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Do individual's differences in need strength influence the relation between coach's need support and athlete's performance self-evaluation?

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Abstract

In the sport environment it is crucial that the coach sufficiently nurtures and supports athletes' needs, because of their relevance in increasing athletes' performance self-evaluation (PSE). The current study aims to examine the relationship between a coach's need support and an athlete's PSE, which is thought to be a function of the corresponding need strength. We hypothesized this moderation for six specific needs: autonomy, competence, relatedness, goal setting, feed forward and reflection. A sample of 402 young soccer players (ages 14-18) were asked to complete a series of questionnaires aimed to explore the coach's support, athlete's needs, and PSE. As hypothesized, the results consistently show a positive and significant relationship between perceived need support from the coach and athletes' PSE, in all six needs. However, the expected moderation effects were found only regarding to goal-setting and feed forward need strength. Unexpectedly, the link between need support and PSE was stronger for low-need strength athletes in both goal setting and feed forward compared to high-need strength athletes. Hence, the role of individual differences in need strength remains unclear.

Keywords: Performance self-evaluation (PSE), Self-determination theory, Self-regulatory needs, Need strength, Coach support

In the sports' environment, a positive and realistic evaluation of one's own skills and abilities is an important aspect, that is linked to athletes' self-efficacy, performance attainment and performance evaluation (Bandura, 1997; Hofseth et al., 2017). Athletes' performance self-evaluation (PSE) was found not only to be associated with their sport expertise and level of mastery, but also by the guidance and support of their coach (Hofseth et al., 2017). The aim of the present study is to focus on the link between perceived need support from the coach and athletes' PSE, which is assumed to be a function of the athletes' corresponding need strength (see Figure 1).

Psychological and self-regulatory need support

The basic assumption of Self-Determination Theory (SDT) is that the fulfilment of three universal psychological needs increases self-determination, growth, and, accordingly, athletes' PSE (Ryan & Deci, 2000; Legault, 2017). SDT states individual interactions depend on the social environment; cultural and social factors and contexts have the power to hinder or facilitate the fulfilment of the fundamental needs by altering the person's perceived sense of well-being, competence, performance, and self-direction (Legault, 2017). In the current context, need support is related to athletes' self-evaluation of their own performance and their psychological well-being (Reinboth et al., 2017; Lundqvist & Raglin, 2014). In the present work, as highlighted by Ryan and Deci (2000), we considered the following three fundamental needs:

The first of the needs is the one for *autonomy (NfA)*: the demand to be able to choose, willingly endorse and self-direct one's behaviour (Niemiec et al., 2009). NfA can be fulfilled and enhanced by the acknowledgement of one's feelings, exploration, and rationale (Teixeira et al., 2012). The autonomy support provided to athletes can help them feel more autonomous by having a multiple-needs effect (Adie et al, 2008; 2012). Namely it can help athletes by satisfying other needs, such as competence, goal setting, and feed forward; by having a multiple-needs effect (Adie et al., 2008; 2012).

Second, the need for *competence (NfC):* defined as the experience of mastery and effectiveness in one's actions, spurs the individual to seek adequate challenges and the growth of

new abilities (Legault, 2017). The need for competence can be reflected in an adequate, efficient and confident interaction with the environment of the individual and athletes (Berntsen et al., 2019). In addition, encountering a situation that increases the individual's sense of competence will be reflected in their interest, motivational level, and future engagement in the same action (Legault, 2017). The need for competence feeds an individual's sustained attention, persistence and promotes determination and effort (Rottensteiner et al., 2015); we can create a state of flow when pairing the appropriate levels of competence and challenge.

Last, the SDT describes the need for *relatedness (NfR)*: meaning the necessity to feel belonging and connection with others (Legault, 2011; Lin, 2016). The feeling and sensations of being accepted, connected and being cared for by teammates can express relatedness in a group environment, such as a team sport. The creation of an empowering environment was shown to facilitate the development of strong and respectful relationships with teammates and other athletes (Duda & Appleton, 2016). In addition, the SDT considers the satisfaction of the need for relatedness as a necessary element for a high personal psychological well-being; force impacting cognition, emotions, behaviours, and adjustments (Lavigne et al., 2011). Athletes' PSE is not only related to support in the three SDT psychological needs but also to support in self-regulatory needs (SR). Self-regulation (SR): the individual's changes and adaptations in thoughts, actions, and plans in order to attain a personal goal (Zimmerman, 2000).

Besides SDT needs, the present study focuses on three key components of self-regulation (SR). First, *goal-setting* (*NfGS*) is the development of an action plan to monitor and reach a specific goal (Weinberg, 2002). Second, *feed forward* (*NfF*) refers to the progressive increment in the level of difficulty of the goals in order to increase competence and gain new skills (Ste-Marie et al., 2011). Third, *reflection* (*NfRE*) is used to analyse personal improvements, achievements, performance, and refining plans. (Zimmerman, 2000).

The fulfilment of these fundamental psychological and self-regulatory needs is found to be associated with the strength of motivation and enjoyment to perform physical activities and sport

(Kang et al., 2019). Support of psychological and SR needs were shown to have a relationship with participant's adherence and continuity in training, intrinsic motivation and increased autonomy motives, that consequently could promote constancy (Kang et al., 2019).

The current study specifically focuses on the link between athletes' perceived coach support on the three SDT dimensions, as well as the three SR dimensions. Perceived coach support can promote the fulfilment of athletes' needs, and was consequently positively liked to the athletes' PSE (Lundqvist & Raglin, 2014). Regarding the three SDT needs, perceived NfC, NfA and NfR support are expected to be positively related to athletes' PSE (*Hypothesis 1a, 1b, and 1c)*. Specifically, coaches' behaviours such as providing appropriate and reliable feedback, granting guidance, structure, tolerance in the face of errors and the use of constructive feedback are important behaviours for the fulfilment of athletes' NfC. Coaches' engagement in these behaviours may influence interpersonal dynamics and fulfil an athlete's NfA (Lavigne et al., 2011; Bartholomew et al., 2009). Autonomy-supportive behaviours such as promoting independence and shared goals without imposing demands or diminishing the athletes' needs promote growth and performance satisfaction, thus influencing athletes' PSE (Bartholomew et al., 2009; Carpentier & Mageau, 2013). Additionally, autonomy-support coaching was found to nurture and increase athlete's wellbeing and sport enjoyment (Berntsen et al., 2019). Lastly, the satisfaction of the need for relatedness would be facilitated by a coach who places emphasis on building task-involving atmospheres, rewards efforts and recognizes each team member as having a noteworthy role (Reinboth & Duda, 2006).

Hence, *Hypothesis 1a* states there is a positive link between perceived autonomy support and PSE; *Hypothesis 1b* states there is a positive link between perceived competence support and PSE; and *Hypothesis 1c* states there is a positive link between perceived relatedness support and PSE.

With regard to the SR needs, perceived goal-setting support was shown to keep athletes' commitment high, increase individual competence, and PSE (Healy et al., 2018). Similarly,

perceived feed forward support, by maintaining learning demands high, supports athletes' achievements while increasing satisfaction and athletes' PSE (Taylor et al., 2015). Finally, perceived reflection support nurtures athletes' need satisfaction, competence, and increases PSE. Coach support on self-regulation dimensions helps athletes to better evaluate their performance, to attribute failures and successes in appropriate ways and finally to adapt and improve performance and self-evaluation (Kitsantas & Zimmerman ,2002; Williams et al., 2000).

Therefore, the following hypotheses were formulated: *Hypothesis 1d* states a positive link between perceived goal-setting support and PSE; *Hypothesis 1e* states a positive link between perceived feed forward support and PSE; and ultimately *Hypothesis 1f* states a positive link between perceived reflection support and PSE.

Person Environment Fit

Individuals' behaviours and well-being are determined by their qualities and by the environment in which they live (Edwards et al., 1998). The person-environment theory (P-E) highlights the necessity of having a match, or congruence between the person (i.e., their needs), and the environment (i.e., support from their coach); according to this theory, a lack of fit or mismatch between these two causes stress and other negative outcomes such as low PSE (Caplan et al., 1985). In sports environments, coaches have an important role in the fulfilment and nurturing of the psychological and self-regulatory needs discussed above. However, significant differences are seen in the degree and nature of need satisfaction, hence athletes are likely to differ in the strength of the different psychological needs (Schüler et al., 2012; Glendinning et al, 2021; Kenow & Williams, 1999).

The matching theory states that the stronger an athlete's need strength, the more they will benefit from support and fulfilment of the corresponding need (Schüler et al., 2012; Glendinning et al., 2021). Reversely, the stronger an athletes' need strength, the more they will suffer from a lack of support from their coach. In the sport context, athletes with a strong need for competence and

motivational accomplishment were shown to have higher levels of flow during performance when their demand for competence was met, compared to athletes with a low-need strength (Schüler et al., 2012). For this reason, we expect a moderation effect of the athlete's need strength on the relationship between perceived coach support on the corresponding need and the PSE. Specifically, the proposed links (*Hypotheses 1a to 1f*) are hypothesised (*Hypothesis 2a to 2f*) to be particularly strong among athletes whose need strength is high on the corresponding need (see Figure 1). Hence, *Hypothesis 2a* states a positive moderation effect of autonomy need strength on the relationship between perceived autonomy support from the coach and PSE. *Hypothesis 2b* states a moderation effect of competence need strength on the relationship between perceived coach support and PSE. *Hypothesis 2c* states a moderation effect of relatedness need strength on the relation between coach support and PSE. Moreover, the moderation effect was hypothesised for the three SR needs; *Hypothesis 2d* states a moderation effect of the goal setting need strength, *Hypothesis 2e* states a positive moderation of feed forward need strength and ultimately *Hypothesis 2f* states a positive moderation effect of reflection need strength on the relationship between perceived coach support and athletes PSE.

The current study intends to add to the existing knowledge on perceived need support and PSE by studying not only the link between perceived need support and athletes' performance self-evaluation but also this relationship as a function of need strengths. As a result, it aims to replicate the findings regarding the link between perceived need support and performance self-evaluation, but additionally it also aims to investigate the importance of need strength in this relationship; attempting to add to the matching theory on the necessity of having a fit between athletes' needs and coach support corresponding to athletes' need strength.

Method

Participants

The sample used in the current research is comprised of N = 402 Dutch male athletes ranging

from 12 to 18 years of age (M*age* = 15.07; SD = 2.08); all participants were amateur football players who started playing football before the age of 11. Participants were recruited by first contacting the coach or sports organisation. Once they agreed to the terms of the XOET-scan (Jonker et al., 2018) they were advised to inform the athletes and, if necessary, the parents. Two hundred and twenty-three athletes, out of the 402 selected, required and received parental consent (under 16); the remaining 179 athletes consented without the necessity of a parental accord. After receiving the consent of the coaches and athletes, the survey was sent via email. At the beginning, the form explains the objectives of the study and then informs the participants of the policy statements used to describe how the collected data will be used. The answers collected from the XOET-scan were all anonymous. At the end of the questionnaire, after being shown the results of the scan, the athletes could state their agreement in sharing the results with the coach and with the XOET as a distribution partner. All participants were part of a larger project conducted by Jonker and colleagues (2018) based on the XOET-Model, an online Dutch survey (www.xoet.nl) used to tackle coaching styles by collecting athlete's contributions. The data used in the current study were given ethical approval in 2018 from the Ethics Committee of the Faculty of Behavioural and Social Sciences (EC-BSS) at the University of Groningen (RUG).

Measures

During the XOET-scan participants were asked to fill in the coach's name at the beginning of the questionnaire and then it would subsequently be automatically filled in by the software on the remaining questions. Adding the name of the coach was used to match the athletes' and coaches' answers; this information was then used in different research to compare the athletes' and coaches' points of view (Joker et al., 2018); the current research does not take into consideration coaches' responses. In the current research, the XOET-scan was used to determine to what extent athletes feel supported by their coaches on the basis of their needs.

Need strength.

The survey is composed of items measuring the strength of the participants' three basic

psychological needs (Van Yperen et al., 2014): (1) need for competence (3 items, Cronbach's alpha is .71) with a sample item such as "*I think it's important to be good at what I do as an athlete*"; (2) Need for autonomy (4 items, Cronbach's alpha = .71), a sample item is "*I would like <NAME of the coach> to eventually let me decide how I approach things in my sport*"; (3) Need for relatedness (3 items, Cronbach' alpha = .71), a sample item is "*I think it's important that I can trust <NAME of the coach>".*

Besides the strength of these SDT needs, the strength of athletes' self-regulation needs was assessed (Toering et al., 2012). The three self-regulatory needs were (1) need for goal-setting (4 items, Cronbach's alpha is .87), an item used is "I would like <NAME *of the coach*> to guide me in achieving my goals; (2) Need for feed forward (3 items, Cronbach's alpha is .76), a sample item is "*I would like feedback from <NAME of the coach> that matches my goals*"; lastly, (3) Need for reflection (3 items, Cronbach's alpha = .82), sample item is "*I think it's important that <NAME of the coach> helps me to think about improving my strengths and weaknesses*".

We considered all reliability regarding these measures sufficient because of a Cronbach's alpha value higher than .60 (Gliement et al., 2003). All items per subscale can be found in Table 3. Participants were asked to respond to the items with regard to the past 12 months on a Likert scale ranging from 1*"never"* to 7 *"always"*. Higher scores on the scale indicated a stronger need.

Perceived need support from the coach.

To assess an athlete's perceived coach support for basic psychological and self-regulation needs, participants were asked to respond to items on a 7-point Likert scale ranging from 1 *"never"* to 7 *"always"*. We investigated perceived need support by the coach for the following needs: (1) perceived autonomy support (5 items, Cronbach's alpha is .72) with items such as "*<NAME of the coach> in the end let me decide how I approach things in my sport*"; (2) perceived competence support (3 items, Cronbach's alpha = .80), sample item is "*<NAME of the coach> gives me the confidence that I can do things well*"; (3) perceived relatedness support (5 items, Cronbach's alpha is .82), sample item is "*I feel supported by <NAME of the coach>*"; (4) perceived goal-setting

support (4 items, Cronbach's alpha is .83) measured with items such as "*<NAME of the coach> motivates me to set challenging goals*"; (5) perceived feed forward support (4 items, Cronbach's alpha is .72) sample items are "<NAME of the coach> gives me feedback that matches my goals"; lastly, support for (6) reflection (4 items, Cronbach's alpha is .84) with items sample such as "*<NAME of the coach> helps me think about how I can improve my performance*". All the items used in the investigation of perceived need support from the coach can be found in the Appendix.

Performance self-evaluation (PSE).

Athletes' performance self-evaluation was measured with an adapted version of the Performance Self-Evaluation (PSE) measure developed by Van Yperen and Leander (2014). In the current study, participants were asked: *"How do you rate your performance at the moment?"*, responses were on a Likert scale ranging from 1 *"Far below my capabilities"* to 10 *"To the maximum of my capabilities"*; in which higher values on this scale represented a higher performance self-evaluation by the athletes.

Results

Descriptive Data

Table 1 displays the means, standard deviations, and zero-order correlations of the relevant variables. In line with Figure 1, Table 1 shows that all correlations of perceived need support (in all six needs) with athletes' PSE were found to be positive and highly significant. The moderator variables (need strength) were also found to be positive and significant, however, autonomy need strength was the only variable that held a non-significant correlation with PSE. Table 1 shows that athletes' age was negatively correlated with all six needs strength measures, perceived need support measures, and PSE. Therefore, age was included as a covariate in subsequent analyses.

Model testing

The research model will be tested by employing moderation analyses using the PROCESS V3.4 for IBM SPSS (Hayes, 2018). The procedure will be conducted six times, one for each

specific need.

In the current study, perceived need support from the coach is the independent variable, performance self-evaluation is the dependent variable, and the corresponding need strength is the moderator (see Figure 1). In order to properly use the moderation analyses, the following steps were taken: first, a mean-centering was computed for the variables used; the procedure was adopted to prevent multicollinearity issues when conducting subsequent analyses (Hayes, 2020); second, an interaction term or intercept was calculated by multiplying the centred independent and corresponding moderation variable.

Last, the PROCESS macro was run, using moderation Model 1 with a 95% confidence interval (see Hayes, 2018). In case a moderation effect was found, simple slopes analysis was employed to better understand the nature of the moderation. In addition, simple slopes were tested for differences between them, to explore possible statistical differences. Table 2 contains a summary of all relevant information regarding the moderation analyses conducted for the six fundamental needs, which will be discussed next.

Perceived Autonomy Support.

Hypothesis 1a states a positive link between perceived autonomy support by the coach and athletes' PSE. As shown in Table 1 and Table 2, this link was also significant, which provides empirical evidence for *Hypothesis 1a*. Additionally, *Hypothesis 2a* states a positive moderation effect of autonomy need strength on the relationship between perceived autonomy support from the coach and PSE. Table 2 shows no interaction effect between autonomy needs strength and perceived autonomy support from the coach, so we can conclude that *Hypothesis 2a* regarding autonomy need strength was rejected.

Perceived Competence Support.

Hypothesis 1b was that there is a positive relationship between perceived competence support by the coach and performance self-evaluation. As shown in Table 2, this link was

significant (see also Table 1), providing empirical support for *Hypothesis 1b*. *Hypothesis 2b* states a positive moderation effect of competence need strength on the relationship between perceived competence support from the coach and PSE. Table 2 shows no interaction between need strength and perceived need support by the coach, meaning that competence need strength has no effect on the relationship between perceived need support for competence and athlete's PSE. Hence, *Hypothesis 2b* was rejected.

Perceived Relatedness Support.

Hypothesis 1c states a positive relationship between perceived relatedness support by the coach and athletes' PSE. As seen in Table 2, a significant link was found between perceived relatedness support from the coach and PSE, granting empirical support for *Hypothesis 1c*. *Hypothesis 2c* states a positive moderation effect of relatedness need strength on the relationship between perceived relatedness support from the coach and PSE. Table 2 shows no interaction between relatedness needs strength and perceived support, meaning no moderation effect is present. Hence, *Hypothesis 2c* regarding the moderation of relatedness need strength was rejected because of the non-significant result of the interaction term.

Perceived Goal Setting Support.

The first analysis conducted to explore the three self-regulatory needs was also used to investigate *Hypothesis 1d*, which states a positive relationship between perceived goal-setting support from the coach and the PSE. As we can see in Tables 1 and 2, this relation was found to be significant, providing evidence and support for *Hypothesis 1d*. Furthermore, *Hypothesis 2d* states a positive moderation effect of goal-setting need strength on the relationship between goal-setting

support from the coach and PSE. Regarding the interaction term for goal setting Table 2 shows a significant value.

Follow-up simple slopes analysis was conducted to interpret the nature of the observed moderation effect. Simple slopes are used to interpret the moderation effects in three conditions, namely low (-1 standard deviation), average, and high (+1 SD); in the current analysis, low, average, and high-need strengths for goal-setting were explored. At low-need strength (-1SD = -1.04) the relationship between perceived need support and PSE was positive and significant (b = .37, se = .07, $t(398) = 5.04$, $p < .001$). Similarly, at the mean (0.00) in the centred need strength, representing an average-need strength for goal-setting, the relationship was positive and significant (b = .25, se = .06, $t(398) = 4.20$, $p < .001$). Finally, at a high-need strength (+1SD = +1.04), the relationship was found to be positive and significant with a value of b = .14, se = .07, $t(398) = 2.01$, and a *p*-value of .04. Figure 2 shows a visual representation of these slopes.

To specifically test the moderation hypothesis, a follow-up analysis was conducted to test the differences between the three slopes, given the standard error, sample size and slope. This analysis held a positive and significant results regarding the difference between low and high goal setting need strength; $t(14) = 2.16$, $p = .04$. The analysis also indicates that no significant difference can be found between low and average-need strength ($t(14) = 1.17$, $p = .25$) and between average and high ($t(14) = 1.17$, $p = .25$). In conclusion, *Hypotheses 2d* regarding goal-setting was rejected because the link between coach support and PSE was found stronger in athletes with low-need strength, and not in athletes with high-need strength as stated by *Hypothesis 2d*.

Perceived Feed forward Support.

Hypothesis 1e states a positive relationship between perceived feed forward support by the coach and athletes' PSE. As we can see in Tables 1 and 2, this link was found to be positive and significant. Hence, providing empirical support to *Hypothesis 1e*. Furthermore, *Hypothesis 2e* states a positive moderation effect of feed forward need strength on the relationship between perceived

feed forward support from the coach and PSE. Table 2 shows that the interaction term held a significant result, meaning a moderation effect can be seen by feed forward need strength on the relationship between perceived need support and PSE.

Simple slope analysis held the following results. At a -1SD (= .91) on the centred need strength (representing a low need strength for feed forward), the relationship between perceived need support and athletes' PSE was found positive and significant (b = .47, se = .08, $t(398) = 5.73$, $p < .001$). Similarly, at both average and high-need strength, a positive and significant results were also found with the following values: b = .35, se = .06, $t(398) = 5.35$ and a $p < .001$ for average and b = .23, se = .08, $t(398) = 2.70$ with a $p = 0.007$; visual representation of these slopes can be found in Figure 3.

Lastly, we conducted and analysis to verify possible differences between the slopes; the test held a positive and significant results in regards to the difference between low and high feed forward need strength, with a value of $t(14) = 2.05$, $p = 0.05$. On the other hand, no significant difference was found between low and average ($t(14) = 1.15$, $p = .26$) and high and average need strength ($t(14) = 1.34$, $p = .27$). Hence, a stronger link between coach support and PSE was found in athletes with a low-need strength. In other words, *Hypotheses 2e* regarding feed forward was not confirmed.

Perceived Reflection Support.

Hypothesis 1f states a positive relationship between perceived reflection support from the coach and PSE. Tables 1 and 2 show that this link was found to be positive and significant. Hence, providing support and confirming *Hypothesis* 1f. Lastly, *Hypotheses 2f* states a positive moderation effect of reflection need strength on the relationship between perceived reflection support from the coach and PSE. Table 2 shows a non-significant result for the interaction term of reflection need

strength, concluding in a rejection of *Hypotheses 2f* regarding the moderation effect of reflection needs strength on the relation between perceived support and PSE.

Discussion

The present research investigated the link between perceived support by the coach on six basic needs and athlete's PSE, as a function of the corresponding need strength. The study hypothesized a positive relationship between perceived need support by the coach on all six needs and PSE. Six moderations analyses were conjointly hypothesized, meaning athletes with stronger need strength were expected to benefit more from the coach support than athletes with lower need strength (see Figure 1). As hypothesized, the results demonstrate a positive and significant relationship between coach support and athletes' PSE. However, the moderation analysis revealed a significant moderation effect only for goal-setting and feed forward need strength. The moderation revealed an opposite relation compared to the expected one; a stronger link was found between perceived coach support and PSE in athletes with low-need strength compared to athletes with a stronger goal-setting and feed forward need strength.

Perceived support by coach.

The main finding of this research is that across all psychological needs, perceived coach support was positively and highly correlated to athletes' PSE. These findings are in line with previous studies that demonstrated that perceived coach support was related to athletes' performance self-evaluation (Hofseth et al., 2017; Haley et al., 2018). More specifically, as depicted in Table 1, perceived support in all six fundamental and self-regulatory needs is positively and highly correlated with athletes' PSE. Hence, with an increase in perceived support by the coach we can expect an increase in athletes' PSE; thus, highlighting the importance of coaches' support on the fundamental and self-regulatory needs for athletes and their PSE.

In the development and nurture of the fundamental and self-regulatory needs, a crucial determinant is the environment and presence of need-nurturing possibilities; the coach, with their

behavioural style and effort, can create a stimulating and nurturing social environment for athletes to develop (Legault, 2017). Coaching behaviour aimed at developing and nurturing the fundamental and self-regulatory needs can foster athletes' freedom in pursuing objectives or acquiring new skills and raise their PSE. Additionally, giving athletes ownership of their actions and growth helps athletes develop independence, self-regulatory abilities, and connections to one's objectives. Coaches, by providing athletes with instructions and self-endorsement, create an environment in which they stimulate the athletes to pursuit and satisfy their needs and increase PSE (Rees et al., 2016). The level of closeness and type of relationship between teammates and players are also factors influencing need support and satisfaction and athletes' PSE. The formation of strong and respectful relationships with teammates and other athletes was showed to be facilitated by the construction of an empowering atmosphere (Adie et al., 2008). Adult athletes reported a high degree of perceived sport-related ability when the need for relatedness was met, as well as an elevated level of personal vitality and PSE while participating in sports activities (Richer & Vallerand 1998), supporting the current findings. Coaches use feedback and instructions to guide athletes, nurture self-regulatory needs and teach skills that can be used in time and stress management and in the development of metacognition (Jonker et al., 2010). Engaging in goal-setting, while gradually incrementing the level of difficulty and following progress with reflection and communications, are all behaviours that aim to support and foster athletes' needs and increase PSE. The research supports the value of coach behaviour by stating the effect of coaching style and behaviour on players' intrinsic motivation via the satisfaction of fundamental and self-regulatory needs (Wu et al., 2014; Reiboth et al., 2004; Kimberley et al., 2009).

The current results can also be seen in light of the universal hypothesis (Schüler et al., 2012) in which we assume the support of basic needs, such as those examined in the current research, to be universally beneficial; hence, every individual, independent of their need strength, will benefit from psychological need support (Schüler et al., 2012). The positive relationship found between

need support in all six needs and PSE confirms that received support from coaches on these fundamental and self-regulatory needs is beneficial, in some degree, for all athletes' PSE. It is important to consider that in teams or competitive sports, the effectiveness of coaching was shown to be associated with external factors such as team composition, player skills level, group dynamic within the team and athletes need strength (Lameiras et al., 2017; López de Subijana et al.,2022). Previous literature found the athletes skill level, such as being at the bottom of the league, has a moderation effect between coaches' behaviours and support and athletes' motivation. Lower-level athletes perceived their coaches to be more supportive than more experienced athletes; this could be explained by experienced athletes having more independence from their coach (López de Subijana et al.,2022). Furthermore, age was also found to moderate this relationship, younger athletes were found to benefit more from coaches' support than older players; athletes at different maturation and developmental points perceived coaching behaviours and support differently (López de Subijana et al.,2022). On one hand coaching style and efficacy depends on athletes' characteristics such as age, level of expertise and team composition. On the other hand, coaching behaviour can affect teams' dynamics and athletes' behaviours, for this reason further research is needed to better understand this relationship. The following paragraph will focus on the moderation effect of need strength on the relationship between coach support and athlete's PSE.

Need strength as moderator

The analyses revealed an interesting moderation effect; overall no moderation was found but in regard to goal setting and feedforward models a moderation effect was found. Athletes with lower need strength in goal setting and feed forward benefitted more from their coach support than athletes with high-need strength did. The fact that a moderation effect was found only in two (goal setting and feed forward) of the six analysed needs was treated as peculiar and sustains the mixed result concerning the moderation effect of need strength existent in the literature (Schüler et al., 2012; 2014; Hoff et al., 2019). Contrary to the previous interpretation, the universal hypothesis or

the matching theory cannot entirely explain this moderation effect, because firstly, only two out of the six needs were deemed to have a moderation effect and because athletes with lower need strength were found to benefit more from coach support, opposing the matching theory.

The matching theory states that individuals' preferences or strength on different needs will influence the experienced benefits when satisfying these needs. More specifically, individuals with higher need strength benefit more from that specific need support and satisfaction than individuals with low-need strength (Schüler et al., 2012; Glendinning et al., 2021). Findings sustaining this theory date back to 1965, in which individuals with high-need strength were seen to benefit more from that specific need satisfaction than individuals with low-need strength (Mc Clellands, 1965). However, other researches have been inconsistent in sustaining the matching hypothesis. Chen and colleagues (2014) found that cultural background and, more specifically, the need for autonomy was deemed more or less important depending on the culture and country. Scales and measure of need support also varied across cultures and domains, explaining the discrepancies found in the literature across different contexts. In school settings, need satisfaction (competence and relatedness) was shown to influence students' well-being and performance in the same manner independently of their need strength (Sheldon & Schüler, 2011). Alternatively, in the work environment, the support and satisfaction of the need for relatedness was positively related to work well-being in individuals with a high-need strength (Madelon et al., 2019; Van den Broeck et al., 2010). Furthermore, in athletes and sports environment, need strength was found important in benefits of need satisfaction and athletes' well-being (Schüler et al., 2012).

In the present study, the moderation was conducted with regard to perceived coach support and PSE in young soccer players. When considering context and domain-specific performance, the perceived and objective importance of certain activities and exercises influence athletes' need strength, satisfaction and contributes to the individual self-esteem and consequently PSE (Glendinning et al., 2021). Results did not reveal a moderation effect of need strength for all six

fundamental and SR needs, but highlighted a moderation effect of goal setting and feedforward need strength. The reported results on the moderation effects of goal setting and feedforward were deemed particularly interesting because opposite to the hypothesized one; athletes with lower need strength benefited more from coach support than athletes with higher goal setting and feed forward need strength. Considering the present results, they can be translated as soccer players deeming goal achievement and the increment of goal difficulty (goal setting and feed forward needs) as being particularly important for their self-esteem, facilitating behaviours that supports and satisfies their needs and consequently positively impacting their PSE.

More specifically, goal-setting was deemed to be effective when implementing a specific, stimulating and achievable goal, especially when accompanied by feedback, while increasing other needs support and PSE. Setting goals within the reach of the athletes increases competence and maintains commitment high. The use of setting a learning objective was seen to increase students' and athletes' motivation and successful compares to individuals who did not set specific and stimulating goals (Zimmerman et al., 2017). Support for the importance of goal-setting can also be seen in students' self-efficacy perception and attainment of certain skills, such as student's mathematical abilities and retainment of relevant information in athletes (Zimmerman et al., 2017; Feltz & Lirgg, 2001). Setting goals was seen to be important not only in increasing self-efficacy but also for improving self-judgement learning processes, goal setting strategies and self-regulatory competences; these results, found by Zimmerman and colleagues (2017) underlie the importance of goal setting in different contexts and could explain the positive significant result found in the current research. A possible reason why goal-setting resulted in a significant moderator could also be partially explained by the fact that athletes agreed to share their results with their coach and with XOET as a distribution partner. Public goal setting was more effective than setting private goals (without sharing it with external parties), specifically in sport, as it is common for the coach to set or know the athletes' goals. The feed forward approach is important, because of the gradual

increase in the level of difficulty, to maintain a constant level of improvement and motivation in athletes. It is important to consider that to properly assess and assign the level of difficulty of a goal; it is usually required to possess knowledge regarding the required ability, context and, in this case, techniques, hence also self-evaluation requires a certain level of competence in the field. Feed forward guidance, besides facilitating learning processes by constantly stimulating the individual by incrementing the level of difficulty, also projects the efforts and concentration forward to future actions. Support for the importance of feed forward abilities in the sport environment was shown in fencing, in which athletes displayed early and anticipated postural adjustment, underlying their ability to look and think ahead in their actions and goals (Akbaş et al., 2021).

To conclude, nurturing and supporting athletes' self-regulatory abilities and SDT needs, are factors associated with athletes' perception of their own performance and learning development. Using metacognitive skills, such as goal setting and feedforward, to understand the demands of particular goals, the planning required to accomplish all the steps and ability to self-reflect and redirect the effort to the future are all abilities linked to performance and PSE in different sports, including soccer (Elferink-Gemser et al., 2018). Athletes' developmental and learning trajectories could explain the importance and relevance of these self-regulatory behaviours for athletes' success. In a cohort of adolescent's individuals numerous neurological and cognitive developmental differences can be seen; coaching behaviours and their effectiveness vary depending on the athletes' necessities (Rees et al., 2016). In the current sample, we could hypothesize that athletes with lower need strengths also possessed lower self-regulatory abilities and benefitted more from learning such techniques and skills than athletes who already possessed them, explaining the unexpected direction of the moderation effect.

Study limitations and strengths

The current research has distinctive strengths. The large chosen cohort comprising young Dutch football players who all started taking part in the sport before the age of eleven, sample

characteristics that simplified the interpretation and inferences made on the role of coach support to athlete's PSE, and specifically in soccer players. Having a specific and well-defined cohort permits making extrapolations in the current population sample and consider specific environmental characteristics such as the type of coach support and performance achievement. In opposition, we should also take into account the limitations of the study. First, the sample was specific but limited to a set age range and only to male soccer players; no gender or age differences could be examined or shown in the study. Future research should amplify the sample characteristics and size or collect data from other populations, and then compare the results to highlight possible cohort differences. Second, we measured PSE using just one item, further research could develop a multiple-item scale to better explore athletes' performance self-evaluation and the constructs facets and dimensions (Cuvillier et a., 2021). Furthermore, one-item scales do not allow the investigation of reliability; Cronbach's alpha was used to calculate reliability in other scales but since it makes use of the correlations between items no reliability could be calculated for PSE (Cuvillier et al., 2021). Third, in order to better explore athletes' and coaches' perspectives, it would be necessary to investigate whether athletes' PSE differs from coaches' evaluations and if there are discrepancies between perceived coach support by athletes and coaches' perception of the support they give. Fourth, the data were collected at only one time point, longitudinal design can give more information on relationship of coach support on an athlete's PSE but also on possible differences in need strength during development or time (Reinboth et al., 2004). The relevance of each need can vary depending on the situation and functionality each need have in the specific context; hence data collected at only one time point limits the inferences we can make on the direction of processes and the causality. Last, as previously presented, research in different domains obtained different results; we can infer that the matching theory can be applied when exploring need support in specific behavioural domains and not in more generalized domains.

Conclusion

In conclusion, the current study confirmed a positive relationship between perceived needs support from the coach and athletes' PSE in a sample of young football players. In general, no moderation effects were reported except of goal-setting and feed forward need strength in which a relationship in an unexpected direction was described. In order to better and further help athletes in their success, the study results suggest coaches (1) to adopt a coaching style that aims to nurture athletes' needs; (2) to strengthen athletes' skills, particularly goal setting and feed forward abilities in order to promote future and accurate decisions; (3) to foster athletes' self-regulatory needs, particularly in individuals with low needs strength, and (4) to promote PSE and the acquisition of further knowledge and abilities with regards to athletes own skills and performance. The latter suggestion was deemed as particularly important because the perception of one's own talents and performance (PSE) is an essential factor in the lives of athletes since it determines their effort, motivation, and self-regulation abilities.

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Table 1

Means, standard deviations, and Correlations

			Pearson Correlation (r)												
	Mean	SD	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Age	15.07	2.08	-.02**	-0.06**	-.21**	-.17**	-.14**	-.16**	-.27**	-.20**	-.25**	-.18**	-.19**	-.20**	-.23**
2.NfC	6.43	.68		.17**	.41**	.35**	.47**	.33**	.23**	.17**	.23**	.16**	.18**	.18**	.02**
3.NfA	5.3	.89			.22**	.27**	.24**	.27**	.21**	.61**	.16**	.20**	.23**	.21**	.06
4.NfR	6.25	.83				.51**	.55**	.52**	.45**	.33**	.58**	.35**	.34**	.35**	.11*
5.NfGS	5.65	1.04					.69**	.79**	.47**	.37**	.42**	.51**	.47**	.49**	.27**
6.NfFW	5.96	.91						.70**	.38**	.30**	.35**	.36**	.37**	.35**	.16**
7.Nfefl	5.75	.98							.44**	.34**	.40**	.41**	.41**	.46**	.19**
8.ComSup	5.63	.98								.58**	.76**	.71**	.72**	.73**	.30**
9.AutSup	5.23	.85									.51**	.59**	.59**	.57**	.15**
10.RelaSup	6.03	.80										.58**	.61**	.57**	.19**
11.GoalSup	5.15	1.07											.81**	.85**	.30**
12.FWSup	5.32	.94												.79**	.30**
13.ReflSup	5.38	1.00													.31**
14.PSE	6.92	1.22													1

Note. Sample characteristics with means, standard deviation (SD), and correlations are represented for the following variables: need for competence (NfC), need for autonomy (NfA), need for relatedness (NfR), need for goalsetting (NfGS), need for feedforward (NfFW), and need for reflection (NfRefl).
Additionally, the same values are reported for the perceived support by the coach of each of these six needs.

*Significant at .05 (2-sided)

**Significant at .01 (2-sided)

Table 2

Summary moderation analyses with all relevant variables

		R^2	MSE	Coeff.	SE	t	p	90% CI
		0.098	1.354				0,000**	
NfC	(Constant)			6.923	0.059	116.171	0,000	[6.806,7.040]
	CompSup.			0.399	0.06	6.572	0,000**	[0.279,0.518]
	NfC			-0.094	0.087	-1.076	0.282	[-0.265,0.077]
	Interaction			0.013	0.083	0.162	0.871	[-0.150,0.177]
NfA		0.025	1.463				0.016*	
	(Constant)			6.906	0.067	102.045	0,000	[6.773,7.039]
	AutSup.			0.252	0.089	2.829	0,004*	[0.077,0.428]
	NfA			-0.053	0.085	-0.616	0.537	[-0,221,0.116]
	Interaction			0.040	0.065	0.615	0.538	[-0.088,0.169]
		0.038	1.443				0.001**	
NfR	(Constant)			6.891	0.067	101.925	0.000	[6.758,7.024]
	RelSup.			0.091	0.091	3.243	0.001**	[0.117,0.477]
	NfR			0.096	0.096	0.435	0.663	[-0.144,0.231]
	Interaction			0.080	0.08	1.095	0.273	[-0.069,0.245]
		0.13	1.306				0.000**	
NfGS	(Constant)			6.987	0.061	114.344	0.001	[6.867,7.107]
	GoalSup.			0.259	0.061	4.2	0.001**	[0.138,0.381]
	NfGS			0.117	0.068	1.727	0.084	[-0.016,0.251]
	Interaction			-0.107	0.038	-2.834	*0.005***	[-0.183,-0.032]
		0.105	1.344				0.000**	
NfFW	(Constant)			6.968	0.067	114.8	0.000	[6.849,7.087]
	FeedWSup.			0.355	0.066	5.355	0.000**	[0.225,0.486]
	NfFW			0.048	0.069	0.694	0.488	[-0.088,0.185]
	Interaction			-0.135	0.057	-2.332	*0.020**	[-0.248,-0.021]
		0.102	1.348				0.000**	
NfRE	(Constant)			6.935	0.063	109.237	0.000	[6.810,7.059]
	RefSup.			0.349	0.058	6.609	0.001**	[0.270,0.479]
	NfRE			0.073	0.069	1.067	0.286	[-0.061,0.209]
	Interaction			-0.021	0.057	-0.369	0.712	[0-0.134,0.092]

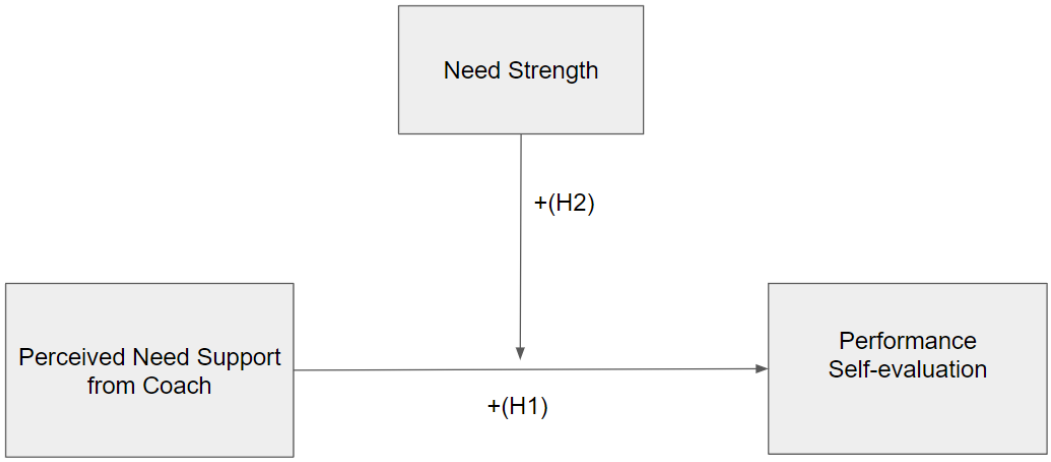
Note. Table summarizes the moderation analyses conducted for each of the six needs with the correspondent R^2 value, namely, competence (NfC), autonomy (NfA), relatedness (NfR), goal setting (NfGS), feed forward (NfFW) and reflection (NfRE).

******Significant for 0.05

***** Significant for 0.01

Figure 1

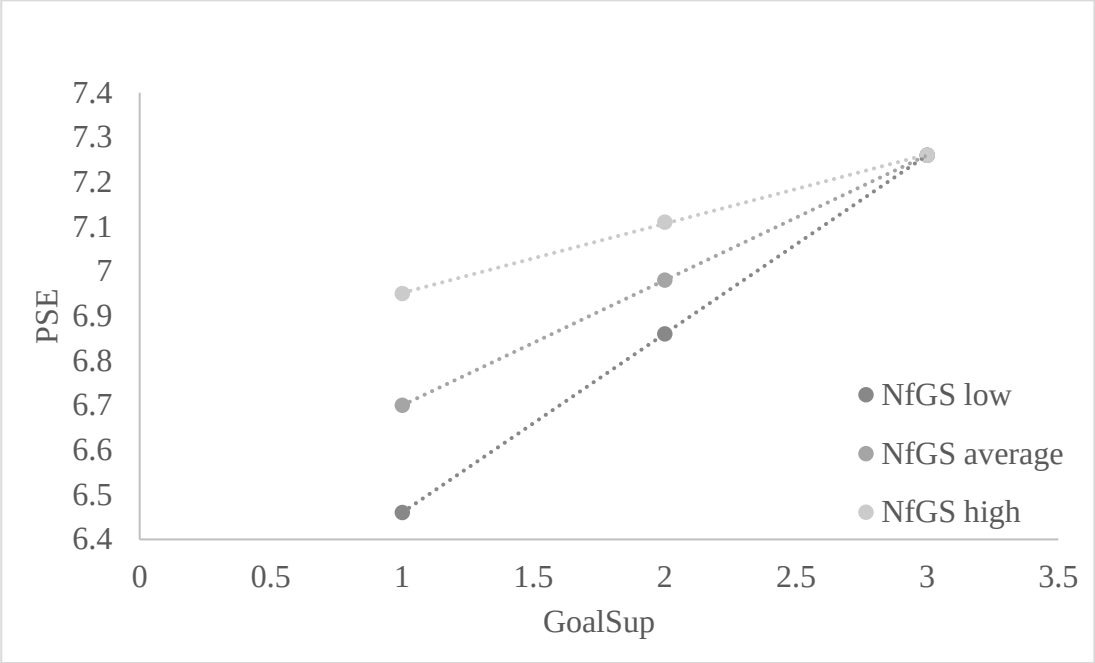
Research model



Note. The model will be tested separately for each of the needs: competence, autonomy, relatedness, goal setting, feed forward and reflection (hypotheses *a* to *f*).

Figure 2

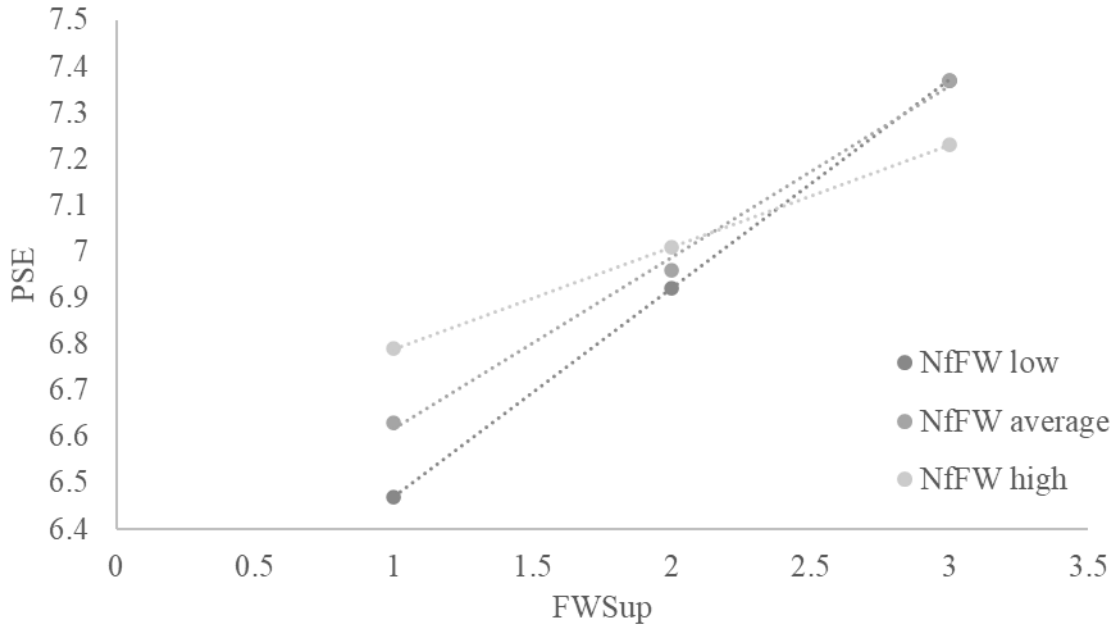
Simple slopes for need for goal setting



Note. Figures representing the three slopes for low (-1SD), average and high (+1SD) levels of goal setting need strength constructed after simple slopes analysis. In the axes we can see perceived goal setting support by the coach (GoalSup) and performance self-evaluation (PSE) on the Y-axis. The dotted lines represent the interpolation lines for each of the need strength levels, Interpolation line is used to reliably estimate unknown values. Additionally, an equation for each need strength was retrieved; High NfGS (y=0.15x + 6.7), Average NfGS (y=0.28x + 6.42) and Low NfGS (y=0.4x + 6.06).

Figure 3

Simple slope analyses of Feed Forward need strength



Note. Figures represent the three slopes for low (-1SD), average and high (+1SD) levels of the strength for feed forward constructed after simple slopes analysis. In the axes we can see perceived feed forward support by the coach (FWSup) and performance self-evaluation (PSE) on the Y-axis. The dotted lines represent the interpolation lines for each of the need strength levels, Interpolation line is used to reliably estimate unknown values. Additionally, an equation for each need strength was retrieved; High NfFW (y=0.22x + 6.57), Average NfFW (y=0.37x + 6.24) and Low NfFW (y=0.45x + 6.02).

Appendix
Transcript in English of the Items used

Summary of items used to investigate Need Strength

Need strength		Scale	Name
Autonomy (NfA)	I would like <NAME> to eventually let me decide how I approach things in my sport	1-7	ASB24_1
	I think it is important that <NAME> involves me in making choices that may have consequences for me	1-7	ASB26_7
	I think it is important that <NAME> lets me decide for myself what is good for me as an athlete	1-7	ASB27_10
	I would like <NAME> to leave me free to make my own choices	1-7	ASB28_11
Confidence (NfC)	I think it is important to be good at what I do as an athlete	1-7	CSB15_6
	I think it's important to be able to perform difficult exercises well	1-7	CSB16_9
	It is important to me that as an athlete I have the right qualities and skills	1-7	CSB14_3
Relatedness (NfRel)	I think it's important that I can trust <NAME>	1-7	RLSB9
	I think it's important that I can go to <NAME> if I'm having troubles	1-7	RLSB13
	I would like <NAME> to support me	1-7	RLSB15
Reflection (NfRef)	I think it is important that <NAME> helps me to think about improving my strengths and weaknesses	1-7	RFB3
	I would like <NAME> to help me think about how I can improve my performance	1-7	RFB1
	I would like <NAME> to motivate me to think if I am training the right things to move forward	1-7	RFB2
Goal Setting (NfGS)	I would like <NAME> to guide me in achieving my goals	1-7	DSB4
	I would like <NAME> to encourage me to have a goal in mind	1-7	DSB1
	I think it's important that <NAME> lets me work in my goals	1-7	DSB2
	I want <NAME> to motivate me to test challenging goals	1-7	DSB3
Feed forward (NfFW)	I would like feedback from <NAME> that matches my goals	1-7	FFB1
	I think it's important to know what <NAME> expects of me	1-7	FFB3
	I would like clear feedback from <NAME>	1-7	FFB2

Note. Table represents the transcription of the items used to investigate each need strength in the sample population. Answers on a 1-7 Likert scale comprised by 1 "never", 2 "rarely", 3 "occasionally", 4 "on a regular basis", 5 "often", 6 "very often", 7 "always". The name of the variable indicates the label of each corresponding items in the dataset.

Summary of items used to investigate Perceived Support

Perceived need support by coach		Scale	Name
Autonomy (AutSup)	<NAME> in the end let me decide how I approach things in my sport	1-7	AS16_1
	<NAME> listens and advises, but let me decide for myself what is good for me as an athlete	1-7	AS6
	I consult with <NAME> but <NAME> leaves me free to make my own choices	1-7	AS14
	<NAME> involves me in making choices that may affect me	1-7	AS1
	I would like <NAME> to leave me free to make my own choices	1-7	ASB28_11
Confidence (ConSup)	<NAME> gives me the confidence that I can do things well	1-7	CS6_5
	<NAME> encourages me to challenge myself	1-7	CS3
	<NAME> makes me feel like I can achieve my goals	1-7	CS10_7
Relatedness (RelaSup)	I feel supported by <NAME>	1-7	RL8
	I can go to <NAME> if I have a problem	1-7	RLS13
	I trust <NAME>	1-7	RLS4
	<NAME> treats me well	1-7	RL102
	<NAME> explains decisions	1-7	RLS5
Reflection (RefSup)	<NAME> helps me think about how I can improve my performance	1-7	RFS3
	<NAME> helps me think about improving my strengths	1-7	RFS1
	<NAME> motivates me to think if I'm doing the right things to move forward	1-7	RFS4
	<NAME> helps me think about improving my weak(er) sides	1-7	RFS2
Goal Setting (GaolSup)	<NAME> motivates me to set challenging goals	1-7	DSS5
	<NAME> makes me think how far I am from my goals	1-7	DSS4
	<NAME> has an eye for my personal goals	1-7	DSS8
	<NAME> encourages me to have a clear goal in mind	1-7	DSS1
Feed forward (FWSup)	<NAME> gives me feedback that matches my goals	1-7	FFS1
	<NAME> let me know when I have achieved my goal	1-7	FFS100
	I know what <NAME> expects of me	1-7	FFS5
	<NAME> gives me bright and clear feedbacks	1-7	FFS4

Note. Table represents the transcription of the items used for the investigation perceived need support by the coach on each of the six needs. Answers on a 1-7 Likert scale comprised: 1 "never", 2 "rarely", 3 "occasionally", 4 "on a regular basis", 5 "often", 6 "very often", 7 "always". The name of the variable indicates the label of each corresponding items in the dataset.