may explain how the environment in which coaches

16 operate is related to their interpersonal behavior towards their athletes. We now discuss each

17 stage of the proposed model in turn.

18 **The Social Context and Basic Psychological Needs**

19 In line with previous qualitative work (Allen & Shaw, 2009), coaches who perceived

20 that they were provided with opportunities for professional development reported greater

21 psychological need satisfaction, compared to coaches who did not have such opportunities.

22 These educational opportunities may foster coaches' competence through increased

23 knowledge and experience, increase their perceived value of coaching, and allow coaches to

24 engage with other coaching peers. Contrastingly, opportunities for professional development

25 demonstrated a small to moderate negative relationship with psychological need thwarting. If

coaches are not extended professional development opportunities, they may feel isolated

without the opportunity to engage with peers and that they are being prohibited from

developing their coaching skills, leading to a sense of reduced competence.

Job security also emerged as a moderate positive predictor of psychological need

satisfaction, an association that no other research has examined. If coaches feel secure in their

role they may attribute this to their proficiency and effectiveness as a coach. A secure

position may also allow coaches the freedom to go about their work as they wish. Last, if

coaches perceive a strong sense of job security from their employers or organizations, this

may facilitate coaches' sense of belongingness within that organization. Job security,

however, did not demonstrate a significant relationship with psychological need thwarting. A

lack of job security may lead to low need satisfaction, however, it is plausible that only when

coaches are actively made to feel insecure about their job position would overt thwarting of

coaches' psychological needs occur. Indeed, evidence exists in the occupational psychology

literature, in which job insecurity has been cross-sectionally and longitudinally associated

with indices of poor psychological health (see Sverke, Hellgren, & Näswall, 2006, for a

review). Future research is warranted to clarify the definitions of job security versus

insecurity within coaching, and assess their differential effects on psychological need

satisfaction and thwarting.

Within the present study, evidence was found for a direct relationship between work-

life conflict and psychological ill-being, which is consistent with previous research in the

organizational domain (e.g., Major, et al., 2002). Yet in accordance with the work of Van den

Broeck and colleagues (2008), our findings also highlight the mediating role of basic

psychological needs, as coaches operating at high competitive levels (i.e., regional level and

above) who experience conflict between coaching and other life roles are likely to experience

low satisfaction and high overt frustration of their psychological needs. For example, if

1 coaches experience conflicting demands for their time and energy, they may feel as if they

2 cannot function effectively in their coaching roles, and that their coaching practices are

3 incompatible with other elements of their sense of self. Conflicting demands may also impact

4 negatively upon coaches' relationships with their athletes, employers and organizations. The

5 relationship between work-life conflict and psychological need satisfaction, however, was

6 non-significant for coaches operating at the recreational and club competitive levels. The

7 majority of coaches working at the lower competitive levels reported coaching for fewer than

8 10 hours per week, suggesting that coaching may not be a primary responsibility for many of

9 them. It is possible that work-life conflict may not be a salient issue for these coaches.

10   The present study represents the first quantitative insight into how the social context

11 can satisfy or thwart coaches' basic psychological needs. As a result, these findings offer

12 several implications for sports organizations and practitioners to create a more adaptive

13 working environment for coaches. Employers should aim to work alongside coaches in

14 facilitating a sense of job security, to provide opportunities for further education and training,

15 and to limit conflict between their coaching role and other responsibilities. For example,

16 sporting bodies and coaches could discuss the future plans of the organization, and how the

17 coach's role remains relevant within those plans. Formal educational pathways could be

18 created that allow coaches to plan their coaching development and financial assistance could

19 be made available for the coaches to partake in these training opportunities. Organizations

20 could look to offer childcare facilities, provide opportunities for families to attend

21 tournaments alongside the coach (Shaw & Allen, 2009), and potentially look to increase

22 flexibility with regards to working days and number of working hours. Finally, organizations

23 could also create coaching partnerships in which two or more coaches share the

24 responsibilities of preparing an athlete or team for competition, thus, allowing coaches to

25 negotiate which duties each will perform, at times which are convenient for each coach.

Basic Psychological Needs and Psychological Well- and Ill-Being

Aligned with BPNT and previous research in the sport domain (e.g., Stebbings et al., 2011), results of the current study indicate that psychological need satisfaction was a strong predictor of psychological well-being, as indexed by positive affect and subjective vitality. This suggests that satisfying coaches' needs for competence, autonomy, and relatedness in their coaching role may allow coaches to psychologically thrive within that role. Contrastingly, the manifestation of psychological ill-being was predicted by the experience of psychological need thwarting, which is also in accordance with previous research (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011). This suggests that a coach may experience heightened negative affect and emotional and physical exhaustion if they perceive the satisfaction of their psychological needs to be actively obstructed. Such findings provide support for Bartholomew and colleagues' supposition for the independence of psychological need thwarting and need satisfaction. It is important, therefore, that social agents (e.g., head coaches, performance directors, club managers, sport psychologists) aim to explicitly facilitate coaches' psychological needs while concurrently minimizing exposure to need thwarting environmental cues, particularly through the social-contextual factors outlined in the present study.

Psychological Well- and Ill-Being and Interpersonal Behavior

In line with Stebbings et al. (2011), results from the current study indicate that coaches' psychological well-being was a strong positive predictor of their perceived autonomy support towards their athletes. Therefore, a coach who possesses sufficient positive emotions and internal energy is likely to offer their athletes opportunities for input, decision-making, taking responsibility, and to acknowledge their athletes' feelings, ideas and opinions regarding training sessions and competitions. Such autonomy supportive strategies have been consistently shown to facilitate adaptive athlete consequences, such as self-determined

1   motivation and enhanced psychological well-being (see Amorose, 2007). Stebbings et al also

2   demonstrated that coaches' psychological well-being was a negative predictor of perceived

3   controlling behaviors; however, only 16% of the variance in controlling behaviors was

4   accounted for. We build on this proposal by reporting that coaches' psychological ill-being

5   was a stronger predictor of their perceived controlling behaviors towards their athletes; a

6   relationship which no previous research has examined. Moreover, by including ill-being in

7   the present study, a much greater percentage of variance in controlling behaviors was

8   accounted for (36%). If coaches experience psychological ill-being in their coaching roles,

9   their depleted internal energy and negative emotions may lead them to become more critical,

10   directive and punitive towards their athletes than their psychologically healthy counterparts.

11   In view of these findings, the current study contributes to the existing literature by suggesting

12   that the two SDT-based interpersonal styles may have distinct antecedents, and both

13   psychological well- *and* ill-being should be considered when predicting interpersonal

14   behavior.

15   **Indirect Effects**

16   As well as the direct effects discussed above, a number of significant indirect effects

17   also emerged that provided evidence, albeit cross-sectional, for the implied processes within

18   the conceptual model. Specifically, when coaches operate in a favorable social environment that

19   is supportive of their basic psychological needs, an adaptive process of improved psychological

20   health and greater perceived autonomy support may ensue. Contrastingly, when the social

21   environment serves to undermine coaches' psychological needs, this may result in a maladaptive

22   process of diminished psychological functioning and greater perceived controlling interpersonal

23   behavior. These findings advance the existing literature by suggesting that creating an optimal

24   working environment for coaches may indirectly help to create an adaptive (autonomy

supportive, non-controlling) environment for their athletes, by allowing coaches to

psychologically flourish.

Limitations and Future Directions

First, the present work was cross-sectional in nature, therefore, cross-lagged

longitudinal and experimental designs are warranted to clarify the direction of the processes

proposed in this study. Nonetheless, our cross-sectional model was constructed from a strong

theoretical and empirical research base. Second, the relationships between the 'positive'

factors (i.e., need satisfaction, well-being, and autonomy support), and the 'negative' factors

(i.e., need thwarting, ill-being, and control) may have been susceptible to shared method

variance. Third, the data were based upon self-report instruments; hence, the measurement of

perceived interpersonal behaviors, in particular, may not be an accurate reflection of how

coaches actually behave. Although the inclusion of a social desirability measure may have

conciliated any potential bias, independent observations of coach behavior or athletes' ratings

of coach behavior would complement coaches' own perceptions.

The present model can also be extended from a theoretical and practical perspective.

For example, the model can be extended to incorporate other aspects of coaches'

environment, such as managing multiple roles (e.g., coaching, management, administration),

functioning in an isolated role, and experiencing the lack of a support system (Olusoga et al.,

2009). From an applied perspective, investigation of these social-contextual factors would

add to our understanding of how coaches experience their working environment and highlight

elements of the context on which sporting organizations and sports psychology practitioners

could intervene in order to create the most optimal environment for coaches. Finally,

psychological need satisfaction and need thwarting were included in the present model as

composite latent factors. Future research to delineate the separate effects of social-contextual

factors on each psychological need would be insightful, thereby allowing practitioners to

1   focus on enhancing any specific psychological need in which coaches are experiencing

2   dissatisfaction or overt thwarting. In a similar fashion, future work could examine the relative

3   contributions of the various well-/ill-being indicators on interpersonal behaviors. For

4   instance, the energy-related indicators of well- and ill-being may be stronger predictors of

5   interpersonal style, compared to the affective indicators. Moreover, in the present study,

6   provision of autonomy support and control were operationalized as relatively independent

7   constructs, however, research in the parenting domain also exists to suggest that autonomy

8   support and control represent opposite ends of a continuum (e.g., Soenens, et al., 2009).

9   Future research is required, therefore, to more explicitly examine the relationship between

10   coach autonomy support and control, and whether this relationship may differ as a function of

11   the level at which the behaviors are studied (i.e., domain or situation specific), or as a

12   function of the information source (i.e., athlete perceptions, coach perceptions, or

13   researchers' observed perceptions of coach behavior).

14   **Conclusions**

15   The current research represents the first attempt to determine how elements of the

16   coaching environment influence psychological need satisfaction and thwarting in coaching.

17   We also extend the extant literature by proposing two distinct mechanisms that explain how

18   the coaching context influences coaches' perceived interpersonal style. That is, psychological

19   well-being was more strongly predictive of an autonomy supportive style, whereas

20   psychological ill-being was more strongly associated with a controlling style. In its entirety,

21   the current model suggests that creating an optimal working environment for coaches, in

22   which they can enjoy a sense of job security, opportunities for professional development, and

23   a stable work-life balance, may allow coaches to psychologically flourish. In addition, this

24   adaptive working environment may benefit athletes in terms of the adaptive (autonomy

25   supportive, non-controlling) interpersonal environment that coaches will subsequently create.

References

Allen, J. B., & Shaw, S. (2009). Women coaches' perceptions of their sport organizations' social environment: Supporting coaches' psychological needs? *The Sport Psychologist, 23*, 346-366. Retrieved from http://journals.humankinetics.com/tsp

Amorose, A. J. (2007). Coaching effectiveness. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 209-227). Leeds: Human Kinetics.

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. Journal of Managerial Psychology, 22, 309-328. doi: 10.1108/02683940710733115

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin,* 37, 1459-1473. doi:10.1177/0146167211413125

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumani, C. (2011). Psychological need thwarting in the sport context: Assessing the darker side of athletic experience. *Journal of Sport & Exercise Psychology, 33,* 75-102. Retrieved from http://journals.humankinetics.com/jsep

Bartholomew, K. J, Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling interpersonal style in a coaching context: Development and initial validation of a psychometric scale. *Journal of Sport & Exercise Psychology, 32,* 193-216. Retrieved from http://journals.humankinetics.com/jsep

Bentler, P. M. (2003). *EQS 6.1 for Windows* [Computer software]. Encino, CA: Multivariate Software.

Bentler, P. M., & Chou, C. P. (1987). Practical issues in structural modeling. *Sociological Methods & Research, 16*, 78-117. doi:10.1177/0049124187016001004

Byrne, B. M. (2006). *Structural equation modeling with EQS: Basic concepts, applications, and programming* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9,* 233–255. doi:10.1177/1534484311399731

Chelladurai, P., & Ogasawara, E. (2003). Satisfaction and commitment of American and Japanese collegiate coaches. *Journal of Sport Management, 17*, 62-73. Retrieved from http://journals.humankinetics.com/jsm

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*, 91-104. doi: 10.1037/0021-9010.78.1.98

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11,* 227-268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin, 27,* 930-942. doi:10.1177/0146167201278002

Ford, J., MacCallum, R., & Tait, M. (1986). The application of factor analysis in psychology: A critical review and analysis. *Personnel Psychology, 39*, 291-314. doi:10.1111/j.1744-6570.1986.tb00583.x

Forgas, J. P (2002). Feeling and doing: Affective influences on interpersonal behavior. *Psychological Inquiry, 13*, 1-28. doi:10.1207/S15327965PLI1301_01.

Gagné, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology, 15,* 372-390. doi:10.1080/714044203

Hair, J. E., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. (5th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hofmann, R. (1995). Establish factor validity using variable reduction in confirmatory factor analysis. *Educational and Psychological Measurement, 55,* 572-582. doi:10.1177/0013164495055004005

Hu, L., & Bentler, P.M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55. doi:10.1080/10705519909540118

Kline, R.B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.

Klussman, U., Kunter, M., Trautwein, U., Lüdtke, O., & Baumert, J. (2008). Teachers' occupational well-being and quality of instruction: The important role of self-regulatory patterns. *Journal of Educational Psychology, 100,* 702-715. doi:10.1037/0022-0663.100.3.702

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences, 21,* 883-904. doi:10.1080/0264041031000140374

Maslach, C., & Leiter, M. P. (1997). The truth about burnout: How organizations cause personal stress and what to do about it. San Francisco, CA: Jossey-Bass.

Major, V. S., Klein, K. J., & Ehrhart, M. G. (2002). Work time, work interference with family, and psychological distress. *Journal of Applied Psychology, 87*, 427-436. doi:10.1037/0021-9010.87.3.427

Marsh, H. W., Hau, K., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*, 320-341. doi:10.1207/s15328007sem1103_2

Netemeyer, R. G., Boles, J. S., & McMurrian, R. (1996). Development and validation of work-family conflict and family-work conflict scales. *Journal of Applied Psychology, 81*, 400-410. doi:10.1037/0021-9010.81.4.400

Ntoumanis, N. (2005). A prospective study of participation in optional school physical education using a self-determination theory perspective. *Journal of Educational Psychology, 97,* 444-453. doi:10.1037/0022-0663.97.3.444

Olusoga, P., Butt, J., Hays, K., & Maynard, I. (2009). Stress in elite sports coaching: Identifying stressors. *Journal of Applied Sport Psychology, 21*, 442-459. doi:10.1080/10413200903222921

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Brière, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25,* 279-306. doi:10.1023/A:1014805132406

Probst, T. M. (2003). Development and validation of the Job Security Index and the Job Security Satisfaction scale: A classical test theory and IRT approach. Journal of Occupational and Organizational Psychology, 76, 451-467. doi:10.1348/096317903322591587

Quested, E., & Duda, J. L (2010). Exploring the social-environmental determinants of well- and ill-being in dancers: A test of basic needs theory. *Journal of Sport & Exercise Psychology, 32,* 39-60. Retrieved from http://journals.humankinetics.com/jsep

Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport & Exercise Psychology, 23*, 281-306. Retrieved from http://journals.humankinetics.com/jsep

Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne social desirability scale. *Journal of Clinical Psychology*, *38, 119-125.* doi:10.1002/1097-4679(198201)38:1<119::AID-JCLP2270380118>3.0.CO;2-I

Ryan, R. M., & Frederick, C. M. (1997). On energy, personality and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, *65,* 529-565. doi:10.1111/j.1467-6494.1997.tb00326.x

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multisample study. *Journal of Organizational Behavior, 25*, 293-315. doi:10.1002/job.248

Shaw, S., & Allen, J. B. (2009). The experiences of high performance women coaches: A case study of two regional sport organisations. *Sport Management Review, 12*, 217-228. doi:10.1016/j.smr.2009.03.005

Shirom. A., Nirel, N., & Vinokur, A.D. (2006). Overload, autonomy, and burnout as predictors of physicians' quality of care. *Journal of Occupational Health Psychology, 11*, 328-342. doi: 10.1037/1076-8998.11.4.328

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*, 422-445. doi: 10.1037//1082-989X.7.4.422

Soenens, B., Sierens, E., Vansteenkiste, M., Dochy, F., & Goossens, L. (in press). Psychologically controlling teaching: Examining outcomes, antecedents, and mediators. Journal of Educational Psychology. doi:10.1037/a0025742

Soenens, B., Vansteenkiste, M., & Sierens, E. (2009). How are parental psychological control and autonomy-support related? A cluster-analytic approach. *Journal of Marriage and Family, 71*, 187-202. doi:10.1111/j.1741-3737.2008.00589.x

Stebbings, J., Taylor, I. M., & Spray, C. M. (2011). Antecedents of Perceived Coach Autonomy Supportive and Controlling Behaviors: Coach Psychological Need Satisfaction and Well-Being. *Journal of Sport & Exercise Psychology, 33,* 255-272. Retrieved from http://journals.humankinetics.com/jsep

Strahan, R., & Gerbasi, K. C. (1972). Short, homogeneous versions of the Marlowe-Crowne social desirability scale. *Journal of Clinical Psychology*, *28*, 191-193. doi:10.1002/1097-4679(197204)28:2<191::AID-JCLP2270280220>3.0.CO;2-G

Sverke, M., Hellgren, J., & Näswall, K. (2006). Job insecurity: A literature review. In B. Badura, H. Schellschmidt, & C. Vetter (eds.), *Absenteeism report 2005: Job insecurity and well-being* (pp. 59-92). Berlin: Springer-Verlag.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). New York: Harper Collins.

Taylor, I. M., Ntoumanis, N., & Standage, M. (2008). A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education. *Journal of Sport & Exercise Psychology, 30,* 75-94. Retrieved from http://journals.humankinetics.com/jsep

Van den Broeck, A., Vansteenkiste, M., De Witte, H., & Lens, W. (2008). Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work and Stress, 22*, 277-294. doi:10.1080/02678370802393672

Watson, D., Tellegen, A., & Clark, L. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063-1070. doi:10.1037/0022-3514.54.6.1063

Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology, 70,* 115-126. doi:10.1037/0022-3514.70.1.115

1   Footnotes

2   [1]At the request of a reviewer, we also tested a social contextual factors → psychological need

3   satisfaction/thwarting → autonomy support/control → psychological well-/ill-being

4   sequence. This model did not fit the data well: S-Bχ^2 (390) = 884.15, $p < .001$; SRMR = .07;

5   CFI = .88; RMSEA = .06 (CI = .05-.06), and modifications suggested by the Lagrange

6   Multiplier test (i.e., the addition of direct pathways from psychological need

7   satisfaction/thwarting → well-/ill-being) mirrored our hypothesized model.

8   [2] One reviewer suggested that we test the direct relationships between need satisfaction and

9   autonomy support, and between need thwarting and control. Both were significant ($\beta = .39$

10 and .23, respectively), however, the inclusion of these direct effects did not significantly

11 improve model fit over the current model (ΔCFI < .01; Cheung & Rensvold, 2002).

12 Moreover, the paths between well-being and autonomy support, and ill-being and control,

13 still remained significant even with these direct paths estimated. A second reviewer suggested

14 that we test the direct relationships between the three contextual factors and the well-/ill-

15 being and autonomy support/control factors. Only four out of these 11 additional direct

16 effects were significant (job security → ill-being; job security → controlling behaviors;

17 work-life conflict → autonomy supportive behaviors; work-life conflict → controlling

18 behaviors) and the inclusion of these direct effects did not improve model fit.

1   Table 1

2   *Descriptive Statistics and Cronbach's Alpha Coefficients for all Variables*

| Variable	α	Range	*M*	*SD*
1. Opportunities for Professional Development	.86	1 to 7	4.22	1.52
2. Job Security	.76	1 to 7	3.82	1.39
3. Work-Life Conflict	.86	1 to 7	3.30	1.55
4. Competence Need Satisfaction	.53	1 to 7	5.61	.92
5. Autonomy Need Satisfaction	.69	1 to 7	5.62	.95
6. Relatedness Need Satisfaction	.72	1 to 7	5.67	.89
7. Competence Need Thwarting	.80	1 to 7	2.17	1.18
8. Autonomy Need thwarting	.76	1 to 7	2.48	1.25
9. Relatedness Need Thwarting	.69	1 to 7	2.21	1.07
10. Positive Affect	.87	1 to 5	4.04	.59
11. Vitality	.86	1 to 7	5.43	.93
12. Negative Affect	.82	1 to 5	1.61	.56
13. Emotional and Physical Exhaustion	.93	1 to 5	1.93	.90
14. Autonomy Supportive Behaviors	.81	1 to 7	5.73	.81
15. Controlling Use of Rewards	.73	1 to 7	2.46	1.17
16. Negative Conditional Regard	.76	1 to 7	2.29	1.16
17. Intimidation	.77	1 to 7	1.88	1.06
18. Excessive Personal Control	.60	1 to 7	1.77	.90
19. Social Desirability	.66	0 to 10	6.80	2.16

Table 2

Bivariate Correlations Between all Factors

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Opportunities for Professional Development	-									
2. Job Security	.47**	-								
3. Work-Life Conflict	-.01	-.01	-							
4. Psychological Need Satisfaction	.41**	.38**	-.15**	-						
5. Psychological Need Thwarting	-.19**	-.15**	.32**	-.42**	-					
6. Psychological Well-Being	.26**	.25**	-.08	.60**	-.24**	-				
7. Psychological Ill-Being	-.10*	-.03	.50**	-.24**	.45**	-.24**	-			
8. Autonomy Supportive Behaviors	.25**	.24**	-.02	.56**	-.17**	.53**	-.05	-		
9. Controlling Behaviors	-.02	-.10*	. 22**	-.16**	.40**	-.10*	.36**	-.24**	-	

*Note. *p < .05, **p < .01.*

Figure 1

Structural model of the coaching environment, psychological need satisfaction and thwarting, psychological well- and ill-being, and coach

interpersonal behaviors.
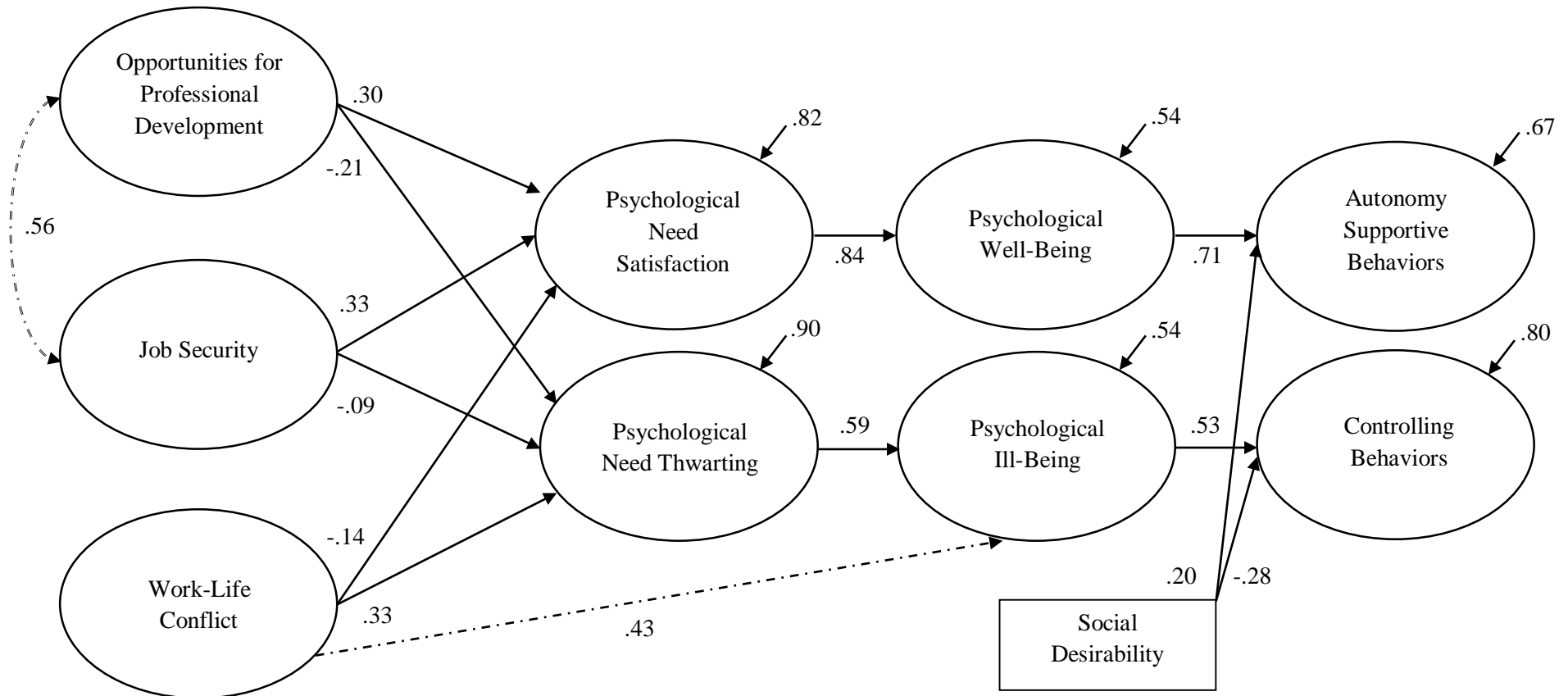
Note. All regression path coefficients are standardized and significant, with the exception of the pathway between job security and psychological need thwarting. For clarity of presentation, factor indicators and the correlation of error terms between psychological need satisfaction and need thwarting ($r = -.37$) and between perceived autonomy supportive and controlling behaviors ($r = -.36$) are omitted. Dashed lines indicate modifications to the original hypothesized model.