



Citation for published version:

Curran, T, Hill, AP, Hall, HK & Jowett, GE 2014, 'Perceived coach behaviours and athletes' engagement and disaffection in youth sport: The mediating role of the psychological needs', *International Journal of Sport Psychology*, vol. 45, no. 6, pp. 559-580.

Publication date:
2014

Document Version
Peer reviewed version

[Link to publication](#)

University of Bath

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

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
27
28
29
30
31
32
33
34

Perceived coach behaviors and athletes' engagement and disaffection in youth sport: The mediating role of the psychological needs.

Thomas Curran¹, Andrew, P. Hill², Howard, K. Hall³ & Gareth, E. Jowett³
University of Gloucestershire, UK¹.
University of Leeds, UK².
York St John University, UK³

Author Notes

Thomas Curran, Faculty of Applied Sciences, University of Gloucestershire, UK; Andrew P. Hill, Faculty of Biological Sciences, University of Leeds, UK; Howard, K. Hall & Gareth, E. Jowett, Faculty of Health and Life Sciences, York St John University, UK.

Address correspondence to Thomas Curran, Faculty of Applied Sciences, University of Gloucestershire, Oxstalls Lane, Gloucester, Gloucestershire, GL2 9HW UK; E-mail: tcurran@glos.ac.uk

Curran, T. Hill, A. P., Hall, H. K., & Jowett, G. E. (in press). Perceived coach behaviors and athletes' engagement and disaffection in youth sport: The mediating role of the psychological needs. *International Journal of Sport Psychology*.

Abstract

Understanding how coaches influence adolescents' levels of engagement and disaffection in youth sport is important in light of the high attrition in this population. Grounded in self-determination theory, we proposed and tested a mediation model that described pathways linking perceptions of coach behavior (autonomy supportive versus controlling) to adolescents' engagement and disaffection via psychological need satisfaction and thwarting in youth sport. One-hundred and fifty-three young soccer players ($M_{age} = 13.96 \pm 1.41$) completed a questionnaire that assessed the study variables. Structural equation modelling supported the hypothesised model. Perceptions of autonomy support positively predicted psychological need satisfaction which, in turn, positively predicted engagement. Perceptions of controlling behaviors positively predicted psychological need thwarting which, in turn, positively predicted disaffection. In addition, a number of cross-over paths emerged. The findings substantiate claims that encouraging self-directed action, and reducing controlling behaviors, is critical in order to foster engagement and avoid disaffection in youth sport.

Keywords: Motivation, Athlete, Psychological Need Satisfaction, Autonomy Support

1 Participation in youth soccer is a popular pastime for children and adolescents.
2 Indeed, according to the Federation Internationale de Football Association (FIFA,
3 2007), 22 million of those under the age of 16 play the game regularly worldwide. Yet
4 beyond this age, participation in youth sports such as soccer decreases sharply
5 (Department for Culture, Media and Sport, 2012a). In the United Kingdom, for
6 instance, estimates suggest that as many as 25,000 16 year-olds drop out of youth
7 sport each year and more than half of the population over 16 do not participate in any
8 sport at all (Department for Culture, Media and Sport, 2010; 2012b). One important
9 antecedent of continued participation is perceived coach behavior (Gervis & Dunn,
10 2004; Horn, 2008). Understanding coach behaviour and how it shapes experiences in
11 youth sports such as soccer is therefore essential in order to promote participation
12 beyond late adolescence.

13 **Behavioral engagement and disaffection in youth sport**

14 Adolescents who continue participation in youth sport appear outwardly to be
15 displaying a pattern of behavior akin to engagement. Numerous models of
16 engagement have been proposed in the contexts of work, education, and sport (e.g.,
17 Appleton, Christenson, & Furlong, 2008; Lonsdale, Hodge & Raedeke, 2007;
18 Schaufeli, Salanova, González-Romá, & Bakker, 2002). One of the most prominent
19 approaches to engagement is that developed by Skinner and colleagues (e.g., Skinner,
20 Kindermann, Connell & Wellborn, 2009; Skinner, Kindermann & Furrer, 2009;
21 Skinner, Furrer, Marchand & Kinderman, 2008). According to these researchers, the
22 primary feature of engaged behavior is proactive and energetic involvement in
23 achievement activities. It encompasses an array of self-regulatory strategies, including
24 effort exertion and persistence, as well as mental efforts such as concentration,
25 attention, asking questions, and contributing to discussions. Engagement is important
26 to understand because it is linked to a number of adaptive outcomes for adolescents

1 that include greater well-being and task adherence (e.g., Blair & Razza, 2007; Duda,
2 2001; Guthrie, Schafer, & Huang, 2001).

3 The antithesis of engagement is disaffection. In contrast to engagement,
4 disaffection captures passive and reactive behaviors reflecting a lack of self-
5 regulation. These behaviors encompass disinterest, a lack of initiation, a lack of effort,
6 and giving up. Disaffection also includes indicators of ritualistic participation and
7 mental withdrawal, such as a lack of attention and concentration. Considered
8 alongside engagement, disaffected behaviors provide additional insight into youth
9 sport. This is because they are linked to a number of maladaptive outcomes for
10 adolescents that include greater ill-being and higher attrition (e.g., Furrer, Skinner,
11 Marchand, & Kindermann, 2006; Kirk, 2005; Skinner et al., 2009).

12 **Self-determination theory**

13 Self-determination theory (SDT; Deci & Ryan, 2008; Niemiec, Ryan, & Deci,
14 2010) can be used to explain the coach behaviors that catalyze engagement and
15 disaffection in youth sport. SDT is a macro-theory of human motivation with
16 applications to sport and exercise (Standage & Ryan, 2012). According to SDT, two
17 coach motivational styles create the conditions necessary for engagement and
18 disaffection. The first, autonomy support, refers to the degree to which coaches
19 encourage athletes to take initiative in sport and be active problem-solvers, provide
20 meaningful rationales for necessary limits, and take an athlete, rather than coach
21 perspective (Mageau & Vallerand, 2003). Such provisions are understood to allow
22 youth sports participants to endorse external events as personally meaningful and,
23 thus, cultivate their engagement. In support of this tenet of SDT, numerous studies
24 have found perceptions of autonomy support to predict attentive, effortful, persistent,
25 and active participation in sport (e.g., Curran, Hill & Niemiec, 2013; Sarrazin,
26 Vallerand, Guillet, Pelletier & Cury, 2002; Smith, Ntoumanis, & Duda, 2007).

1 The second motivational style is controlling behavior. It refers to the degree to
2 which coaches apply pressure to athletes to meet demands, solve problems on behalf
3 of athletes and adopt their own perspective, rather than the athlete's perspective
4 (Bartholomew, Ntoumanis & Thøgersen-Ntoumani, 2009; Mageau & Vallerand,
5 2003). These provisions are thought to socially impose the relevance of external
6 events to youth sports participants without cultivating personal relevance and, thus,
7 disaffection. In comparison to the amount of research examining autonomy support,
8 little empirical research has examined the role of controlling behavior by coaches in
9 adolescents' experiences in sport. However, support for this tenet of SDT is offered by
10 qualitative studies in which many adolescents have reported controlling coach
11 behavior as central to their decisions to withdraw (Fraser-Thomas & Côté, 2009;
12 Fraser-Thomas, Côté & Deakin, 2008).

13 **SDT's mediation model of behavioral engagement and disaffection**

14 To explain the effects of coach motivational style on adolescents' engagement
15 and disaffection in youth sport, SDT proposes a mediation model (see Jang, Kim &
16 Reeve, 2012) based on an organismic-dialectic outlook (Reeve, Deci & Ryan, 2004;
17 Vansteenkiste & Deci, 2004). This outlook purports that human beings have innate
18 motivational resources which interact with the social-context to promote optimal
19 functioning (Ryan & Deci, 2000). These motivational resources take the form of three
20 basic psychological needs. Autonomy is the need to experience behavior as
21 originating from within the self. It represents the inner endorsement and self-
22 determination of one's behavior (Deci & Ryan, 1985). Competence is the need to feel
23 that one can effectively negotiate their interactions with the environment. It reflects
24 the innate desire to approach and master achievement-oriented tasks (Deci, 1975).
25 Finally, relatedness is the need to create close bonds and attachments with significant
26 others. It embodies the will to be immersed in caring and reciprocally appreciated

1 inter-personal relationships (Ryan, 1995). In sport and exercise settings, a growing
2 body of research supports the role of the psychological needs in promoting
3 persistence, effort and adherence (e.g., Sarrazin et al., 2002; Smith, Ntoumanis, Duda
4 & Vansteenkiste, 2011; Teixeira et al., 2012).

5 Returning to SDT's mediation model, these psychological needs represent a
6 unifying principle – linking coach behaviors to the behavioral outcomes exhibited by
7 youth sports participants (Vansteenkiste & Ryan, 2013). A number of studies in sport,
8 and in other domains, have supported this mediation model as it relates to children's
9 cognitions and affect (e.g., Adie, Duda & Ntoumanis, 2008; Jang et al., 2012;
10 Reinboth, Duda & Ntoumanis, 2004). This research has typically focused on
11 examining the benefits of perceived autonomy support and psychological need
12 satisfaction. Reinboth et al (2004), for instance, found that perceived autonomy
13 support from coaches positively correlated with psychological need satisfaction
14 which, in turn, correlated positively with vitality and life satisfaction in a sample of
15 youth sports participants. Similar findings have also been reported by Adie and
16 colleagues (Adie et al., 2008; Adie, Duda & Ntoumanis, 2012), who observed that
17 perceived coach autonomy support was positively associated with the psychological
18 needs which, in turn, correlated positively with vitality in adult and adolescent
19 athletes.

20 Research has more recently begun to examine perceptions of controlling
21 behavior by coaches and psychological need thwarting – the perception that the
22 psychological needs are actively frustrated (as opposed to simply unmet). Work
23 conducted by numerous researchers is similarly supportive of SDT's mediation model
24 in this regard. Specifically, in addition to replicating findings regarding autonomy
25 support and need satisfaction, this research has reported that perceived controlling
26 behaviors by coaches positively predicted psychological need thwarting which, in

1 turn, positively predicted negative affect, depression, and burnout among adult and
2 adolescent athletes (Bartholomew, Ntoumanis, Ryan & Thøgersen-Ntoumani, 2011;
3 Balaguer, González, et al., 2012). In addition, this research suggests that the effects of
4 psychological need thwarting on negative outcomes extend beyond the contributions
5 made by psychological need satisfaction (Gunnell, Crocker, Wilson, Mack & Zumbo,
6 2013). Therefore, owing to its unique explanatory ability in negative outcomes, the
7 inclusion of the pathway from controlling behaviors to psychological need thwarting
8 in SDT's mediation model appears to be important.

9 In light of the importance of both pathways in SDT's mediation model,
10 research has begun to examine the unique and collective effects of psychological need
11 satisfaction and thwarting in SDT's mediation model. Bartholomew, Ntoumanis, Ryan
12 and Thøgersen-Ntoumani (2011), for example, compared the predictive ability of
13 psychological need satisfaction and thwarting and found significant effects of both on
14 athletes' vitality, but only psychological need thwarting was a significant predictor of
15 athlete burnout. Similar findings are also evident in the work of Balaguer et al. (2012)
16 and Gunnell et al. (2013) and suggest that there are occasions when psychological
17 need satisfaction and thwarting operate in tandem and others when they operate
18 separately depending on the outcomes assessed. Consequently, examination of the
19 unique (captured via two separate pathways) and collective (captured via two separate
20 pathways and two cross-over pathways) influences of psychological need satisfaction
21 and thwarting is likely to offer further insight into their influence on negative and
22 positive experiences in sport.

23 **The present research**

24 The present research, then, had two aims. First, we intended to build upon the
25 work of Bartholomew et al (2011) and others (Balaguer et al., 2012; Gunnell et al.,
26 2013) by testing SDT's mediation model in relation to engagement and disaffection in

1 youth sport (see Figure 1). In this model, autonomy support from coaches was
2 hypothesised to positively predict athletes' psychological need satisfaction which, in
3 turn, was hypothesised to positively predict their engaged behavior. By contrast,
4 coaches' provision of a controlling motivational style was hypothesised to positively
5 predict athletes' psychological need thwarting which, in turn, was hypothesised to
6 positively predict their disaffected behavior.

7 In testing this model, the second aim of the present research was to identify the
8 unique and collective effects of the psychological needs (both satisfaction and
9 thwarting) on engagement and disaffection. To do this, in addition to the hypothesised
10 parallel paths, the cross-over paths in SDT's mediation model were also examined
11 (Figure 1; dashed arrows). On the basis of SDT, it was hypothesised that perceived
12 autonomy support from coaches would negatively predict athletes' psychological need
13 thwarting which, in turn, would negatively predict their engagement. By contrast,
14 perceived control from coaches was expected to negatively predict athletes'
15 psychological need satisfaction which, in turn, would negatively predict their
16 disaffection.

17 **Method**

18 **Participants and procedure.** One-hundred and fifty-three (115 male, 38
19 female; M age = 13.96 years, s = 1.41, range = 12-18) young recreational soccer
20 players were the sample of this study. The participants reported that they had been
21 playing soccer for an average of 7.04 (SD = 2.21) years and had been attached to their
22 clubs for an average of 3.56 (SD = 2.39) years. Prior to data collection, ethical
23 approval was provided by the research ethics committee of a British University and
24 parental consent was sought for the children's participation. Data collection was
25 conducted in a training session setting, where the lead author was on hand at all times
26 to give general instructions and answer any questions. A multi-section questionnaire

1 was given to the participants. The questionnaire took approximately 20 minutes to
2 complete.

3 **Instruments.** All items were responded to on a seven-point Likert scale,
4 which ranged from 1 (*not true at all*) to 7 (*very true*).

5 **Behavioral engagement and disaffection.** Engaged and disaffected behaviors
6 were assessed using the behavioral sub-scales of the Engagement Versus Disaffection
7 with Learning Scale (EVDLS; Skinner et al., 2009; Wellborn, 1991). These items
8 were adapted to focus participants on soccer training. Behavioral engagement was
9 measured using five items that tapped athletes' effort, attention, and persistence while
10 participating in soccer (e.g. "I try hard to do well in training"). Behavioral disaffection
11 was assessed using five items that tapped athletes' lack of effort and withdrawal from
12 soccer (e.g. "In training, I do just enough to get by"). These scales have been found to
13 be valid and internally reliable in educational contexts (Skinner et al., 2008; Skinner,
14 Kindermann & Furrer, 2009).

15 As the scale was adapted in the current study, it was considered necessary to
16 more closely assess its psychometric properties. The factor structure of the adapted
17 EVDLS for youth sport was thus examined using confirmatory factor analysis,
18 employing structural equation modelling with maximum likelihood estimation. A
19 measurement model was stipulated that included two correlated latent factors:
20 behavioral engagement (five observed indicators) and behavioral disaffection (five
21 observed indicators). This model demonstrated acceptable fit to the observed data: χ^2
22 (34) = 88.10, $p < .001$; $\chi^2/df = 2.59$; TLI = .92; CFI = .92; SRMR = .07; RMSEA
23 = .10 (Hu & Bentler, 1995; Hu & Bentler, 1995; Marsh, Hau & Wen, 2004;
24 Schermelleh-Engel, Moosbrugger, & Müller, 2003). Consequently, the analyses
25 supported the use of the adapted sub-scales.

1 **Psychological need satisfaction.** Psychological need satisfaction was assessed
2 using the Basic Need Satisfaction in Sport Scale (BNSSS adapted for soccer; Ng,
3 Lonsdale & Hodge, 2011). This twenty-item scale measures three aspects of
4 autonomy satisfaction; choice (four items; e.g. “In soccer, I can take part in the
5 decision-making process”), volition (three items e.g. “I feel I participate in soccer
6 willingly”), and internal locus of control (three items; e.g. “In soccer, I feel I am
7 pursuing goals that are my own”), relatedness satisfaction (five items; e.g. “In soccer,
8 I feel close to other people”), and competence satisfaction (five items; e.g. “I have the
9 ability to perform well in soccer”). The three aspects of autonomy were averaged to
10 produce a score of total autonomy in current study. This scale has been found to
11 possess adequate psychometric properties in sport (see Ng et al., 2011).

12 **Psychological need thwarting.** Psychological need thwarting was measured
13 using the Psychological Need Thwarting Scale (PNTS adapted for soccer;
14 Batholomew, Ntoumanis, Ryan & Thogersen-Ntmoumani, 2011). This twelve-item
15 scale measures autonomy thwarting (four items; e.g. “I feel pushed to behave in
16 certain ways in soccer.”), relatedness thwarting (four items; e.g. “I feel others in
17 football can be dismissive of me.”), and competence thwarting (four items; e.g. “There
18 are situations in soccer where I am made to feel inadequate.”). This scale has been
19 found to possess adequate psychometric properties in sport (see Bartholomew et al.,
20 2011).

21 **Perceived autonomy support.** An adapted sport version (Gillet, Vallerand,
22 Paty, Gobanche, Berjot, 2010) of the Perceived Autonomy Support Scale for Exercise
23 Settings (PASSSES; Hagger, Chatzisarantis, Hein, Pihu, Soos &Karsai, 2007) was
24 employed to measure perceived coach autonomy support. This twelve-item inventory
25 taps athletes’ perceptions of their coaches’ provision of autonomy support (e.g. “I feel
26 that my coach provides me with choices, options and opportunities about whether to

1 play soccer”). This adapted version of the PASSES has been found to possess
2 adequate psychometric properties in sport (see Gillet et al., 2010).

3 **Perceived controlling motivational style.** The Controlling Coach Behaviors
4 Scale (CCBS; Bartholomew et al., 2010) was employed to measure perceived coach
5 controlling motivational style. This fifteen-item inventory measures athletes’
6 perceptions of their coaches controlling use of rewards (four items; e.g. “My coach
7 only uses rewards or praise to make me train harder”), negative conditional regard
8 (four items; e.g. “My coach pays me less attention if I have displeased him/her”),
9 intimidation (four items; e.g. “My coach threatens to punish me to keep me in line in
10 training”), and excessive personal control (three items; e.g. “My coach tries to control
11 what I do during my free time”). This scale has also been found to possess adequate
12 psychometric properties in sport (see Bartholomew et al., 2010).

13 **Analytical strategy.** Structural equation modelling (AMOS version 18.0;
14 Arbuckle, 2007) with maximum likelihood estimation was the primary data analysis
15 strategy. Using a two-step method, a confirmatory factor analysis was first used to
16 assess the measurement model and was followed by an assessment of the hypothesised
17 model (Anderson & Gerbing, 1988). This approach first establishes the fit of the
18 measurement model by examining the relation of the observed variables (e.g.,
19 psychological need satisfaction) to their underlying constructs (e.g., autonomy,
20 competence, and relatedness). Secondly, this approach then establishes the fit of the
21 structural model (i.e., Figure 1) by comparing the hypothesised variance-covariance
22 matrix to the sample variance-covariance matrix. If the two variance-covariance
23 matrices are closely matched (implied by fit indices), the conclusion is that the
24 hypothesised model approximates the data well.

25 To determine the statistical significance of the mediated pathways in the
26 current study, indirect effects were calculated and their 95% confidence intervals were

1 derived using a distribution of the products method (*PRODCLIN* programme;
2 MacKinnon, Fritz, Williams & Lockwood, 2007). Indirect effects are the product of
3 the coefficients (i.e., *ab*; Hayes, 2009), where *a* is the path from the predictor to the
4 mediator and *b* is the path from the mediator to the criterion. The 95% confidence
5 interval denotes the upper and lower boundary of an indirect effect that would be
6 observed 95 times out of 100 if a sample of the same size were to be drawn from the
7 population. Provided that a null or zero effect is not observed between the upper and
8 lower bound of the 95% confidence interval, the indirect effect is deemed significant
9 at the $p < .05$ level.

10 **Results**

11 **Preliminary analysis.** Missing value analysis revealed that there were 113
12 complete cases and 40 incomplete cases. Of the cases with incomplete data, none had
13 more than 3 items missing ($M = 1.38$, $SD = .66$, range = 1-3). Missing values were
14 therefore replaced with the mean of the non-missing items in the respective sub-scale
15 for each individual case (Graham, Cumsille & Elek-Fisk, 2003). A central assumption
16 of structural equation modelling is a normal distribution. However, while the data was
17 considered approximately univariate normal (absolute skewness $M = .16$, $SD = .49$,
18 $SE = .12$; absolute kurtosis $M = .54$, $SD = .29$, $SE = .39$), estimates of multivariate
19 kurtosis (Mardia's normalised coefficient = 27.52) indicated the data was multivariate
20 asymmetrical (Kline, 1998). Conventional modelling using maximum likelihood
21 estimation is robust to small violations of normality (McDonald & Ho, 2002).

22 However, concerns arise regarding the type I error attached to the chi-square statistic
23 under circumstances of moderate to major violations (Curran, West, & Finch, 1996).

24 This problem was remedied in two ways. Firstly, model fit was not solely
25 based on the interpretation of the chi-square. Following guidelines provided by Hu &
26 Bentler (1995), two absolute (Standardised Root Mean Square Residual [SRMR] and

1 Root Mean Squared Error of Approximation [RMSEA]) and two incremental (Tucker
2 Lewis Index [TLI] and Confirmatory Fit Index [CFI]) fit indexes were reported. Fit
3 was deemed acceptable in the current study if; TLI and CFI > .90 and RMSEA < .10
4 (Hu & Bentler, 1995; Marsh et al., 2004; Schmeller-Engel et al., 2003). Secondly,
5 structural equation analysis was followed by a bootstrapping procedure that drew
6 5000 replication samples to test parameter stability. Bootstrapping produces an
7 empirical representation of the sampling distribution of path coefficients by treating
8 the observed sample as a representation of the population in miniature, one that is
9 repeatedly resampled as a means of reproducing the original sampling process (Hayes,
10 2009). Provided the bootstrap estimate closely approximates the sample coefficient,
11 high path stability can be inferred.

12 **Assessment of the measurement model.** The measurement model consisted
13 of seven related latent factors that represented all study variables. Scores for each item
14 were used as the measured variables for the latent engagement and disaffection
15 factors. Subscales were used as measured variables for the latent factors; perceived
16 controlling motivational style, psychological need satisfaction and psychological need
17 thwarting. As perceived autonomy support contained a large number of items, three
18 random parcels of items were used as manifest variables (Little, Cunningham, Shahar
19 & Wilderman, 2002). Standardised factor loadings for the manifest variables were
20 significant (autonomy support $M \beta = .88$, range = .78-.93; control $M \beta = .83$, range =
21 .68-.97; psychological need satisfaction $M \beta = .86$, range = .79-.96; psychological
22 need thwarting $M \beta = .85$, range = .79-.91; engagement $M \beta = .75$, range = .63-.85;
23 disaffection $M \beta = .64$, range = .50-.83), and each of these latent factors demonstrated
24 acceptable composite reliability (see Table 1; Nunnally & Bernstein, 1994).
25 Furthermore, the measurement model exhibited an acceptable fit to the data: $\chi^2 =$
26 377.86 (215), $p < .05$; $\chi^2/df = 1.57$; TLI = .92; CFI = .93; SRMR = .06; RMSEA = .07

1 and the error free correlations between all latent factors were in the expected
2 directions and significant (see Table 1).

3 **Structural equation modelling.** The hypothesised model that was tested can
4 be seen in Figure 2. Fit indexes suggested the hypothesized model possessed an
5 adequate fit to the data: $\chi^2(221) = 422.14$, $p < .05$; $\chi^2/df = 1.91$; TLI = .90; CFI = .92;
6 SRMR = .07; RMSEA = .08. Autonomy support predicted psychological need
7 satisfaction ($\gamma = .68$, $p < .01$) and thwarting ($\gamma = -.31$, $p < .01$). Likewise, a controlling
8 motivational style predicted psychological need satisfaction ($\gamma = -.21$, $p < .01$) and
9 thwarting ($\gamma = .51$, $p < .01$). Psychological need satisfaction, in turn, predicted
10 behavioral engagement ($\beta = .78$, $p < .01$) and disaffection ($\beta = -.44$, $p < .01$).
11 Psychological need thwarting predicted behavioral disaffection ($\beta = .23$, $p < .05$) but
12 not engagement ($\beta = .00$, $p > .05$). The hypothesised model accounted for 65% of the
13 variance in psychological need satisfaction, 52% of the variance in psychological need
14 thwarting, 61% of the variance in behavioral engagement and 35% of the variance in
15 behavioral disaffection.

16 **Bootstrap analysis.** Bootstrapping was employed to test the stability of the
17 hypothesised model parameters. The resulting means for each standardised path
18 coefficient across the 5000 iterations were almost identical to those derived from the
19 maximum likelihood estimation method (see Table 1). Therefore, high parameter
20 stability can be inferred.

21 **Indirect effects.** Specific indirect effects were calculated to further test the
22 mediating role of psychological need satisfaction and thwarting. With the exception of
23 the specific indirect effects of the two inter-personal styles on engagement via
24 psychological need thwarting, all specific indirect effects were significant (see Table
25 2).

26 **Discussion**

1 The purpose of this study was two-fold. First, we intended to test SDT's
2 mediation model in relation to behavioral engagement and behavioral disaffection in
3 youth sport. In this model, perceived autonomy support from coaches was
4 hypothesised to positively predict athletes' psychological need satisfaction which, in
5 turn, was hypothesised to positively predict their engagement. By contrast, perceived
6 control from coaches was hypothesised to positively predict athletes' psychological
7 need thwarting which, in turn, was hypothesised to positively predict their
8 disaffection. Second, in addition to the hypothesised parallel paths, the cross-over
9 paths were concurrently tested to examine unique and collective effects in SDT's
10 mediation model. It was hypothesised that perceived autonomy support from coaches
11 would negatively predict athletes' psychological need thwarting which, in turn, would
12 negatively predict their engagement. By contrast, perceived controlling behavior from
13 coaches was expected to negatively predict athletes' psychological need satisfaction
14 which, in turn, would negatively predict their disaffection.

15 Findings indicated that the hypothesised model possessed an adequate fit to the
16 observed data. Furthermore, the parallel paths were significant and in the hypothesised
17 directions. Additional support for the model was provided by the indirect effects, with
18 all but two (those containing a non-significant cross-over path from psychological
19 need thwarting to engagement) reaching significance. As regards the second aim of
20 this study, with the exception of the psychological need thwarting to engagement path,
21 the hypothesised cross-over paths were also statistically significant and in the
22 expected directions.

23 **Relationships between perceptions of the coach and youth sports participants'** 24 **engagement and disaffection**

25 At the zero-order level, the provision of autonomy support from coaches
26 positively correlated with engagement and negatively correlated with disaffection. By

1 contrast, a controlling motivational style negatively correlated with engagement and
2 positively correlated with disaffection. These findings indicate that the two types of
3 coaching behavior have a differential relationship with engagement and disaffection in
4 a manner observed for affective outcomes by others (Adie et al., 2008; Bartholomew,
5 Ntoumanis, Ryan & Thøgersen-Ntoumani, 2011; Balaguer et al., 2012; Reinboth et
6 al., 2004). In doing so, the results substantiate the notion that encouraging self-
7 directed action and tempering the use of controlling behavior have high predictive
8 utility in sport. Notably, in an extension to extant research, our findings indicate that
9 the predictive utility of perceived autonomy support and control extend to the
10 adherence and attrition fostering self-regulatory strategies (e.g., attention, persistence
11 and effort versus passivity, disinterest and a lack of initiation) evident in engagement
12 and disaffection.

13 **SDT's mediation model**

14 Consistent with findings from previous research (Adie et al., 2008;
15 Bartholomew, Ntoumanis, Ryan & Thøgersen-Ntoumani, 2011; Balaguer et al., 2012;
16 Jang et al., 2012; Reinboth et al., 2004), the effects of perceived coach autonomy
17 support and perceived coach control to engagement and were mediated, to varying
18 degrees, by the satisfaction and thwarting of the psychological needs. As was
19 expected, perceptions that coaches' provide autonomy support corresponded with
20 higher engagement via higher psychological need satisfaction. Moreover, autonomy
21 supportive coaches also appear to quell disaffection. This is because autonomy
22 support indirectly predicted lower disaffection via lower psychological need thwarting
23 and higher psychological need satisfaction. In this regard the current findings closely
24 mirror the mechanisms described in SDT. Psychological need fulfilment ensures
25 personal endorsement of sports participation and this volitional regulation paves the

1 way for enjoyment, effort and persistence which, here, promotes proactivity and offers
2 resistance to passivity in youth sport (Ntoumanis, 2012).

3 Perceptions of controlling coach behaviors, by contrast, indirectly contributed
4 to higher disaffection and lower engagement. This is because a controlling
5 motivational style predicted higher psychological need thwarting and lower
6 psychological need satisfaction. According to SDT, low psychological need
7 satisfaction and high psychological need thwarting provoke adolescents to relinquish
8 the personal endorsement of their sporting participation for compensatory
9 environmental motives (e.g., others approval, rewards, punishment avoidance). This
10 controlled regulation is influential in athletes' negative affect and boredom
11 (Ntoumanis, 2012) and appears to promote passivity and disinterest as well as a
12 waylay to effort and persistence in youth sport. Overall, these findings support and
13 build upon extant research (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani,
14 2011; Balaguer et al., 2012; Gunnell et al., 2013) by further indicating that
15 psychological need thwarting is important alongside psychological need satisfaction in
16 order to understand positive and negative experiences in sport.

17 Examination of the cross-over pathways provided further insight into the
18 unique and combined effects of the psychological satisfaction and thwarting. The
19 findings provided support for the findings of some previous studies (e.g., Aide et al.,
20 2008; Balaguer et al., 2012; Gunnell et al., 2013), but not others (Bartholomew,
21 Ntoumanis, Ryan & Thøgersen-Ntoumani, 2011), in that psychological need
22 satisfaction uniquely contributed to both positive (viz. engagement) and negative
23 outcomes (viz. disaffection) whereas psychological need thwarting uniquely predicted
24 only disaffection (and not engagement). These effects suggest that although
25 psychological need satisfaction is principally understood to contribute to positive
26 experiences, it can also prevent the emergence of negative experience via a

1 development of the psychological resources necessary for effective coping
2 (Vansteenkiste & Ryan, 2013). By contrast, contrary to expectations, psychological
3 need thwarting appears to elicit only negative experiences with an absence of any
4 effect on positive experience. Accordingly, although less likely to contribute to
5 athletes' disaffection, coaches who merely provide reduced opportunity for
6 psychological need thwarting are unlikely to promote any engagement.

7 **Limitations and future research**

8 The current study has a number of limitations. First, it employed a non-
9 experimental, cross-sectional design. Accordingly, it is not possible to infer causality
10 between the studied variables. Developing this line of research should involve the use
11 of longitudinal data to support the temporal precedence implied by SDT's mediation
12 model. This particularly important in light of Jang et al's (2012) finding that
13 children's psychological need satisfaction and engagement share a reciprocal
14 relationship, and Reeve's (2009) assertion that disaffection may evoke controlling
15 (rather than autonomy-supportive) strategies from socializers over time. Second, data
16 were collected among youth soccer players in the UK. Such a homogeneous sample
17 limits the generalizability of the findings. It is important for future research to
18 examine these dynamics in other, more competitive, sport contexts. Third, the current
19 study did not assess perceptions of structure from coaches. According to SDT,
20 structure refers to the help, support, rules and limits that coaches provide to support
21 children's competence in sport (Mageau & Vallerand, 2003). Recent studies have
22 shown that structure and autonomy support interact to predict higher psychological
23 need satisfaction and engagement in school (Jang, Reeve & Deci, 2010; Sierens,
24 Vansteenkiste, Goossens, Soenens & Dochy, 2009) and sport (Curran et al., 2013).
25 Therefore, it is important for future research to integrate both autonomy support and
26 structure within SDT's mediation model.

1 **Creating bridges between motivation and self-regulation in sport and exercise**

2 The relationship between motivation related concepts (e.g., needs, goals,
3 efficacy) and self-regulation (e.g., planning, monitoring, meta-cognition) is dynamic
4 and reciprocal (Martin, 2012; Zimmerman & Capillo, 2003). SDT offers a distinctive
5 account of this relationship. This is because SDT centres on innate motivational
6 resources (viz. the psychological needs) and how they govern behaviour. This deviates
7 somewhat from other approaches to motivation that might guide practice, such as
8 achievement goal theory (Nicholls, 1984). For example, within achievement goal
9 theory, individual differences (e.g., goal orientations) are understood to be
10 developmentally acquired. By contrast, SDT assumes inherent internal actualisation
11 tendencies reside within each individual that must be cultivated. In addition, in
12 achievement goal theory, high perceptions of competence (regardless of how it is
13 construed) contribute to adaptive self-regulation. However, in SDT, high competence
14 is, in isolation, insufficient to promote optimal self-regulation, as complementary
15 needs for autonomy and relatedness must also be fulfilled (Ryan & Deci, 2000).
16 Although these differences may appear subtle, the ramifications for practice may be
17 considerable if one approach or the other is adopted since coaches might seek to
18 nurture (as opposed to impart) the antecedents of self-regulation by offering support
19 for a wider array of motivation resources (as opposed to just competence).

20 As discussed, within the SDT framework autonomy-support describes the
21 motivational style through which coaches and others create conditions to nurture
22 athletes' inner motivational resources. This includes listening to, and acting upon,
23 athletes' ideas, offering them opportunity to take initiative, providing them with
24 meaningful rationales for necessary limits, acknowledging any negative experiences
25 and providing them with a number of desired choices (Reeve, 2006). Similarly,
26 providing adequate structure that fosters competence is also known to be important

1 (Grolnick & Ryan, 1989). This includes providing rules and limits prior to an activity,
2 help and support during and activity, and informational feedback after an activity
3 (Reeve, 2006). By providing structure in a context of autonomy support, coaches
4 provide fertile conditions for athletes' self-regulation via the concurrent facilitation of
5 autonomy and competence (Curran et al., 2013).

6 Above all, our results underscore the need for effective coach education. In
7 youth sport, coaches are typically parent volunteers (Wiersma & Sherman, 2005) and
8 receive very little formal training in how their behaviors influence athletes' underlying
9 motivation. The key message stemming from this study is that supporting athletes'
10 autonomy, and resisting the temptation to utilize controlling behaviours, is central to
11 the cultivation of positive experiences in youth sport. We therefore encourage a
12 greater focus among sport psychologists on the evaluation of interventions aimed at
13 enhancing coaches' ability to recognise, and support, the psychological needs of their
14 young athletes. By this means, coaches will be better equipped to promote athletes'
15 adaptive self-regulation (viz. engaged behaviors) and, thereby, greater adherence to
16 youth sport.

17 **Acknowledgements**

18 This research was supported by the European Commission under the
19 Framework 7 Program (Health; 2236000) as part of the PAPA Project
20 (www.projectpapa.org). The first author would like to also acknowledge the support
21 of York St John University, UK, where this research took place.

22 **References**

23 Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need
24 satisfaction and the optimal functioning of adult male and female sport
25 participants: A test of basic needs theory. *Motivation and Emotion*, 32, 189-
26 199.

- 1 Adie, J. W., Duda, J. L., & Ntoumanis, N. (2012). Perceived coach-autonomy support,
2 basic need satisfaction and the well-and ill-being of elite youth soccer
3 players: A longitudinal investigation. *Psychology of Sport and Exercise*, 13,
4 51-59.
- 5 Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A
6 review and recommended two-step approach. *Psychological bulletin*, 103,
7 411-423.
- 8 Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with
9 school: Critical conceptual and methodological issues of the
10 construct. *Psychology in the Schools*, 45, 369-386.
- 11 Arbuckle, J. L. (2007). *Amos 16 user's guide*. Chicago: SPSS.
- 12 Balaguer, I., González, L., Fabra, P., Castillo, I., Mercé, J., & Duda, J. L. (2012).
13 Coaches' interpersonal style, basic psychological needs and the well-and ill-
14 being of young soccer players: A longitudinal analysis. *Journal of sports
15 sciences*, 30, 1619-1629.
- 16 Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of
17 controlling motivational strategies from a self-determination theory
18 perspective: Implications for sports coaches. *International Review of Sport
19 and Exercise Psychology*, 2, 215-233.
- 20 Bartholomew, K., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling
21 interpersonal style in a coaching context: Development and initial validation
22 of a psychometric scale. *Journal of Sport and Exercise Psychology*, 32, 193-
23 21.
- 24 Bartholomew, K., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumani, C. (2011).
25 Psychological need thwarting in the sport context: Assessing the darker side
26 of athletic experience. *Journal of Sport and Exercise Psychology*, 33, 75-102.

- 1 Bartholomew, K.J., Ntoumanis, N., Ryan, R.M., Bosch, J.A. & Thøgersen-Ntoumani,
2 C. (2011). Self-determination theory and diminished functioning: The role of
3 interpersonal control and psychological need thwarting. *Personality and*
4 *Social Psychology Bulletin*, 37, 1459-1473.
- 5 Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and
6 false belief understanding to emerging math and literacy ability in
7 kindergarten. *Child development*, 78, 647-663.
- 8 Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of
9 children's behavioral engagement and behavioral disaffection in sport based
10 on self-determination theory. *Journal of Sport and Exercise Psychology*. 35,
11 30-43.
- 12 Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum Press.
- 13 Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in*
14 *human behavior*. New York: Plenum.
- 15 Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological
16 well-being across life's domains. *Canadian Psychology*, 49, 14-23.
- 17 Department for Culture, Media and Sport (2012b). *Taking Part 2011/12 Adult and*
18 *Child Report*. DCMS: London. Retrieved August 13, 2013 from
19 [www.gov.uk/government/uploads/system/uploads/attachment_data/file/7792](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/77920/Taking_Part_2011_12_Annual_Report.pdf)
20 [0/Taking_Part_2011_12_Annual_Report.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/77920/Taking_Part_2011_12_Annual_Report.pdf)
- 21 Department of Culture, Media, and Sport (2010). *Taking Part: The National Survey of*
22 *Culture, Leisure and Sport Adult and Child Report 2009/10*. DCMS: London.
23 Retrieved August 13, 2013 from
24 [www.gov.uk/government/uploads/system/uploads/attachment_data/file/7732](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/77322/TakingPart_AdultChild2009-10_StatisticalRelease.pdf)
25 [2/TakingPart_AdultChild2009-10_StatisticalRelease.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/77322/TakingPart_AdultChild2009-10_StatisticalRelease.pdf)

- 1 Department of Culture, Media, and Sport (2012a). *Creating a sporting habit for life: A*
2 *new sport strategy*. DCMS: London. Retrieved August 13, 2013 from
3 [https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/78318/creating_a_sporting_habit_for_life.pdf)
4 [78318/creating_a_sporting_habit_for_life.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/78318/creating_a_sporting_habit_for_life.pdf)
- 5 Duda, J. L. (2001). Achievement goal research in sport: pushing the boundaries and
6 clarifying some misunderstandings. In G. C. Roberts (Ed.), *Advances in*
7 *motivation in sport and exercise*. Champaign, IL: Human Kinetics.
- 8 Federation Internationale de Football Association (2007). *FIFA big count 2006: 270*
9 *million people active in football*. Retrieved February 20, 2012, from
10 [www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.statspackage_7024](http://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.statspackage_7024.pdf)
11 [.pdf](http://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.statspackage_7024.pdf)
- 12 Fraser-Thomas, J., & Côté, J. (2009). Understanding adolescents' positive and
13 negative developmental experiences in sport. *The Sport Psychologist, 23*, 3-
14 23.
- 15 Fraser-Thomas, J., Côté, J., & Deakin, J. (2008). Understanding dropout and
16 prolonged engagement in adolescent competitive sport. *Psychology of Sport*
17 *and Exercise, 9*, 645-662.
- 18 Furrer, C. J., Skinner, E., Marchand, G., & Kindermann, T. A. (2006, March).
19 *Engagement vs. disaffection as central constructs in the dynamics of*
20 *motivational development*. Paper presented at the Annual Meeting of the
21 Society for Research on Adolescence, San Francisco, CA.
- 22 Gervis, M., & Dunn, N. (2004). The emotional abuse of elite child athletes by their
23 coaches. *Child Abuse Review, 13*, 215-223.
- 24 Gillet, N., Vallerand, R. J., Paty, E., Gobancé, L., & Berjot, S. (2010). French
25 validation and adaptation of the Perceived Autonomy Support Scale for

- 1 Exercise Settings to the sport context. *International Journal of Sport and*
2 *Exercise Psychology*, 8, 117-128.
- 3 Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing
4 data. In: J. A. Schinka & W. F. Velicer (Eds.), *Research methods in*
5 *psychology* (pp. 87–114). New York: Wiley.
- 6 Gunnell, K. E., Crocker, P. R., Wilson, P. M., Mack, D. E., & Zumbo, B. D. (2013).
7 Psychological need satisfaction and thwarting: A test of Basic Psychological
8 Needs Theory in physical activity contexts. *Psychology of Sport and*
9 *Exercise*, 15, 599-607.
- 10 Guthrie, J. T., Schafer, W. D., & Huang, C. W. (2001). Benefits of opportunity to read
11 and balanced instruction on the NAEP. *The Journal of Educational*
12 *Research*, 94, 145-162.
- 13 Hagger, M. S., Chatzisarantis, N. L., Hein, V., Pihu, M., Soós, I., & Karsai, I. (2007).
14 The perceived autonomy support scale for exercise settings (PASSES):
15 Development, validity, and cross-cultural invariance in young people.
16 *Psychology of Sport and Exercise*, 8, 632-653.
- 17 Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the
18 new millennium. *Communication Monographs*, 76, 408-420.
- 19 Horn, T. (2008). Coaching effectiveness in the sport domain. In T. Horn (Ed.),
20 *Advances in Sport Psychology*, (3rd ed., pp. 239-267). Champaign, IL:
21 Human Kinetics.
- 22 Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.),
23 *Structural equation modeling: Concepts, issues, and applications* (pp. 76–
24 99). Thousand Oaks, CA: Sage.

- 1 Jang, H., Kim, E. J., & Reeve, J. (2012). Longitudinal Test of Self-Determination
2 Theory's Motivation Mediation Model in a Naturally Occurring Classroom
3 Context. *Journal of Educational Psychology*, 104, 1175-1188.
- 4 Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is
5 not autonomy support or structure but autonomy support and
6 structure. *Journal of Educational Psychology*, 102, 588-600.
- 7 Kirk, D. (2005). Physical education, youth sport and lifelong participation: the
8 importance of early learning experiences. *European Physical Education
9 Review*, 11, 239-255.
- 10 Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New
11 York: Guilford.
- 12 Klint, K. A., & Weiss, M. R. (1986). Dropping in and dropping out: Participation
13 motives of current and former youth gymnasts. *Canadian Journal of Applied
14 Sport Sciences*, 11, 106-114.
- 15 Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or
16 not to parcel: Exploring the question, weighing the merits. *Structural
17 Equation Modeling*, 9, 151-173.
- 18 Lonsdale, C., Hodge, K., & Jackson, S. A. (2007). Athlete engagement: II.
19 Development and initial validation of the Athlete Engagement Questionnaire.
20 *International Journal of Sport Psychology*, 38, 471-492.
- 21 MacKinnon, D. P., Fritz, M. S., Williams, J., & Lockwood, C. M. (2007). Distribution
22 of the product confidence limits for the indirect effect: Program
23 PRODCLIN. *Behavior Research Methods*, 39, 384-389.
- 24 Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A
25 motivational model. *Journal of Sports Sciences*, 21, 883-904.

- 1 Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on
2 hypothesis-testing approaches to setting cutoff values for fit indexes and
3 dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural*
4 *Equation Modeling*, 11, 320-341.
- 5 Martin, A. J. (2012). Part II commentary: Motivation and engagement: Conceptual,
6 operational, and empirical clarity. In S. L. Christenson, A. L. Reschly, & C.
7 Wylie (Eds.), *Handbook of research on student engagement* (pp. 303–313).
8 New York, NY: Springer.
- 9 McDonald, R. P., & Ho, M. H. R. (2002). Principles and practice in reporting
10 structural equation analyses. *Psychological methods*, 7, 64-82.
- 11 Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport
12 Scale (BNSSS): Instrument development and initial validity evidence.
13 *Psychology of Sport and Exercise*, 12, 257-264.
- 14 Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective
15 experience, task choice, and performance. *Psychological review*, 91, 328-
16 346.
- 17 Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2010). Self-determination theory and the
18 relation of autonomy to self-regulatory processes and personality
19 development. In R. H. Hoyle (Ed.), *Handbook of personality and self-*
20 *regulation* (pp. 169-191). Malden, MA: Blackwell Publishing.
- 21 Ntoumanis, N. (2012). A self-determination theory perspective on motivation in sport
22 and physical education: Current trends and possible future directions. In G.
23 C. Roberts & D. C. Treasure (Eds.), *Advances in motivation in sport and*
24 *exercise* (pp. 91-128). Champaign, IL: Human Kinetics.
- 25 Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and
26 why their students benefit. *The Elementary School Journal*, 106, 225-236.

- 1 Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students
2 and how they can become more autonomy supportive. *Educational*
3 *Psychologist, 44*, 159-178.
- 4 Reeve, J. (2012). A self-determination theory perspective on student engagement. In
5 S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on*
6 *student engagement* (pp. 149-172). New York, NY: Springer.
- 7 Reeve, J., Deci, E. L., & Ryan, R. M. (2004). Self-determination theory: A dialectical
8 framework for understanding the sociocultural influences on student
9 motivation. In D. M. McInerney & S. Van Etten (Eds.), *Research on*
10 *sociocultural influences on motivation and learning: Big theories revisited*
11 (Vol. 4, pp. 31–59). Greenwich, CT: Information Age Press.
- 12 Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching
13 behavior, need satisfaction, and the psychological and physical welfare of
14 young athletes. *Motivation and Emotion, 28*, 297-313.
- 15 Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes.
16 *Journal of Personality, 63*, 397-427.
- 17 Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of
18 intrinsic motivation, social development, and well-being. *American*
19 *psychologist, 55*, 68-78.
- 20 Sarrazin, P., Vallerand, R., Guillet, E., Pelletier, L., & Cury, F. (2002). Motivation and
21 dropout in female handballers: A 21-month prospective study. *European*
22 *Journal of Social Psychology, 32*, 395-418.
- 23 Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The
24 measurement of engagement and burnout: A two sample confirmatory factor
25 analytic approach. *Journal of Happiness studies, 3*, 71-92.

- 1 Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of
2 structural equation models: Tests of significance and descriptive goodness-
3 of-fit measures. *Methods of psychological research online*, 8, 23-74.
- 4 Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The
5 synergistic relationship of perceived autonomy support and structure in the
6 prediction of self-regulated learning. *British Journal of Educational
7 Psychology*, 79, 57-68.
- 8 Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective
9 on engagement and disaffection: Conceptualization and assessment of
10 children's behavioral and emotional participation in academic activities in the
11 classroom. *Educational and Psychological Measurement*, 69, 493-525.
- 12 Skinner, E. A., Kindermann, T. A., Connell, J. P., & Wellborn, J. G. (2009).
13 Engagement and disaffection as organizational constructs in the dynamics of
14 motivational development. *Handbook of motivation at school*, 223-245.
- 15 Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and
16 disaffection in the classroom: Part of a larger motivational dynamic? *Journal
17 of Educational Psychology*, 100, 765-781.
- 18 Smith, A. L., Ntoumanis, N., Duda, J. L., & Vansteenkiste, M. (2011). Goal striving,
19 coping, and well-being: A prospective investigation of the self-concordance
20 model in sport. *Journal of Sport & Exercise Psychology*, 33, 124-145.
- 21 Smith, A., Ntoumanis, N., & Duda, J. L. (2007). Goal striving, goal attainment, and
22 well-being: Adapting and testing the self-concordance model in sport.
23 *Journal of Sport and Exercise Psychology*, 29, 763-782.
- 24 Standage, M. & Ryan, R. M. (2012). Self-determination theory and exercise
25 motivation: Facilitating self-regulatory processes to support and maintain
26 health and well-being. In G. C. Roberts & D. C. Treasure (Eds.), *Advances*

- 1 *in motivation in sport and exercise* (3rd ed., pp. 233-270). Champaign, IL:
2 Human Kinetics.
- 3 Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012).
4 Exercise, physical activity, and self-determination theory: A systematic
5 review. *International Journal of Behavioral Nutrition and Physical*
6 *Activity*, 9:78.
- 7 Vansteenkiste, M., & Ryan, R. M. (2013). On Psychological Growth and
8 Vulnerability: Basic Psychological Need Satisfaction and Need Frustration as
9 a Unifying Principle. *Journal of Psychotherapy Integration*, 23, 263-280.
10 Doi: 10.1037/a0032359.
- 11 Wellborn, J. G. (1991). *Engaged and disaffected action: The conceptualization and*
12 *measurement of motivation in the academic domain* (Doctoral dissertation,
13 University of Rochester. Dept. of Psychology).
- 14 Wiersma, L. D., & Sherman, C. P. (2005). Volunteer youth sport coaches'
15 perspectives of coaching education/certification and parental codes of
16 conduct. *Research Quarterly for Exercise and Sport*, 76, 324-338.
- 17 Zimmerman, B. J., & Campillo, M. (2003). Motivating self-regulated problem solvers.
18 In J. E. Davidson & R. Sternberg (Eds.), *The nature of problem solving* (pp.
19 233–262). New York, NY: Cambridge University Press.
- 20
- 21

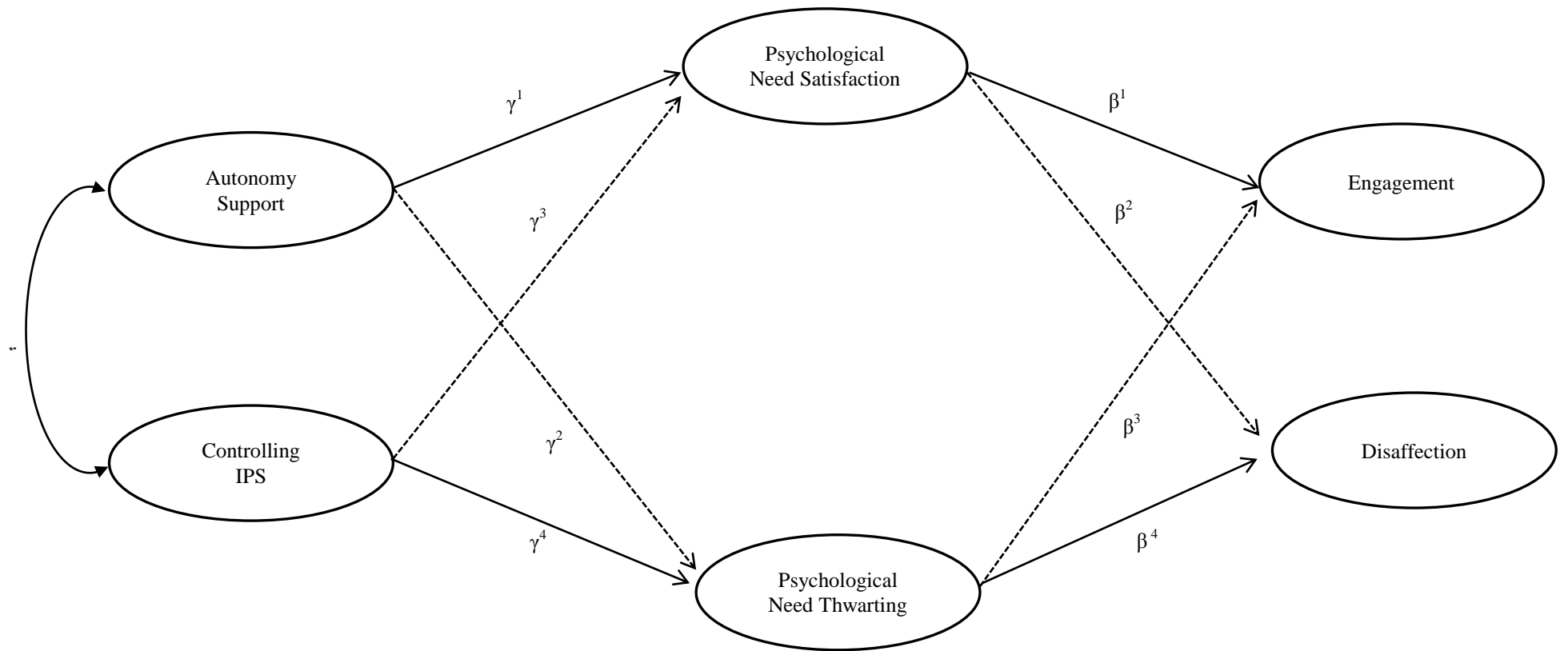


Figure 1. Hypothesised motivation mediation model of coach inter-personal style, psychological need satisfaction/thwarting and behavioral engagement/disaffection. Path letters denote paths in Table 4.1. *Note.* dashed lines indicate a hypothesised negative relationship; un-dashed lines indicate a hypothesised positive relationship.

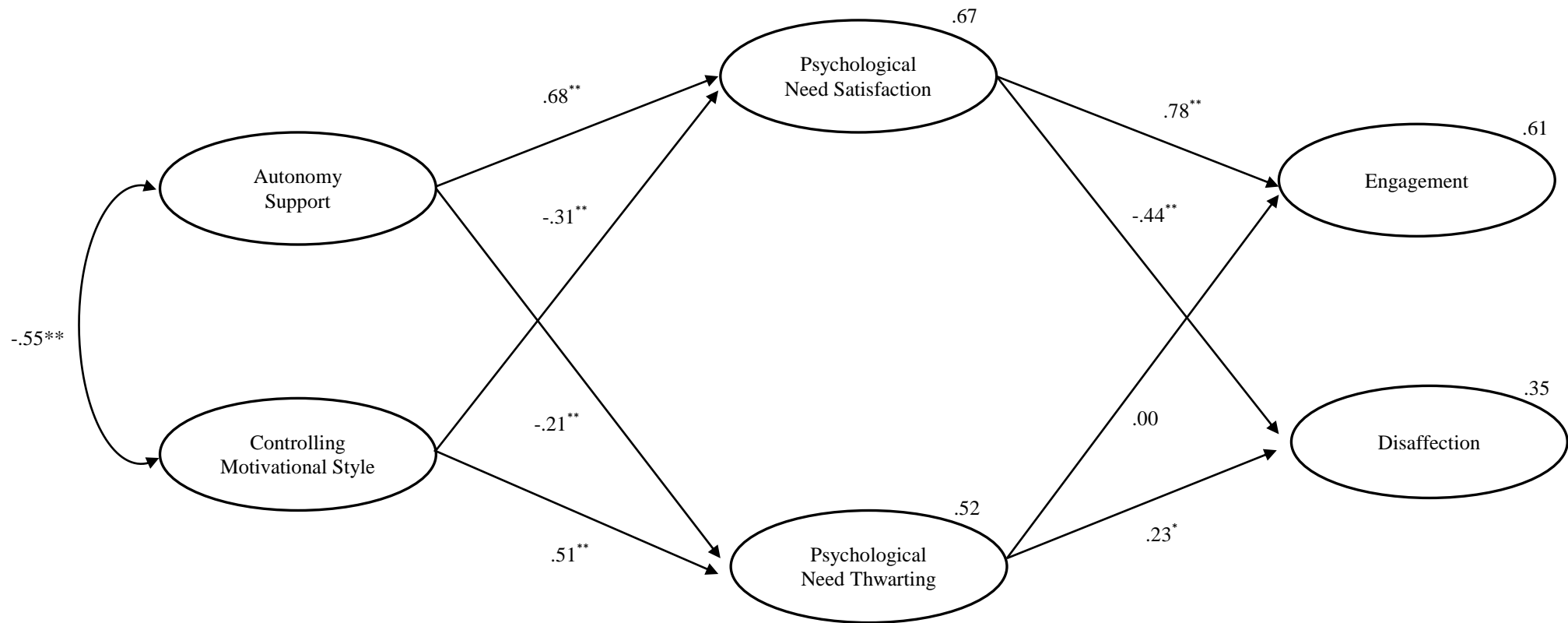


Figure 2. Results of structural equation modelling for the hypothesised motivation mediation model. *p <.05, **p <.01. *Note.* figures above the exogenous variables refer to the variance explained (R^2) by the endogenous variables. The exogenous variable residuals were uncorrelated

Table 1. Composite reliabilities and zero-order correlations.

Measures	1	2	3	4	5	6
1. Autonomy Support	---					
2. Controlling inter-personal style	-.55 ^{***}	---				
3. Psychological need satisfaction	.77 ^{***}	-.55 ^{***}	---			
4. Psychological need thwarting	-.57 ^{***}	.67 ^{***}	-.67 ^{***}	---		
5. Engagement	.67 ^{***}	-.55 ^{***}	.74 ^{***}	-.49 ^{***}	---	
6. Disaffection	-.44 ^{***}	.44 ^{***}	-.55 ^{***}	.50 ^{***}	-.65 ^{***}	---
Composite Reliability (Dillon-Goldstein's ρ)	.94	.93	.93	.93	.89	.85

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

Table 1 Standardised coefficients for the paths in the hypothesized model and results from the bootstrap analysis.

Path	Standardised coefficient	Bootstrap analysis for hyp. model		
	Hypothesised model	Mean st. coefficient	SE	95% CI st. coefficient
Autonomy support to psychological need satisfaction (γ^1)	.68**	.67	.10	.45 to .85
Autonomy support to psychological need thwarting (γ^2)	-.31**	-.31	.12	-.31 to -.07
Controlling IPS to psychological need satisfaction (γ^3)	-.21**	-.21	.09	-.41 to -.21
Controlling IPS to psychological need thwarting (γ^4)	.51**	.50	.10	.32 to .51
Psychological need satisfaction to engagement (β^1)	.78**	.78	.09	.57 to .94
Psychological need satisfaction to disaffection (β^2)	-.44**	-.45	.13	-.69 to -.44
Psychological need thwarting to engagement (β^3)	.00	-.00	.12	-.25 to .20
Psychological need thwarting to disaffection (β^4)	.23**	.23	.15	-.06 to .51
Correlation autonomy support and controlling IPS (r)	-.55**	-.54	.07	-.69 to -.40

Note. St. coefficient = standardised coefficient; CI = confidence interval; hyp = hypothesised. Bootstrap analysis was based on 1000 iterations. The standardised coefficient columns denote the standardised betas or gammas of the various paths with the exception of r which denotes the bivariate correlation. * $p < .05$, ** $p < .01$.

Table 2 Specific indirect effects.

Predictor (X) → Mediator (M) → Outcome (Y)	Indirect effect	
	ab (SE)	95% CI
Engagement		
Autonomy support → Need satisfaction → Behavioral engagement	.53 (.10)	.34 to .74
Autonomy support → Need thwarting → Behavioral engagement	-.00 (.03)	-.05 to .05
Controlling IPS → Need satisfaction → Behavioral engagement	-.16 (.05)	-.70 to -.27
Controlling IPS → Need thwarting → Behavioral engagement	.00 (.04)	-.09 to .09
Disaffection		
Autonomy support → Need satisfaction → Behavioral disaffection	-.30 (.07)	-.44 to -.17
Autonomy support → Need thwarting → Behavioral disaffection	-.07 (.03)	-.13 to -.02
Controlling IPS → Need satisfaction → Behavioral disaffection	.09 (.03)	.04 to .16
Controlling IPS → Need thwarting → Behavioral disaffection	.11 (.04)	.04 to .20

Note. The 95% confidence intervals for the indirect effects were those derived from the *PRODCLIN* programme that produces confidence intervals on the basis of a distribution-of-the-product-method (Mackinnon et al., 2007).

Appendix A

Items for the modified version of the Engagement Versus Disaffection with Learning Scale (behavioral subscales)

1. I try hard to do well in training
2. When I'm in training, I listen very carefully
3. I don't try very hard in training
4. In training, I do just enough to get by
5. When I'm in training, my mind wanders
6. When I'm in training, I just act like I'm trying
7. When I'm in training, I think about other things
8. In training, I work as hard as I can
9. I pay attention in training
10. When I'm in training, I participate in training discussions

Notes. Items 1, 2, 8, 9, and 10 are used to assess engagement. Items 3, 4, 5, 6, and 7 are used to assess disaffection.