

Est.
1841

YORK
ST JOHN
UNIVERSITY

Curran, Thomas, Hill, Andrew P. ORCID:
<https://orcid.org/0000-0001-6370-8901> and Niemiec, Christopher P.
(2013) A conditional process model of children's behavioral
engagement and behavioral disaffection in sport based on self-
determination theory. *Journal of Sport & Exercise Psychology*, 35
(1). 30 - 43.

Downloaded from: <http://ray.yorks.ac.uk/id/eprint/858/>

The version presented here may differ from the published version or version of record. If
you intend to cite from the work you are advised to consult the publisher's version:
[http://journals.humankinetics.com/jsep-back-issues/jsep-volume-35-issue-1-february/a-
conditional-process-model-of-childrens-quos-behavioral-engagement-and-behavioral-
disaffection-in-sport-based-on-self-determination-theory](http://journals.humankinetics.com/jsep-back-issues/jsep-volume-35-issue-1-february/a-conditional-process-model-of-childrens-quos-behavioral-engagement-and-behavioral-disaffection-in-sport-based-on-self-determination-theory)

Research at York St John (RaY) is an institutional repository. It supports the principles of
open access by making the research outputs of the University available in digital form.
Copyright of the items stored in RaY reside with the authors and/or other copyright
owners. Users may access full text items free of charge, and may download a copy for
private study or non-commercial research. For further reuse terms, see licence terms
governing individual outputs. [Institutional Repository Policy Statement](#)

RaY

Research at the University of York St John

For more information please contact RaY at ray@yorks.ac.uk

1 Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of children's
2 behavioural engagement and behavioural disaffection in sport based on self-determination
3 theory. *Journal of Sport and Exercise Psychology*. 35, 30-43.

4
5
6 A conditional process model of children's behavioural engagement and behavioural
7 disaffection in sport based on self-determination theory

8
9
10 **Thomas Curran¹, Andrew P. Hill², and Christopher P. Niemiec³**

11 **Victoria University, Australia¹.**

12 **University of Leeds, UK².**

13 **University of Rochester, USA³.**

14
15
16
17
18 *Keywords:* Autonomy Support, Basic Psychological Need Satisfaction, Moderated
19 Mediation, Self-Determination Theory, Structure

20
21
22
23
24
25 **Author Notes**

26
27 Thomas Curran, Institute of Sport, Exercise and Active Living, Australia; Andrew P. Hill,
28 Faculty of Biological Sciences, University of Leeds, UK; Christopher P. Niemiec,
29 Department of Clinical and Social Sciences in Psychology, University of Rochester, USA.

30 Address correspondence to Thomas Curran, Institute of Sport, Exercise and Active
31 Living, Victoria University, P.O. Box 14428, Melbourne, Victoria, 8001 Australia; E-mail:
32 thomas.curran@vu.edu.au

Behavioural Engagement and Disaffection in Sport 2

1

2

3

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Abstract

The potential benefits of children’s engagement in sport for their psychological, social, and physical health are well established. Yet children may also experience psychological and social impairments due, in part, to a variety of detrimental coach behaviours. In the current study, we proposed and tested a conditional process model of children’s self-reported behavioural engagement and behavioural disaffection in sport based on self-determination theory. Results from a sample of 245 youth soccer players suggested that structure from coaches related positively to behavioural engagement and negatively to behavioural disaffection, and that these relations were mediated by athletes’ basic psychological need satisfaction. Importantly, and in line with our hypotheses, these indirect effects were moderated by autonomy support from coaches, such that the mediation was evident only among those who reported higher levels of autonomy support. These findings underscore the importance of coaches’ providing guidance, expectations, and feedback (i.e., structure) in a way that respects athletes’ volition (i.e., autonomy support).

Key Words: Autonomy Support, Basic Psychological Need Satisfaction, Moderated Mediation, Self-Determination Theory, Sport, Structure

1
2 Recent estimates suggest that there are 22 million youth soccer players worldwide
3 (Federation Internationale de Football Association, 2007). The potential benefits of children's
4 engagement in activities such as soccer for their psychological, social, and physical health are
5 well established (Smith & Smoll, 2007). In particular, sport affords opportunities to develop
6 healthy styles of emotion regulation, to refine interpersonal skills, and to enhance
7 psychological wellness (Reinboth & Duda, 2006; Smith, 2003; Smoll & Smith, 2002). Yet
8 athletes may also experience psychological and social impairments due, in part, to a variety
9 of detrimental coach behaviours (Fraser-Thomas & Côté, 2009; Krane, Greenleaf, & Snow,
10 1997). Therefore, it is important to consider how the way in which coaches relate to young
11 athletes may affect children's experiences in sport.

12 In the current study, we used self-determination theory (SDT; Deci & Ryan, 2008;
13 Niemiec, Ryan, & Deci, 2010) to propose and test a conditional process model (moderated
14 mediation) of children's self-reported behavioural engagement and behavioural disaffection
15 in sport (see Figure 1). SDT is an organismic approach to human motivation, emotion, and
16 personality in social contexts that has applications to sport and exercise psychology (Hagger
17 & Chatzisarantis, 2007; Standage & Ryan, 2012). The first component of the proposed
18 conditional process model (labelled A) was that structure from coaches would relate
19 positively to athletes' behavioural engagement and negatively to behavioural disaffection in
20 sport. The second component (labelled B) was that structure from coaches would relate
21 positively to athletes' satisfaction of the basic psychological needs for autonomy,
22 competence, and relatedness in sport. The third component (labelled C) was that athletes'
23 satisfaction of the basic psychological needs would relate positively to behavioural
24 engagement and negatively to behavioural disaffection in sport. The fourth component
25 (labelled D) was that the association between structure and basic psychological need
26 satisfaction would be moderated by autonomy support from coaches, such that athletes who

1 experienced higher levels of autonomy support would show a stronger positive association
2 between structure and basic psychological need satisfaction. That is, the mediation by basic
3 psychological need satisfaction was hypothesized to be evident only among those who
4 reported higher levels of autonomy support. Next, we describe the theoretical and empirical
5 foundations for these hypotheses.

6 **Engagement in Sport and Structure from Coaches**

7 Engagement and disaffection are indicators of the quality of motivation in sport, as
8 well as in other achievement contexts (Skinner, Wellborn, & Connell, 1990). Behavioural
9 engagement refers to a high level of effort and attention while doing an activity, whereas
10 behavioural disaffection manifests as passive and ritualistic investment in an activity. These
11 constructs are important to understand because they reflect outward expressions of one's
12 underlying motivation at the level of participation (Reeve, Jang, Carrell, Jeon, & Barch,
13 2004) and involve very different phenomenological experiences (e.g., enthusiasm, interest,
14 and enjoyment versus anxiety, frustration, and anger; Skinner, Furrer, Marchand, &
15 Kindermann, 2008). Thus, behavioural engagement and behavioural disaffection are cogent
16 indicators of athletes' positive and negative experiences in sport.

17 Research conducted over three decades has demonstrated the strong influence that
18 coaches have on athletes' experiences in sport (for a review, see Smoll & Smith, 2002). For
19 instance, perceptions of coaches have been found to be associated with athletes' self-reported
20 behavioural engagement (e.g., effort; Smith, Ntoumanis, & Duda, 2007; Vazou, Ntoumanis,
21 & Duda, 2006) and psychological health, including vitality (Reinboth & Duda, 2006),
22 positive affect (Smith et al., 2007), and self-esteem (Reinboth & Duda, 2004). According to
23 SDT, one of the important tasks that socializers (such as coaches) have is to provide a sense
24 of structure. In the context of sport, structure refers to information that coaches provide to
25 their athletes about expectations and strategies for achieving desired outcomes (Mageau &
26 Vallerand, 2003). This involves the provision of clear and consistent rules and goals prior to

1 the activity, guidance and assistance during the activity, and constructive feedback after the
2 activity (Reeve, 2006a; Vansteenkiste, Sierens, et al., 2012). These elements of structure are
3 important because they cultivate achievement-related competencies and thus provide a
4 framework for behavioural engagement (rather than behavioural disaffection). In the absence
5 of structure, learning is experienced as chaotic (Jang, Reeve, & Deci, 2010) and, as a result,
6 subordinates may feel incompetent, isolated, and helpless (cf. Soenens, Vansteenkiste, et al.,
7 2007).

8 To date, only a small amount of research using SDT has examined structure in the
9 sport domain, possibly due to a lack of instrumentation in this context. Rather, much of the
10 research on structure has been conducted in the education domain (Jang et al., 2010; Sierens,
11 Vansteenkiste, Goossens, Soenens, & Dochy, 2009; Skinner et al., 1990). There are at least
12 two reasons, however, to expect a similar set of correlates among athletes. One is that the
13 correlates of structure are likely to be evident across a variety of life's domains (cf. Ryan &
14 Deci, 2000). A second reason is that analogous constructs, such as goal setting, feedback, and
15 instruction, have been shown to be important for athletes' motivation and development in
16 sport (Horn, 1985; Roberts & Kristiansen, 2012; Strachan, Côté, & Deakin, 2009). Therefore,
17 we hypothesized that structure from coaches would relate positively to athletes' behavioural
18 engagement and negatively to behavioural disaffection in sport.

19 **Mediation by Basic Psychological Need Satisfaction**

20 If support is found for the divergent relations of structure from coaches to athletes'
21 behavioural engagement and behavioural disaffection in sport, then an important next step in
22 this line of inquiry is to identify a possible mechanism that might explain these associations.
23 Within SDT, the concept of basic psychological needs is a unifying principle that is used to
24 explain social-contextual influences on psychological integration, social wellness, and
25 physical health. SDT proposes that regardless of their gender, age, social class, culture, or
26 any other delimiting factor, all individuals require satisfaction of three basic psychological

1 needs for full functioning and wellness (see Niemiec & Ryan, in press). The need for
2 autonomy (de Charms, 1968) refers to the experience that behaviour is enacted with a sense
3 of volition, self-direction, reflective self-endorsement, and choice. The need for competence
4 (White, 1959) refers to the experience of effectance and mastery in interacting with the
5 physical world. The need for relatedness (Baumeister & Leary, 1995; Ryan, 1995) refers to
6 the experience of mutual care, concern, and connection with important others.

7 Mageau and Vallerand (2003) have argued that coaches' behaviours are likely to be
8 associated with athletes' basic psychological need satisfaction. In an extension of their model,
9 we argue that structure from coaches may relate positively to athletes' satisfaction of *each* of
10 the basic psychological needs. Providing clear expectations and strategies for success, as well
11 as effectance-relevant feedback, is likely to afford satisfaction of the need for competence. In
12 addition, structure from coaches is likely to be associated with satisfaction of the need for
13 relatedness because it involves offering help and guidance in the face of setbacks to better
14 accomplish goals. Finally, structure from coaches is likely to be associated with satisfaction
15 of the need for autonomy because it facilitates perceived control over goal attainment and the
16 development of intentions for action (cf. Reeve, 2006b; Skinner et al., 1990). In support of
17 these ideas, structure has been found to be positively associated with satisfaction of all three
18 psychological needs in a physical education setting (Taylor & Ntoumanis, 2007), as well as
19 with self-regulated learning among secondary school children (Sierens et al., 2009).
20 Therefore, we hypothesized that satisfaction of the basic psychological needs for autonomy,
21 competence, and relatedness would mediate the positive relation of structure from coaches to
22 athletes' behavioural engagement and the negative relation of structure from coaches to
23 athletes' behavioural disaffection in sport.

24 **Moderation by Autonomy Support from Coaches**

25 Although structure from coaches is expected to be associated with higher levels of
26 basic psychological need satisfaction, the magnitude (and perhaps even direction) of this

1 association may depend on how structure is conveyed to athletes. According to SDT, the way
2 in which socializers (such as coaches) introduce information, expectations, strategies,
3 support, limits, and other aspects of structure can be perceived by those who are being
4 socialized as either supportive or inhibitive of their volition. Autonomy support is an
5 interpersonal style in which an authority figure assumes the perspective of the person for
6 whom (s)he has responsibility. In doing so, the authority figure elicits and acknowledges the
7 other's perspective and ideas, takes interest in and accepts the other's feelings, provides a
8 rationale when limits are set on behaviour, encourages self-initiation and self-direction of
9 action, and minimizes use of controlling language (e.g., "should", "must", "ought", and "have
10 to"). The presumed theoretical opposite of autonomy support is a controlling interpersonal
11 style, in which the authority figure pressures or coerces the other to think, feel, or behave in
12 particular ways.

13 The importance of autonomy support (versus control) for psychological, social, and
14 physical health has been demonstrated in a variety of domains, including parenting (Roth,
15 Assor, Niemiec, Ryan, & Deci, 2009), education (Grolnick & Ryan, 1989), work (Deci,
16 Ryan, et al., 2001), healthcare (Williams, Niemiec, Patrick, Ryan, & Deci, 2009; Williams,
17 Patrick, et al., 2009), and close relationships (Deci, La Guardia, Moller, Scheiner, & Ryan,
18 2006), among others. Consistent results have also been found across the lifespan, including in
19 infancy (Grolnick, Frodi, & Bridges, 1984), childhood (Deci, Driver, Hotchkiss, Robbins, &
20 Wilson, 1993), adolescence (Soenens, Vansteenkiste, & Niemiec, 2009) and adulthood
21 (O'Connor & Vallerand, 1994). More germane to the focus of the current study, a growing
22 body of research in the sport domain attests to the importance of autonomy support from
23 coaches. For instance, Adie, Duda, and Ntoumanis (2008) found that autonomy support from
24 coaches has a moderate positive association with athletes' vitality, and Jõesaar, Hein, and
25 Hagger (2012) found that autonomy support from coaches has a moderate positive
26 association with intrinsic motivation among youth sport participants. Thus, the importance of

1 autonomy support for full functioning and wellness in sport is becoming readily apparent.

2 To date, no study has examined the interaction of autonomy support and structure in
3 the prediction of basic psychological need satisfaction in the sport domain. This may be
4 because autonomy support and structure can be viewed as antagonistic, as the imposition of
5 rules and expectations (two elements of structure) may resemble a controlling interpersonal
6 style (cf. Daniels & Bizar, 1998). Yet within SDT, autonomy support and structure are
7 considered to be largely independent constructs (Jang et al., 2010), such that structure can be
8 enacted in a way that supports choice, volition, and self-initiation (autonomy support) or in a
9 way that is perceived to be pressuring and coercive (control). Early support for this
10 proposition was provided by Koestner, Ryan, Bernieri, and Holt (1984), who found that the
11 way in which rules were set affected children's intrinsic motivation in an education setting.
12 Limits that were set in an autonomy-supportive way did not undermine intrinsic motivation,
13 whereas limits that were communicated in a controlling style did undermine intrinsic
14 motivation. More recently, Sierens et al. (2009) and Jang et al. (2010) found that autonomy
15 support and structure interacted to yield positive correlates in the education domain.
16 Therefore, we hypothesized that the association between structure from coaches and athletes'
17 basic psychological need satisfaction would be moderated by autonomy support from
18 coaches. Specifically, we anticipated that athletes who experienced higher levels of autonomy
19 support would show a stronger positive association between structure and basic psychological
20 need satisfaction.

21 Taken together, this set of hypotheses points toward the specification of a conditional
22 process model of behavioural engagement and behavioural disaffection in sport based on
23 SDT. The possibility that the indirect relations of structure to behavioural engagement and
24 behavioural disaffection are moderated by autonomy support alludes to an explanatory model
25 that cannot be captured using simple mediation or moderation analyses. This conditional
26 process model (moderated mediation; Preacher, Rucker, & Hayes, 2007) would establish the

1 strength of the indirect effect across levels of the moderator and, in doing so, would yield a
2 deeper understanding of the associations among these variables. Such findings would support
3 SDT and, importantly, may also inform an understanding of how the way in which coaches
4 relate to young athletes affects children's experiences in sport.

5 **Method**

6 **Participants and Procedure**

7 Participants were 281 youth soccer players (202 boys, 79 girls) with a mean age of
8 13.67 years ($SD = 1.49$) and a range from 11 to 18 years. The participants had been playing
9 soccer for an average of 6.76 years ($SD = 2.34$) and had been attached to their clubs for an
10 average of 3.47 years ($SD = 2.33$). Prior to data collection, ethical approval was provided by
11 the research ethics committee of a British University and parental consent was sought for the
12 children's participation. The questionnaire was administered in a training session setting
13 during which the lead author was present to give general instructions and to answer any
14 questions.

15 **Measures**

16 Responses to all measures were made on a 7-point scale from 1 (*not true at all*) to 7
17 (*very true*).

18 **Structure and autonomy support from coaches.** A modified version of the Teacher
19 as a Social Context Questionnaire (Belmont, Skinner, Wellborn, & Connell, 1988; for a list of
20 items used in the current study, see Appendix A) assessed athletes' perceptions of structure (8
21 items; e.g., The coach always tells us what he/she expects of us in soccer) and autonomy
22 support (8 items; e.g., The coach gives us lots of choices about how we do tasks in soccer)
23 from coaches. Psychometric support for the reliability and concurrent validity of this measure
24 has been found in a physical education setting (Taylor & Ntoumanis, 2007), and evidence of
25 its two-factor structure has been found among secondary school children (Sierens et al.,
26 2009).

1 **Basic psychological need satisfaction.** The Basic Needs Satisfaction in Sport Scale
2 (BNSSS; Ng, Lonsdale, & Hodge, 2011) assessed athletes' satisfaction of autonomy (10
3 items; e.g., I feel I participate in soccer willingly), competence (5 items; e.g., I have the
4 ability to perform well in soccer), and relatedness (5 items; e.g., In soccer, I feel close to
5 other people). Support for the psychometric properties of this measure has been found in past
6 research (Ng et al., 2011).

7 **Behavioural engagement and behavioural disaffection.** A modified version of the
8 Engagement Verses Disaffection with Learning Scale (Skinner, Kindermann, & Furrer, 2009)
9 assessed athletes' behavioural engagement (5 items; e.g., I try hard to do well in training) and
10 behavioural disaffection (5 items; e.g., In training, I do just enough to get by). Broadly, the
11 items used to measure behavioural engagement assessed effort, attention, and persistence in
12 soccer, whereas those used to measure behavioural disaffection assessed lack of effort during,
13 and withdrawal from, soccer. Support for the reliability and validity of this measure has been
14 found in educational contexts (Skinner et al., 2008; Skinner et al., 2009).

15 **Construct Formation**

16 Structure, autonomy support, behavioural engagement, and behavioural disaffection
17 were calculated as weighted linear composites of scale items using the partial least squares
18 path model (PLS-PM) algorithm in XLSTAT (version 2012.1; Addinsoft, Paris, France).
19 Basic psychological need satisfaction was calculated as the weighted linear composite of
20 autonomy, competence, and relatedness using the same algorithm (for a similar approach, see
21 Sebire, Standage, & Vansteenkiste, 2009). This method of construct formation was preferred
22 because it allows each item (or subscale) to make a unique contribution to the construct (Hair,
23 Ringle, & Sarstedt, 2011). The unstandardized composite scores representing these constructs
24 were used in all subsequent analyses.

25 **Results**

26 **Preliminary Analyses**

1 There were 227 participants who provided complete data. In accordance with the
2 recommendations of Tabachnick and Fidell (2007), 31 participants with missing data were
3 removed because their item non-response exceeded 5%. Since none of the participants in the
4 remaining sample had more than 2 missing items, those values were replaced by the mean of
5 the corresponding scale (Graham, Cumsille, & Elek-Fisk, 2003). Standardized z-scores larger
6 than 3.29 ($p < .001$) and Mahalanobis distances greater than $\chi^2(6) = 22.46$ ($p < .001$) were
7 used to identify participants as univariate and multivariate outliers (Tabachnick & Fidell,
8 2007). Five participants were removed on this basis. This yielded a final sample of 245
9 participants (172 boys, 73 girls). These data were normal at the univariate (average absolute
10 skew = .35, $s = .16$, $SE = .16$; average absolute kurtosis = .53, $s = .15$, $SE = .31$) and
11 multivariate (Mardia's normalised coefficient = 3.71) levels.

12 Table 1 presents scale reliabilities (Cronbach's α and Dillon-Goldstein's rho), means,
13 standard deviations, and intercorrelations for the study measures. The measures used to assess
14 each of the constructs were reliable ($\alpha > .70$; Tabachnick & Fidell, 2007) with the exception
15 of behavioural disaffection ($\alpha = .68$), which was retained for two reasons. First, lower internal
16 reliability (α) is more common among scales with a small number of items (Lowenthal,
17 1996). Second, an alternative assessment of reliability for this measure was found to be
18 acceptable (Dillon-Goldstein's rho = .79; Nunnally & Bernstein, 1994). At the zero-order
19 level, all of the variables were significantly intercorrelated and in the directions predicted by
20 SDT, thereby providing some preliminary support for our hypotheses.

21 **Primary Analyses**

22 **Behavioural engagement.** We used the analytic methods discussed in Preacher and
23 Hayes (2008) to examine simple mediation (see Table 2). As shown, the unconditional
24 indirect effect was significant (95% bias correction and acceleration confidence interval [95%
25 BCa CI]: {0.1419, 0.3126} with 5000 resamples). Structure from coaches predicted athletes'
26 basic psychological need satisfaction ($b = .33$, $p < .001$), which in turn predicted behavioural

1 engagement ($b = .66, p < .001$). Controlling for the mediator, the relation of structure to
2 behavioural engagement was reduced from $b = .28 (p < .001)$ to $b = .06 (ns)$.

3 We then used the analytic methods discussed in Preacher et al. (2007) to examine
4 moderation of this indirect effect by autonomy support from coaches, which generated two
5 multiple regression models. The mediator variable model specified basic psychological need
6 satisfaction as the dependent variable, and the dependent variable model specified
7 behavioural engagement as the dependent variable (see Table 3). In the mediator variable
8 model, the interaction of structure with autonomy support predicted basic psychological need
9 satisfaction ($b = .18, p < .001$). In the dependent variable model, basic psychological need
10 satisfaction predicted behavioural engagement ($b = .60, p < .001$). We calculated bootstrap
11 confidence intervals to determine the values of the moderator at which the conditional
12 indirect effect was significant.¹ With 5000 resamples, the conditional indirect effect was
13 significant at 1SD above the mean (95% BCa CI: {0.1376, 0.3677}) and at the mean (95%
14 BCa CI: {0.0400, 0.2114}), but was non-significant at 1SD below the mean (95% BCa CI: {-
15 0.0969, 0.1010}) of autonomy support.

16 Finally, we used the Johnson-Neyman technique (for an application of this technique
17 to conditional process modeling, see Preacher et al., 2007) to examine the regional
18 significance of the conditional indirect effect across a range of values of the moderator.
19 Results suggested that the conditional indirect effect was antagonistic (see Figure 2), such
20 that the conditional indirect effect was positive when autonomy support was higher than
21 4.7136 ($[a_1 + a_3W]b_1 = .11$; 95% BCa CI: {0.0237, 0.1962}) and was negative when
22 autonomy support was lower than 2.4271 ($[a_1 + a_3W]b_1 = -.14$; 95% BCa CI: {-0.2961, -
23 0.0053}).

24 **Behavioural disaffection.** We used the same analytic methods discussed above to
25 examine simple mediation (see Table 4). As shown, the unconditional indirect effect was
26 significant (95% BCa CI: {-0.2113, -0.0841} with 5000 resamples). Structure from coaches

1 predicted athletes' basic psychological need satisfaction ($b = .33, p < .001$), which in turn
2 predicted behavioural disaffection ($b = -.42, p < .001$). Controlling for the mediator, the
3 relation of structure to behavioural disaffection was reduced from $b = -.19 (p < .001)$ to $b = -$
4 $.05 (ns)$.

5 We then used the analytic methods discussed in Preacher et al. (2007) to examine
6 moderation of this indirect effect by autonomy support from coaches (see Table 5). In the
7 mediator variable model, the interaction of structure with autonomy support predicted basic
8 psychological need satisfaction ($b = .18, p < .001$). In the dependent variable model, basic
9 psychological need satisfaction predicted behavioural disaffection ($b = -.36, p < .001$). We
10 calculated bootstrap confidence intervals to determine the values of the moderator at which
11 the conditional indirect effect was significant. With 5000 resamples, the conditional indirect
12 effect was significant at 1SD above the mean (95% BCa CI: $\{-0.2462, -0.0729\}$) and at the
13 mean (95% BCa CI: $\{-0.1413, -0.0242\}$), but was non-significant at 1SD below the mean
14 (95% BCa CI: $\{-0.0629, 0.0560\}$) of autonomy support.

15 Finally, we used the Johnson-Neyman technique to examine the regional significance
16 of the conditional indirect effect across a range of values of the moderator. Results suggested
17 that the conditional indirect effect was antagonistic (see Figure 3), such that the conditional
18 indirect effect was negative when autonomy support was higher than 4.7136 ($[a_1 + a_3W]b_1 = -$
19 $.06$; 95% BCa CI: $\{-0.1328, -0.0159\}$) and was positive when autonomy support was lower
20 than 2.1731 ($[a_1 + a_3W]b_1 = .10$; 95% BCa CI: $\{0.0134, 0.2194\}$).

21 Discussion

22 This study tested a conditional process model of behavioural engagement and
23 behavioural disaffection in sport based on self-determination theory (SDT). In terms of
24 simple mediation, we hypothesized that structure from coaches would relate positively to
25 athletes' behavioural engagement and negatively to behavioural disaffection in sport, and that
26 these divergent associations would be explained (mediated) by athletes' satisfaction of the

1 basic psychological needs for autonomy, competence, and relatedness. Results supported
2 these predictions. It appears, therefore, that structure from coaches affords athletes
3 opportunities for satisfaction of basic psychological needs, which in turn is associated with
4 higher levels of behavioural engagement and lower levels of behavioural disaffection in
5 sport.

6 According to SDT, though, the way in which coaches provide structure can be
7 perceived by athletes as either supportive of their choice and volition (autonomy support) or
8 pressuring and coercive (control). In terms of moderated mediation, then, we hypothesized
9 that the strength of the indirect effects would depend on athletes' perceptions of autonomy
10 support from coaches. Results supported this prediction. The interaction of structure with
11 autonomy support predicted basic psychological need satisfaction, and thus mediation was
12 evident only among athletes who reported levels of autonomy support at or above the mean.
13 As well, the conditional indirect effects were antagonistic. That is, the conditional indirect
14 effect of structure on behavioural engagement was positive for those who reported higher
15 levels of autonomy support and was negative for those who reported lower levels of
16 autonomy support. In contrast, the conditional indirect effect of structure on behavioural
17 disaffection was negative for those who reported higher levels of autonomy support and was
18 positive for those who reported lower levels of autonomy support.

19 **Theoretical Implications**

20 These findings have important theoretical implications for SDT in the sport domain.
21 Structure from coaches predicted higher levels of behavioural engagement and lower levels
22 of behavioural disaffection in sport, suggesting that clear instructions and positive feedback
23 from coaches are conducive to athletes' investment in sport. Also in line with SDT, these
24 divergent relations were reduced to non-significance after controlling for athletes' satisfaction
25 of the basic psychological needs. Such evidence of mediation speaks to basic psychological
26 need satisfaction as an explanatory mechanism in the association between the social context

1 (the coach) and motivational outcomes in athletes (behavioural engagement and behavioural
2 disaffection). More broadly, these results suggest that provision of information, expectations,
3 strategies, support, limits, and other aspects of structure is not necessarily inhibitive of
4 volitional engagement in sport, as at the zero-order level this approach was conducive to
5 athletes' experience of basic psychological need satisfaction and behavioural engagement.
6 We call for future research in SDT to examine structure in a variety of life's domains, such as
7 health care, parenting, and organizational behaviour.

8 Although structure from coaches predicted basic psychological need satisfaction, this
9 positive relation was moderated by autonomy support and was stronger among athletes who
10 experienced higher levels of autonomy support from their coaches. Thus, athletes are more
11 likely to experience basic psychological need satisfaction when coaches provide structure
12 with support for choice, volition, and self-initiation (autonomy support) rather than in a
13 context of pressure to think, feel, and behave in particular ways (control). Structure and
14 autonomy support were found to interact synergistically in predicting basic psychological
15 need satisfaction, and thus it is important that future research in SDT examine both constructs
16 in a variety of domains to develop a more complete understanding of how the social context
17 affects motivational outcomes.

18 It follows from this synergism that the indirect effects of structure to both behavioural
19 engagement and behavioural disaffection in sport through basic psychological need
20 satisfaction would be moderated by autonomy support from coaches. Athletes experience
21 satisfaction of their basic psychological needs in contexts that are structured and autonomy
22 supportive, and such satisfaction provides the foundation of psychological energy necessary
23 for healthy engagement in sport (Mageau & Vallerand, 2003). Without autonomy support,
24 coaches may communicate information, expectations, strategies, limits, and other aspects of
25 structure in a controlling way, which undermines athletes' perceptions of agency, capability,
26 and support (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). This

1 lack of psychological need satisfaction, in turn, gives rise to passive and ritualistic behaviour
2 (disaffection; Skinner et al., 2008). In short, structure in a context of autonomy support
3 appears to create optimal conditions for the satisfaction of basic psychological needs, which
4 is associated with higher levels of behavioural engagement and lower levels of behavioural
5 disaffection in sport.

6 **Practical Implications**

7 These findings have important implications for coaches, parents, and other socializers
8 who are involved in youth sport. Most notably, our results suggested that structure and
9 autonomy support from coaches operate synergistically to facilitate children's behavioural
10 engagement in sport through basic psychological need satisfaction. As such, the importance
11 of coaches' providing structure in a context of autonomy support is readily apparent. To
12 provide a sense of structure, coaches can offer clear and consistent instructions prior to the
13 activity, guidance and assistance during the activity, and effectance-relevant feedback after
14 the activity. To support autonomy, coaches can assume the perspectives of their athletes and,
15 in doing so, elicit and acknowledge their ideas, take interest in and accept their feelings,
16 provide a meaningful rationale for limits and other relevant requests, encourage self-
17 initiation, provide a desired amount of choice, and minimize use of controlling language.

18 Some elements of structure (such as limits) may seem antagonistic to certain aspects
19 of autonomy support (such as choice), yet it is possible for coaches to provide a sense of
20 structure without compromising autonomy. This might be achieved, for instance, by
21 introducing rules and limits with a meaningful rationale, or by organizing the content of
22 goals, training regimens, and competition strategies in concordance with athletes' ideas and
23 suggestions. As Jang et al. (2010) articulated, providing expectations and limits (structure) in
24 a context that encourages choice and volition (autonomy support) enables children to
25 maintain a sense of autonomy while fostering their competence. Research has shown that
26 socializers can be trained to provide support for the basic psychological needs (Deci, Connell,

1 & Ryan, 1989; Ntoumanis, 2012), and the current study suggests that special emphasis in
2 such interventions may be placed on training socializers to provide structure in a way that
3 respects autonomy.

4 **Limitations and Future Research**

5 Several limitations of this study deserve mention. First, the cross-sectional design
6 precludes any inference of directionality or causality among the variables. It is important for
7 future research to examine the proposed conditional process model using longitudinal and
8 experimental methods, especially in light of Reeve's (2009) suggestion that disaffection may
9 evoke controlling (rather than autonomy-supportive) strategies from teachers over time.

10 Second, data were collected among youth soccer players in England, and thus the
11 specificity and homogeneity of this sample limits the generalizability of the findings. It is
12 interesting to note that sport is a context in which behaviour is fairly well integrated into
13 individuals' self-concepts (Vallerand, 2004), and therefore structure may be less important in
14 sport than in other life spheres (cf. Jang et al., 2010). It is important for future research to
15 examine these dynamics in other achievement contexts and life domains.

16 Third, the lack of a sport-specific measure of structure necessitated our use of a
17 modified version of the Teacher as a Social Context Questionnaire (Belmont et al., 1988).
18 Although this measure has been useful in assessing structure in other domains, there may be
19 some unique elements of structure in sport that this measure does not assess. It is important
20 for future research to develop a well-validated, sport-specific measure of structure.

21 Fourth, the current study did not assess athletes' perceptions of involvement from
22 coaches. Involvement refers to the interest and concern that socializers (such as coaches)
23 show toward those for whom they have responsibility (Skinner et al., 1990). Mageau and
24 Vallerand (2003) have argued that involvement is an important part of the coach-athlete
25 relationship, even though it may have a more distal role in motivation compared to autonomy
26 support and structure (Koestner & Losier, 2002; Markland & Tobin, 2010). It is important for

1 future research to examine the dynamics among autonomy support, structure, and
2 involvement in sport.

3 Fifth, all data were based on self-report measures, which introduces the possibility of
4 bias due to common method variance. This systematic source of measurement error can
5 inflate associations among constructs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). It is
6 important for future research to utilize alternative measures, such as observation, to
7 corroborate the findings of the current study. Observational measures rely on behaviorally
8 anchored rating scales and offer a flexible means of assessing actual (rather than perceived)
9 coach practice. Researchers have adopted this approach in other domains (Jang et al., 2010),
10 and similar work is needed in sport.

11 **Conclusion**

12 Sport contexts that provide athletes with structure and autonomy support are
13 associated with higher levels of behavioural engagement and lower levels of behavioural
14 disaffection. This is because such contexts afford opportunities for satisfaction of autonomy,
15 competence, and relatedness. In contrast, structure from coaches in the absence of autonomy
16 support is unrelated to basic psychological need satisfaction. These findings underscore the
17 importance of coaches' providing guidance, expectations, and feedback (i.e., structure) in a
18 way that respects athletes' volition (i.e., autonomy support).

19

References

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion, 32*, 189-199.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

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

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529.

Belmont, M., Skinner, E., Wellborn, J., & Connell, J. (1988). *Teacher as social context: A measure of student perceptions of teacher provision of involvement, structure, and autonomy support* (Tech. Rep. No. 102). Rochester, NY: University of Rochester.

Daniels, H., & Bizar, M. (1998). *Methods that matter: Six structures for best practice classrooms*. Portland, ME: Stenhouse.

de Charms, R. (1968). *Personal causation*. New York: Academic Press.

Deci, E. L., Connell, J. P., & Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology, 74*, 580-590.

Deci, E. L., Driver, R. E., Hotchkiss, L., Robbins, R. J., & Wilson, I. M. (1993). The relation of mothers' controlling vocalizations to children's intrinsic motivation. *Journal of Experimental Child Psychology, 155*, 151-162.

Deci, E. L., La Guardia, J. G., Moller, A. C., Scheiner, M. J., & Ryan, R. M. (2006). On the

- 1 benefits of giving as well as receiving autonomy support: Mutuality in close
2 friendships. *Personality and Social Psychology Bulletin*, 32, 313-327.
- 3 Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-
4 being across life's domains. *Canadian Psychology*, 49, 14-23.
- 5 Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001).
6 Need satisfaction, motivation, and well-being in the work organizations of a former
7 eastern bloc country: A cross-cultural study of self-determination. *Personality and*
8 *Social Psychology Bulletin*, 27, 930-942.
- 9 Federation Internationale de Football Association (2007). *FIFA big count 2006: 270 million*
10 *people active in football*. Retrieved February 20, 2012, from
11 www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.statspackage_7024.pdf
- 12 Fraser-Thomas, J., & Côté, J. (2009). Understanding adolescents' positive and negative
13 developmental experiences in sport. *The Sport Psychologist*, 23, 3-23.
- 14 Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data.
15 In J. A. Schinka & W. F. Velicer (Eds.), *Research methods in psychology* (pp. 87-
16 114). New York: John Wiley & Sons.
- 17 Grolnick, W. S., Frodi, A., & Bridges, L. (1984). Maternal control style and the mastery
18 motivation of one-year-olds. *Infant Mental Health Journal*, 5, 72-82.
- 19 Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-
20 regulation and competence in school. *Journal of Educational Psychology*, 81, 143-154.
- 21 Hagger, M. S., & Chatzisarantis, N. L. D. (2007). *Intrinsic motivation and self-determination*
22 *in exercise and sport*. Champaign, IL: Human Kinetics.
- 23 Hair, J. F., Ringle, C.M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of*
24 *Marketing Theory and Practice*, 19, 139-151.
- 25 Horn, T. S. (1985). Coaches' feedback and changes in children's perceptions of their physical
26 competence. *Journal of Educational Psychology*, 77, 174-186.

- 1 Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not
2 autonomy support or structure but autonomy support and structure. *Journal of*
3 *Educational Psychology, 102*, 588-600.
- 4 Jõesaar, H., Hein, V., & Hagger, M. S. (2012). Youth athletes' perception of autonomy
5 support from the coach, peer motivational climate and intrinsic motivation in sport
6 setting: One-year effects. *Psychology of Sport and Exercise, 13*, 257-262.
- 7 Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being highly motivated: A
8 closer look at introjection, identification, and intrinsic motivation. In E. L. Deci & R.
9 M. Ryan (Eds.), *Handbook of self-determination research* (pp. 101-121). Rochester,
10 NY: University of Rochester Press.
- 11 Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's
12 behavior: The differential effects of controlling vs. informational styles on intrinsic
13 motivation and creativity. *Journal of Personality, 52*, 233-248.
- 14 Krane, V., Greenleaf, C. A., & Snow, J. (1997). Reaching for gold and the price of glory: A
15 motivational case study of an elite gymnast. *The Sport Psychologist, 11*, 53-71.
- 16 Loewenthal, K. M. (1996). *An introduction to psychological tests and scales*. UCL Press,
17 London.
- 18 Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational
19 model. *Journal of Sports Sciences, 21*, 883-904.
- 20 Markland, D., & Tobin, V. J. (2010). Need support and behavioural regulations for exercise
21 among exercise referral scheme clients: The mediating role of psychological need
22 satisfaction. *Psychology of Sport and Exercise, 11*, 91-99.
- 23 Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale
24 (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport*
25 *and Exercise, 12*, 257-264.
- 26 Niemiec, C. P., & Ryan, R. M. (in press). What makes for a life well lived?: Autonomy and

- 1 its relation to full functioning and organismic wellness. In I. Boniwell & S. David
2 (Eds.), *Oxford handbook of happiness*. Oxford: Oxford University Press.
- 3 Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2010). Self-determination theory and the relation
4 of autonomy to self-regulatory processes and personality development. In R. H. Hoyle
5 (Ed.), *Handbook of personality and self-regulation* (pp. 169-191). Malden, MA:
6 Blackwell Publishing.
- 7 Ntoumanis, N. (2012). A self-determination theory perspective on motivation in sport and
8 physical education: Current trends and possible future directions. In G. C. Roberts &
9 D. C. Treasure (Eds.), *Advances in motivation in sport and exercise* (pp. 91-128).
10 Champaign, IL: Human Kinetics.
- 11 Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York: McGraw-Hill,
12 Inc.
- 13 O'Connor, B. P., & Vallerand, R. J. (1994). The relative effects of actual and experienced
14 autonomy on motivation in nursing home residents. *Canadian Journal on Aging, 13*,
15 528-538.
- 16 Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method
17 biases in behavioral research: A critical review of the literature and recommended
18 remedies. *Journal of Applied Psychology, 88*, 879-903.
- 19 Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing
20 and comparing indirect effects in multiple mediator models. *Behavior Research*
21 *Methods, 40*, 879-891.
- 22 Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative
23 strategies for communicating indirect effects. *Psychological Methods, 16*, 93-115.
- 24 Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Assessing moderated mediation
25 hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research,*
26 *42*, 185-227.

- 1 Reeve, J. (2006a). Extrinsic rewards and inner motivation. In C. M. Evertson & C. S.
2 Weinstein (Eds.), *Handbook of classroom management: Research, practice, and*
3 *contemporary issues* (pp. 645-664). Mahwah, NJ: Lawrence Erlbaum.
- 4 Reeve, J. (2006b). Teachers as facilitators: What autonomy-supportive teachers do and why
5 their students benefit. *The Elementary School Journal*, 106, 225-236.
- 6 Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how
7 they can become more autonomy supportive. *Educational Psychologist*, 44, 159-178.
- 8 Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement
9 by increasing teachers' autonomy support. *Motivation and Emotion*, 28, 147-169.
- 10 Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and
11 indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport*
12 *and Exercise*, 7, 269-286.
- 13 Roberts, G. C., & Kristiansen, E. (2012) Goal setting to enhance motivation in sport. In G. C.
14 Roberts & D. C. Treasure (Eds.), *Advances in motivation in sport and exercise* (pp.
15 207-227). Champaign, IL: Human Kinetics.
- 16 Roth, G., Assor, A., Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The emotional and
17 academic consequences of parental conditional regard: Comparing conditional
18 positive regard, conditional negative regard, and autonomy support as parenting
19 practices. *Developmental Psychology*, 45, 1119-1142.
- 20 Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal*
21 *of Personality*, 63, 397-427.
- 22 Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic
23 motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- 24 Sebire, S. J., Standage, M., & Vansteenkiste, M. (2009). Examining intrinsic versus extrinsic
25 exercise goals: Cognitive, affective, and behavioral outcomes. *Journal of Sport &*
26 *Exercise Psychology*, 31, 189-210.

- 1 Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The
2 synergistic relationship of perceived autonomy support and structure in the prediction
3 of self-regulated learning. *British Journal of Educational Psychology*, 79, 57-68.
- 4 Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and
5 disaffection in the classroom: Part of a larger motivational dynamic? *Journal of*
6 *Educational Psychology*, 100, 765-781.
- 7 Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on
8 engagement and disaffection: Conceptualization and assessment of children's
9 behavioral and emotional participation in academic activities in the classroom.
10 *Educational and Psychological Measurement*, 69, 493-525.
- 11 Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school
12 and whether I've got it: The role of perceived control in children's engagement and
13 school achievement. *Journal of Educational Psychology*, 82, 22-32.
- 14 Smith, A. L. (2003). Peer relationships in physical activity contexts: A road less travelled in
15 youth sport and exercise psychology research. *Psychology of Sport and Exercise*, 4,
16 25-39.
- 17 Smith, A., Ntoumanis, N., & Duda, J. (2007). Goal striving, goal attainment, and well-being:
18 Adapting and testing the self-concordance model in sport. *Journal of Sport and*
19 *Exercise Psychology*, 29, 763-782.
- 20 Smith, R. E., & Smoll, F. L. (2007). Social-cognitive approach to coaching behaviors. In S.
21 Jowett & D. Lavalley (Eds.), *Social psychology in sport* (pp. 75-90). Champaign, IL:
22 Human Kinetics.
- 23 Smoll, F. L., & Smith, R. E. (2002). Coaching behavior research and intervention in youth
24 sports. In F. L. Smoll & R. E. Smith (Eds.), *Children and youth in sport: A*
25 *biopsychosocial perspective* (2nd ed., pp. 211-233). Dubuque, IA: Kendall/Hunt.
- 26 Sobel, M. E. (1986). Some new results on indirect effects and their standard errors in

- 1 covariance structure models. In N. Tuma (Ed.), *Sociological Methodology* (pp. 159-
2 186). Washington, DC: American Sociological Association.
- 3 Soenens, B., Vansteenkiste, M., Lens, W., Luyckx, K., Goossens, L., Beyers, W., & Ryan, R.
4 M. (2007). Conceptualizing parental autonomy support: Adolescent perceptions of
5 promotion of independence versus promotion of volitional functioning.
6 *Developmental Psychology, 43*, 633-646.
- 7 Soenens, B., Vansteenkiste, M., & Niemiec, C. P. (2009). Should parental prohibition of
8 adolescents' peer relationships be prohibited? *Personal Relationships, 16*, 507-530.
- 9 Standage, M., & Ryan, R. M. (2012). Self-determination theory and exercise motivation:
10 Facilitating self-regulatory processes to support and maintain health and well-being.
11 In G. C. Roberts & D. C. Treasure (Eds.), *Advances in motivation in sport and*
12 *exercise* (pp. 233-270). Champaign, IL: Human Kinetics.
- 13 Strachan, L., Côté, J., & Deakin, J. (2009). An evaluation of personal and contextual factors
14 in competitive youth sport. *Journal of Applied Sport Psychology, 21*, 340-355.
- 15 Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston:
16 Allyn and Bacon.
- 17 Taylor, I. M., & Ntoumanis, N. (2007). Teacher motivational strategies and student self-
18 determination in physical education. *Journal of Educational Psychology, 99*, 747-760.
- 19 Vallerand, R. J. (2004). Intrinsic and extrinsic motivation in sport. In C. D. Spielberger (Ed.),
20 *Encyclopaedia of Applied Psychology* (pp. 427-435). San Diego: Elsevier Academic
21 Press.
- 22 Vansteenkiste, M., Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A.,
23 Aelterman, N., Haerens, L., & Beyers, W. (2012). Identifying configurations of
24 perceived teacher autonomy support and structure: Associations with self-regulated
25 learning, motivation and problem behavior. *Learning and Instruction, 22*, 431-439.
- 26 Vazou, S., Ntoumanis, N., & Duda, J. L. (2006). Predicting young athletes' motivational

1 indices as a function of their perceptions of the coach- and peer-created climate.

2 *Psychology of Sport and Exercise*, 7, 215-233.

3 White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological*

4 *Review*, 66, 297-333.

5 Williams, G. C., Niemiec, C. P., Patrick, H., Ryan, R. M., & Deci, E. L. (2009). The

6 importance of supporting autonomy and perceived competence in facilitating long-

7 term tobacco abstinence. *Annals of Behavioral Medicine*, 37, 315-324.

8 Williams, G. C., Patrick, H., Niemiec, C. P., Williams, L. K., Divine, G., Lafata, J. E.,

9 Heisler, M., Tunceli, K., & Pladevall, M. (2009). Reducing the health risks of

10 diabetes: How self-determination theory may help improve medication adherence and

11 quality of life. *The Diabetes Educator*, 35, 484-492.

12

13

14

15

16

Footnotes

¹Extending traditional approaches to mediation (Baron & Kenny, 1986; Sobel, 1986), these indirect effects are termed “conditional” because they are calculated using a product term that includes the interaction coefficient and the level of the moderator (i.e., $[a_1 + a_3W] b_1$, where a_1 is the path from the independent variable to the mediator variable, a_3 is the path from the interaction coefficient to the mediator variable, W is the level of the moderator, and b_1 is the path from the mediator variable to the dependent variable; see Preacher et al., 2007), whereas unconditional indirect effects are calculated as the product of the coefficients (i.e., ab).

Behavioural Engagement and Disaffection in Sport 29

1 *Table 1*
 2 *Scale reliabilities, descriptive statistics, and intercorrelations for the study measures.*
 3

Measures	1	2	3	4	5
1. Structure	.76				
2. Autonomy Support	.64 ^{***}	.73			
3. Basic Psychological Need Satisfaction	.39 ^{***}	.44 ^{***}	--		
4. Behavioural Engagement	.30 ^{***}	.40 ^{***}	.62 ^{***}	.83	
5. Behavioural Disaffection	-.21 ^{***}	-.38 ^{***}	-.41 ^{***}	-.43 ^{***}	.68
Composite Reliability (Dillon-Goldstein's rho)	.82	.81	.92	.88	.79
<i>M</i>	4.88	4.84	5.31	5.41	2.52
<i>SD</i>	1.19	1.09	1.01	1.14	1.08

4 *Notes.* Scale reliabilities (Cronbach's α) are shown on the diagonal. The Cronbach's α values
 5 for the individual measures that were used to form the basic psychological need satisfaction
 6 composite were as follows: autonomy ($\alpha = .85$), competence ($\alpha = .87$), and relatedness ($\alpha =$
 7 $.82$).

8 ^{***} $p < .001$
 9

1
2
3
4
5

Table 2
Unconditional indirect effect of structure from coaches to athletes' behavioural engagement through their basic psychological need satisfaction.

Sample Size = 245			
Number of Bootstrap Resamples = 5,000			
Direct and Total Effects	<i>b</i>	<i>SE</i>	<i>t</i>
<i>b</i> (YX)	.2822	.0582	4.84***
<i>b</i> (MX)	.3298	.0501	6.58***
<i>b</i> (YM.X)	.6647	.0612	10.86***
<i>b</i> (YX.M)	.0630	.0519	1.21
Indirect Effect and Significance Using Normal Distribution	Effect	SE	z
	.2192	.0391	5.61***
Bootstrap Results for Indirect Effect	Mean	SE	95% BCa CI
	.2192	.0430	{0.1419, 0.3126}
Effect Size for Indirect Effect	κ^2	SE	95% BCa CI
	.2384	.0397	{0.1652, 0.3215}

6
7
8
9
10
11
12
13
14
15
16

Notes. *b* (YX) = the total effect of the independent variable (structure) on the dependent variable (behavioural engagement). *b* (MX) = the effect of the independent variable on the mediator (basic psychological need satisfaction). *b* (YM.X) = the effect of the mediator on the dependent variable, controlling for the independent variable. *b* (YX.M) = the effect of the independent variable on the dependent variable, controlling for the mediator. κ^2 = standardised value of the indirect effect, where 0 implies no linear indirect effect and 1 implies that the indirect effect is as large as it could have been (Preacher & Kelley, 2011).
*** $p < .001$

1
2
3
4
5

Table 3
Conditional indirect effect of structure from coaches to athletes' behavioural engagement through their basic psychological need satisfaction.

Sample Size = 245 Number of Bootstrap Resamples = 5,000			
Mediator Variable Model (DV = Basic Psychological Need Satisfaction)			
Predictor	<i>b</i>	<i>SE</i>	<i>t</i>
Structure (a_1)	-.6771	.2066	-3.28**
Autonomy Support	-.6120	.2287	-2.68**
Interaction (a_3)	.1812	.0432	4.19***
Dependent Variable Model (DV = Behavioural Engagement)			
Predictor	<i>b</i>	<i>SE</i>	<i>t</i>
Basic Psychological Need Satisfaction (b_1)	.5986	.0651	9.19***
Structure	-.2736	.2134	-1.28
Autonomy Support	-.0836	.2345	-0.36
Interaction	.0541	.0452	1.19
Conditional Indirect Effect at Different Values of Moderator			
Values of Moderator	$(a_1 + a_3W) b_1$	<i>SE</i>	<i>z</i>
1 <i>SD</i> Below the Mean	.0023	.0489	0.48
At the Mean	.1216	.0439	2.77**
1 <i>SD</i> Above the Mean	.2409	.0590	4.09***

6

7 *Notes.* The conditional indirect effect is calculated by $(a_1 + a_3W) b_1$, where a_1 is the path from
8 structure to basic psychological need satisfaction (from the mediator variable model), a_3 is
9 the path from the interaction of structure with autonomy support to basic psychological need
10 satisfaction (from the mediator variable model), W is autonomy support, and b_1 is the path
11 from basic psychological need satisfaction to behavioural engagement (from the dependent
12 variable model).

13 ** $p < .01$, *** $p < .001$

14

1
2
3
4
5

Table 4
Unconditional indirect effect of structure from coaches to athletes' behavioural disaffection through their basic psychological need satisfaction.

Sample Size = 245			
Number of Bootstrap Resamples = 5,000			
Direct and Total Effects	<i>b</i>	<i>SE</i>	<i>t</i>
<i>b</i> (YX)	-.1909	.0567	-3.37***
<i>b</i> (MX)	.3298	.0501	6.59***
<i>b</i> (YM.X)	-.4159	.0676	-6.15***
<i>b</i> (YX.M)	-.0538	.0573	-0.94
Indirect Effect and Significance Using Normal Distribution	Effect	SE	z
	-.1372	.0307	-4.47***
Bootstrap Results for Indirect Effect	Mean	SE	95% BCa CI
	-.1372	.0322	{-0.2113, -0.0841}
Effect Size for Indirect Effect	κ^2	SE	95% BCa CI
	.1463	.0307	{0.0919, 0.2141}

6
7
8
9
10
11
12
13
14
15

Notes. *b* (YX) = the total effect of the independent variable (structure) on the dependent variable (behavioural disaffection). *b* (MX) = the effect of the independent variable on the mediator (basic psychological need satisfaction). *b* (YM.X) = the effect of the mediator on the dependent variable, controlling for the independent variable. *b* (YX.M) = the effect of the independent variable on the dependent variable, controlling for the mediator. κ^2 = standardised value of the indirect effect, where 0 implies no linear indirect effect and 1 implies that the indirect effect is as large as it could have been (Preacher & Kelley, 2011).
*** $p < .001$

1
2
3
4
5

Table 5
Conditional indirect effect of structure from coaches to athletes' behavioural disaffection through their basic psychological need satisfaction.

Sample Size = 245 Number of Bootstrap Resamples = 5,000			
Mediator Variable Model (DV = Basic Psychological Need Satisfaction)			
Predictor	<i>b</i>	<i>SE</i>	<i>t</i>
Structure (a_1)	-.6771	.2066	3.28**
Autonomy Support	-.6120	.2287	2.68**
Interaction (a_3)	.1812	.0432	4.19***
Dependent Variable Model (DV = Behavioural Disaffection)			
Predictor	<i>b</i>	<i>SE</i>	<i>t</i>
Basic Psychological Need Satisfaction (b_1)	-.3617	.0708	-5.11***
Structure	-.1385	.2320	-0.60
Autonomy Support	-.5515	.2549	-2.16*
Interaction	.0517	.0492	1.05
Conditional Indirect Effect at Different Values of Moderator			
Values of Moderator	$(a_1 + a_3W) b_1$	<i>SE</i>	<i>z</i>
1 <i>SD</i> Below the Mean	-.0013	.0295	-0.04
At the Mean	-.0727	.0295	-2.47*
1 <i>SD</i> Above the Mean	-.1441	.0435	-3.31***

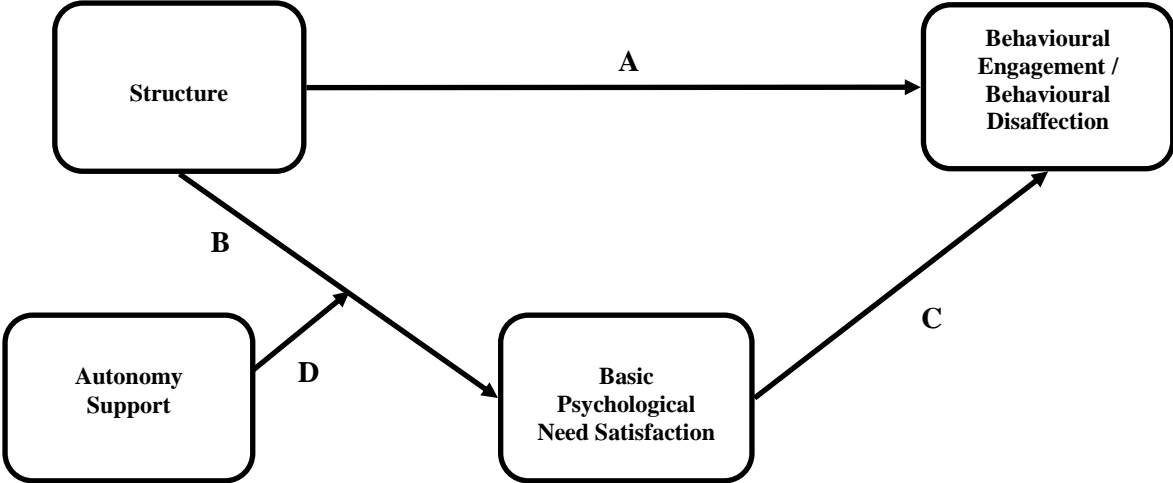
6

7 *Notes.* The conditional indirect effect is calculated by $(a_1 + a_3W) b_1$, where a_1 is the path from
8 structure to basic psychological need satisfaction (from the mediator variable model), a_3 is
9 the path from the interaction of structure with autonomy support to basic psychological need
10 satisfaction (from the mediator variable model), W is autonomy support, and b_1 is the path
11 from basic psychological need satisfaction to behavioural disaffection (from the dependent
12 variable model).

13 * $p < .05$, ** $p < .01$, *** $p < .001$

14

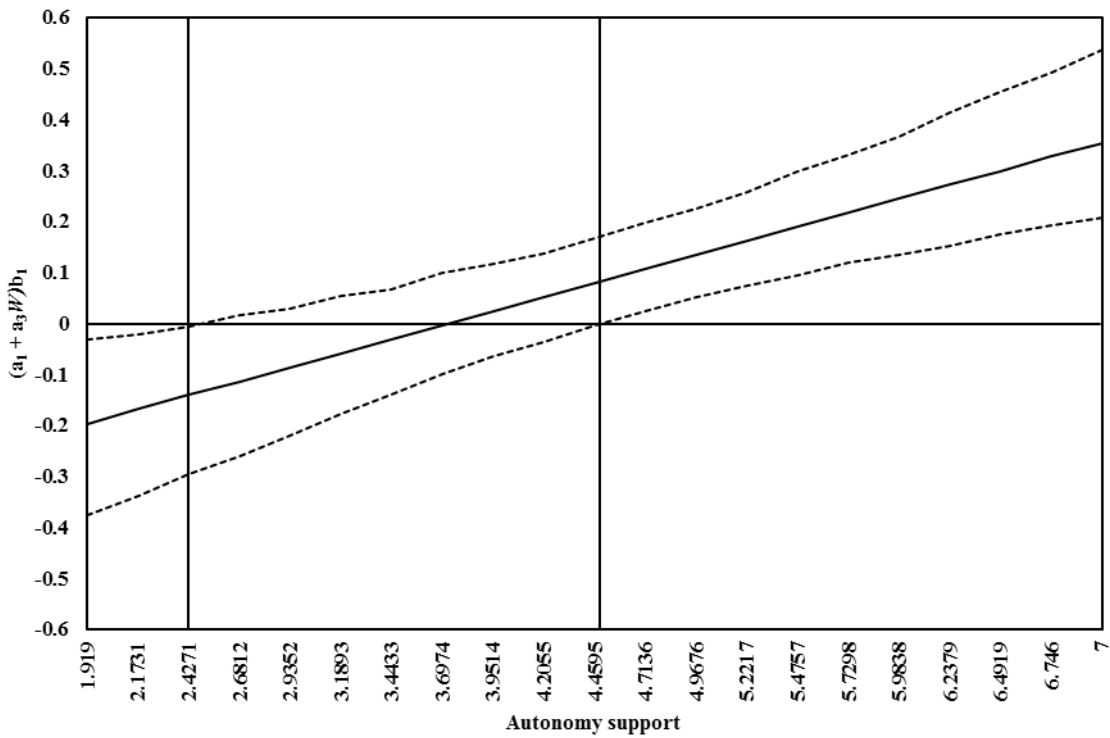
1



2
3
4

Figure 1. The hypothesized conditional process model.

1
2

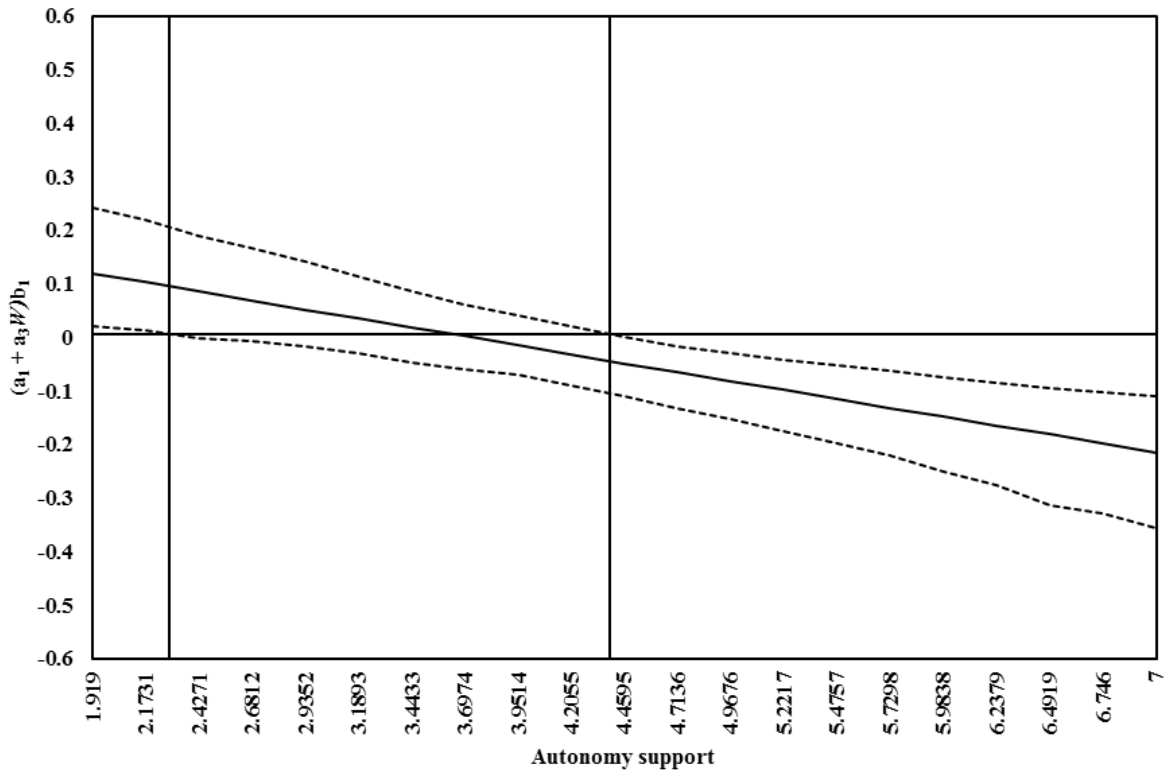


3
4
5
6
7
8
9
10
11
12
13

Figure 2. Plot of the conditional indirect effect of structure from coaches to athletes' behavioural engagement through their basic psychological need satisfaction.

Notes. $(a_1 + a_3W)b_1$ = the conditional indirect effect. The solid plot depicts the trajectory of the conditional indirect effect, and the dashed plots depict the upper and lower limits of the 95% BCa CI. The vertical lines depict the boundaries of the regional significance of the conditional indirect effect.

1



2

3

4

Figure 3. Plot of the conditional indirect effect of structure from coaches to athletes' behavioural disaffection through their basic psychological need satisfaction.

5

6

7

8

Notes. $(a_1 + a_3W)b_1$ = the conditional indirect effect. The solid plot depicts the trajectory of the conditional indirect effect, and the dashed plots depict the upper and lower limits of the 95% BCa CI. The vertical lines depict the boundaries of the regional significance of the conditional indirect effect.

9

10

11

12

13

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Appendix A

Items for the modified version of the Teacher as a Social Context Questionnaire

1. Every time I do something wrong, my coach acts differently
2. My coach gives me a lot of choices about how to do the tasks in football
3. My coach doesn't make it clear what he/she expects of me in football
4. My coach is always getting on my case about work in football
5. My coach shows me how to complete tasks for myself
6. My coach makes sure I understand before he/she moves on
7. My coach talks about how I can use the things we learn in training
8. My coach keeps changing how he/she acts towards me
9. My coach doesn't give me much choice about how I do activities in football
10. My coach always tells me what he/she expects of me in football
11. It seems like my coach is always telling me what to do
12. If I can't complete a task, my coach shows me different ways to try to help me
13. My coach checks to see if I'm ready before he/she starts a new activity
14. My coach doesn't explain why what I do in football is important to me
15. My coach listens to my ideas
16. My coach doesn't listen to my opinion

Notes. Items 2, 4, 7, 9, 11, 14, 15, and 16 were used to assess autonomy support. Items 1, 3, 5, 6, 8, 10, 12, and 13 were used to assess structure. Items 1, 3, 4, 8, 9, 11, 14, and 16 were reverse scored.