FACULTY OF PSYCHOLOGY
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The (de)motivating impact of coach feedback, choice provision, and self-talk in sports disentangled from a Self-Determination Theory perspective

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CHAPTER 1

The (De)motivating Impact of Coach Feedback, Choice Provision, and Self-Talk in Sports Disentangled from a Self-Determination Theory Perspective: A General Introduction.

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Regular sport participation among youth comes with a host of physical, psychological and social benefits, as manifested via, respectively, improved cardiovascular fitness, greater self-esteem, and better cooperative skills (Fraser-Thomas, Coté, & Deakin, 2005). At the same time, sport involvement, and particularly competitive sport participation, can also evoke stress and anxiety as youth athletes face various stressors (Smith, Smoll, Cumming, & Grossbard, 2006). For instance, competition may elicit threat, the loss of a game or a poor performance may come with disappointment and criticism from coaches and parents, and the social comparison inherent in competition may be socially alienating and demotivating. While some athletes are able to withstand these pressures, thereby remaining engaged and performing up to their standards, others get overwhelmed by these stressors, gradually lose their enjoyment in sport and even disengage or drop out (Butcher, Lindner, & Johns, 2002).

Whether athletes reap the benefits or rather suffer from their sport participation is determined by social-contextual factors, athletes' personal characteristics, and the interaction between both. An influential social-contextual factor is the coaches' motivating style (Mageau & Vallerand, 2003), which manifests - among other ways - via the valence (e.g., Whitehead & Corbin, 1991) and style (Mouratidis, Lens, & Vansteenkiste, 2010) of providing feedback, and the degree to which they offer choice (Ward, Wilkinson, Graser, & Prusak, 2008). The degree to which athletes are affected by a coach's motivating style, and especially by specific motivating practices, might also depend on athletes' personal characteristics, such as self-critical perfectionism (Blatt, 1995; Shafran, Cooper, & Fairburn, 2002) or dispositional indecisiveness (Germeijs & De Boeck, 2002). Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017) offers an encompassing theoretical framework to examine the effect of diverse coach behaviors on athletes' motivational, affective, behavioral, and moral functioning (e.g., Adie, Duda, & Ntoumanis, 2008Curran, Hill, & Niemiec, 2013; Ntoumanis, Barkoukis, Gucciardi, & Chan, 2017). Specifically, SDT

reasons that coaches will be able to spur enduring motivation (Pelletier, Fortier, Vallerand, & Briere, 2001) and optimal functioning to the extent they are able to support athletes' psychological needs for autonomy, competence, and relatedness such that athletes feel self-directed, capable, and cared for (e.g., Adie, Duda, & Ntoumanis, 2012; Mageau & Vallerand, 2003).

Within SDT, considerable attention has been paid to the question how a motivating style can best be defined and operationalized (e.g., Reeve, 2009), with a growing number of studies addressing the associations between coaches' motivating styles and athletes' outcomes (e.g., Adie et al., 2008). Although this research has yielded valuable insights, several lacunae can be noted. Most studies have focused on the role of coaches without simultaneously taking into account the role of other important socialization figures in young athletes' lives, such as parents. Most studies in sport also relied on a correlational design to examine a more general motivating style, thereby leaving the causal role of specific motivating practices understudied. Further, relatively few studies looked into underlying processes that may account for the associations between those specific motivating practices and athlete outcomes (Vansteenkiste, Niemiec, & Soenens, 2010). Finally, athletes' reactions to coaches' motivating practices may be fairly different depending on athletes' personal characteristics (e.g., Schüler, Sheldon, Prentice, & Halusic, 2016). Thus, to get a more complete understanding of the (mal)adaptive effects of a (de)motivating coaching style and practices, personal factors also need to be taken into account (Fleeson, 2007). Said differently, a person x context approach may provide a richer account of athletes' functioning. For example, choice provision might be considered less beneficial for persons who are highly indecisive (Germeijs & De Boeck, 2002), whereas negative feedback might be particularly detrimental for athletes high on self-critical perfectionism (Blatt, 1995).

The main objective of the current dissertation was to gain an *insight in the unique and causal impact of coaches' motivating style* in general and a number of specific coaching practices in particular, thereby shedding light on

the question why these effects occur (i.e., underlying mechanisms) and for whom they occur (i.e., moderation). As such, three global aims are pursued, that is, (1) a detailed examination of the unique and causal (de)motivating impact of specific coach practices on athlete functioning, (2) the identification of explanatory mechanisms underlying these relationships and (3) the examination of whether the effects of coach practices are dependent upon athletes' personality characteristics. Congruent with these global aims, the first chapter of this dissertation provides a theoretical background regarding (de)motivating coaching styles, potential explanatory mechanisms and relevant personality characteristics. It concludes with an overview of the key objectives of and empirical studies conducted in the current dissertation.

A SELF-DETERMINATION THEORY PERSPECTIVE ON (DE)MOTIVATING COACHING STYLES

1.1. AT THE HEART OF SELF-DETERMINATION THEORY: BASIC PSYCHOLOGICAL NEEDS

SDT, as a broad theory on human motivation and optimal functioning, has been successfully applied in a variety of contexts such as parenting, education, business, and sports (e.g., Soenens & Vansteenkiste, 2005;). According to SDT, all individuals have three basic psychological needs, that is, the needs for autonomy, competence, and relatedness (Ryan & Deci, 2002). The need for *autonomy* refers to feelings of volition and self-direction and to a sense of experienced psychological freedom in one's thinking, feeling, and acting (deCharms, 1968). The need for *competence* encompasses feeling capable to successfully complete everyday assignments, to deal with challenges effectively, to make progress in the development of talents, and to meet personally valued goals (White, 1959). Finally, the need for *relatedness* refers to feeling cared for and having warm relationships with meaningful others (Baumeister & Leary, 1995).

According to SDT, the psychological needs serve as important sources of energy and are considered the essential nutriments for optimal

functioning (Deci & Ryan, 2000). The role of basic psychological needs in human adjustment, can be metaphorically compared with the role of the sun, soil and water in the growth of plants. Just as plants need sun, soil and water to grow, humans require need satisfaction to function well physically, mentally, and socially (Ryan, 1995). As such, basic psychological needs are characterized as essential, and are additionally considered innate and universal.

Consistent with SDT's claim that psychological needs are *essential*, research in the context of sport has shown that need satisfaction positively relates to athletes' optimal functioning, as indicated by motivational, affective, behavioral and moral indicators (see Figure 1). With regard to motivation, need satisfaction positively relates to autonomous motivation (Mageau & Vallerand, 2003), which involves the regulation of behavior on the basis of self-endorsed reasons (i.e., the personal relevance of the behavior and/or the inherent enjoyment of the behavior), such that the behavior has a perceived internal locus of causality (Vansteenkiste et al., 2010). Furthermore, the more athletes report need satisfaction, the less they display amotivation (Ntoumanis, Pensgaard, Martin, & Pipe, 2004), which refers to not acting at all or acting without intent (Ryan & Deci, 2000). As for affective functioning, athletes reporting more need satisfaction, also experience more subjective vitality, positive affect (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani), and well-being (Adie et al., 2008), while experiencing less anxiety (Quested et al., 2011). Behaviorally speaking, athletes reporting more need satisfaction, put more effort in their sporting endeavors, use more task-oriented coping strategies, and are more likely to attain their goals (Smith, Ntoumanis, Duda, & Vansteenkiste, 2011). Furthermore, need satisfaction is positively related to a successful return to sport following an injury (Podlog & Eklund, 2007) and to objective performance indicators (Sheldon, Zhoayang, & Williams, 2013). Regarding morality, need satisfaction relates positively to sportspersonship (Ntoumanis & Standage, 2009) and prosocial attitudes towards team members (Hodge & Gucciardi,

2015), while it relates negatively to gamesmanship, intentions to cheat or to use doping (Ntoumanis et al., 2017).

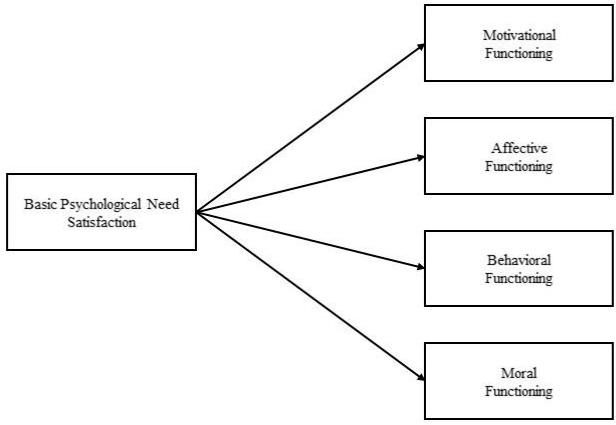

Figure 1. Graphical representation of the relationships between basic psychological need satisfaction and outcomes of interest

The basic psychological needs can also get frustrated, in which case athletes experience more than mere need deprivation (Vansteenkiste & Ryan, 2013). Need frustration involves the active thwarting of basic psychological needs (Bartholomew et al., 2011; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015), such that individuals feel coerced (autonomy need frustration), incapable and inferior (competence need frustration) or isolated, lonely, and abandoned (relatedness need frustration). Because these experiences of need frustration entail a stronger threat to people's needs than a mere absence of need satisfaction (e.g., feeling few opportunities for choice during a training or having only limited experiences of success during a game), need frustration is treated as the "dark" side of individuals' need-based functioning, with this dark side being particularly relevant to the prediction of maladaptive outcomes (Vansteenkiste & Ryan, 2013). Need frustration has indeed been related particularly strongly to aversive outcomes such as amotivation (Pulido, Sanchez-Oliva, Sanchez-Miguel, Amado, & Garcia-Calvo, 2018), negative affect and depression (Bartholomew et al., 2011), disaffection (Curran, Hill, Ntoumanis, Hall, & Jowett, 2016) and immoral behaviors (Ntoumanis et al., 2017).

When needs are frustrated, people might cope in a variety of ways. In most cases, the frustrated need becomes a central focus, such that peoples' attention, desires and actions shift towards that particular need (Maner, DeWall, Baumeister, & Schaller, 2007). Providing more attention to need satisfying cues (Radel, Pelletier, Sarrazin, & Milyavskaya, 2011) and taking well-thought actions to restore the thwarted needs (Sheldon & Gunz, 2009) are among the more adaptive reactions. People are more likely to engage in adaptive coping when the exposure to need frustration is brief and when they have sufficient resources for resilience. However, when the need frustration encountered by people is highly intense or chronic in nature and when people lack adequate personal resources, people become more likely to react in more maladaptive ways. One such maladaptive way of coping is the development of rigid behavior patterns, which may provide short-term feelings of security, stability and efficacy, but which interferes with need satisfaction in the longer run. For example, self-critical perfectionists often aim for very demanding standards. Although these standards provide a sense of structure and predictability, when pursued in a rigid way, they likely interfere with the satisfaction of autonomy, competence, and relatedness across time (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014; Campbell, Boone, Vansteenkiste, & Soenens, in press; Shafran & Mansell, 2001).

In addition to being essential, basic psychological needs are considered *innate*. This means that the basic psychological needs are adaptive for human development at the level of the species and that, as a consequence, these needs have become embedded in the human psychological nature. From this assumption, it follows that satisfaction of these needs is important throughout the lifespan. Research has shown that need satisfaction and contextual support for the needs are indeed related to positive developmental outcomes from early childhood, with children displaying better capacities for executive functioning (e.g., Bernier, Carlson, & Whipple, 2010) to late adulthood, with elderly reporting higher well-being and better adjustment (e.g., Kasser & Ryan, 1999). Furthermore, being innate also implies that the

needs are *universal*, indicating that every person will benefit from need satisfaction, irrespective of their cultural background (Chen et al., 2015), gender (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006), or socio economic status (Chen, Van Assche, Vansteenkiste, Soenens, & Beyers, 2015).

Besides allowing for a discussion of human nature and specific psychological factors that are important for development, the formulation of three basic needs also enables researchers to synthesize a broad range of divergent phenomena (Vansteenkiste et al., 2010). In doing so, researchers and practitioners alike are provided with a theoretical basis to understand which dynamics of social contexts, such as a sport environment, promote athletes' motivational, affective, behavioral, and moral functioning, and which factors are mainly detrimental.

1.2. A GLOBAL VIEWPOINT ON AN AUTONOMY SUPPORTIVE AND STRUCTURING MOTIVATING STYLE

Given the wide array of benefits associated with need satisfaction, SDT posits that socializing agents, through their motivating style, and sport clubs, through their motivational climate, may do well to support athletes' need satisfaction. The most prominent socializing agents in the case of youth athletes are parents and coaches (Wylleman & Lavallee, 2004). While parents have a longer developmental history with children and with children's involvement in sport in particular (e.g., through modeling, encouragement, and transmission of values), coaches are involved more directly in youth athletes' organized sport participation (e.g., through training and direct instructions). Although the current dissertation will predominantly focus on how coaches can enhance athlete functioning, it will also be examined whether coaches and parents play a unique role in athletes' motivation and engagement.

In accordance with the distinction between the three psychological needs, SDT distinguishes between three dimensions of a motivating style, with each of these dimensions having a bright side (i.e., the need-supportive

side) and a dark counterpart (i.e., the need-thwarting side) (Haerens et al., 2015). As shown in Figure 2, the dimensions of autonomy-support, structure, and relatedness support foster satisfaction of the three basic psychological needs. In contrast, controlling, chaotic, and relational rejecting coaching thwart these very same needs, resulting in experiences of need frustration. Although intuitively autonomy support (vs. control) is linked with the need for autonomy, structure (vs. chaos) is linked with the need for competence, and relational support (vs. rejection) is linked with the need for relatedness, these motivating styles often go hand in hand in reality (e.g., Jang, Reeve, & Deci, 2010; Niemiec et al., 2006). As a consequence of this complex reality, motivating styles also do not show a one-to-one relationship with a particular need, but rather are supportive for multiple needs (Ryan, Deci, & Vansteenkiste, 2016)

Research in the context of sport has focused mainly on the dimensions of autonomy-support and structure (and on their 'dark' counterparts), at the expense of a focus on relatedness support. One likely reason for this relative neglect of relatedness support in research on sport is that coaches are less considered as attachment figures compared to parents, with whom children spend more time and who also are assumed to play a more important role in the provision of emotional comfort (Grusec & Davidov, 2010). While it is definitely fruitful for future research to also explore more in depth the meaning and role of relatedness support in coach-athlete relationships; in this dissertation the focus will also be on autonomy-support and structure.

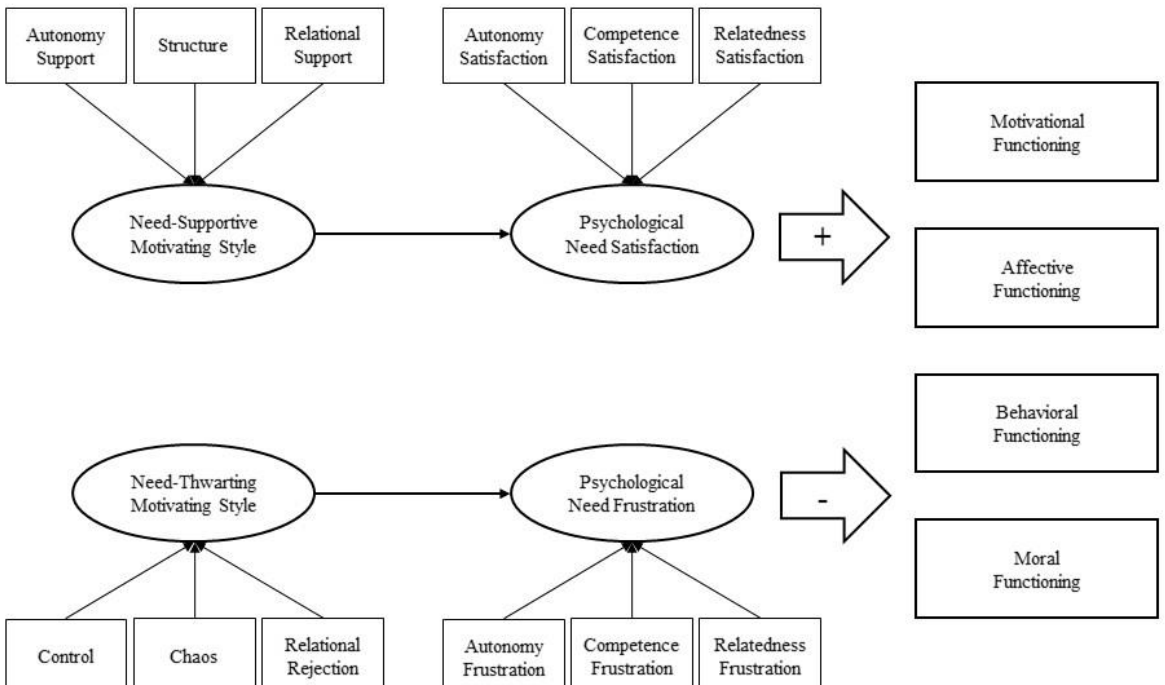

Figure 2. Graphical representation of the relationship between general (de)motivating styles, psychological need-based experiences, and outcomes

1.2.1. AUTONOMY SUPPORTIVE VS. CONTROLLING STYLE

An autonomy-supportive coaching style is characteristic of coaches who adopt the athletes' perspective, who are highly respectful of athletes' initiatives, and who welcome and encourage athletes' thoughts, feelings, and suggestions into the flow of an activity (Deci et al., 1981; Reeve, 2009). The starting point of providing autonomy support is a fundamental attitude characterized by *empathizing with athletes' point of view*, of being flexible and curious, and of providing them with a sense of volition (Ryan, Deci, & Grolnick, 1995; Soenens & Vansteenkiste, 2010).

On the basis of this fundamental autonomy-supportive attitude, coaches can apply several more specific practices. Note, however, that these practices are theory driven or derived from other context of sports (e.g., education), such that only a few have sport-specific empirical support to date. First, coaches can *nurture internally motivating sources*, such as enjoyment, curiosity and challenge (Reeve, 2009), for example by providing background music during physical conditioning exercises or by including other fun elements during practice (Digelidis, Karageorghis, Papapavlou, & Papaioannou, 2014). Second, coaches can provide opportunities for *athletes' input* and participation in decision making (Patall, Cooper, & Robinson, 2008). When athletes are consulted with regard to the organization of a training or the game strategy, or are allowed to choose between several activities, they will be more likely to feel in control of their sporting endeavors (Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011).

However, it is not always possible or feasible for coaches to provide choice or to implement fun elements, nor is it necessary to consistently apply these practices in order to be autonomy-supportive (Assor, Kaplan & Roth, 2002). When allowing input is inconvenient, coaches can give an *explanatory rationale* as to indicate why a certain activity or appointment is worthwhile for athletes (Jang, 2008). Possibly, athletes will react with negative affect or even resistance when they are faced with an exercise that is not aligned with their personal preference. In such a situation, autonomy-support manifests in

acknowledging this negative affect (Miller & Rollnick, 2002). Such acknowledgement, however, does not mean that coaches by definition concede with their athletes' complaints (Reeve, 2009). Granting athletes the opportunity to vent those complaints makes them feel heard which, in turn, will cause athletes to be more likely to adhere to the coach's request or to find a compromise according to SDT (Ryan & Deci, 2017). A final autonomy-supportive practice encompasses relying on *inviting language* (e.g., "try to", "I propose", "let us",…), rather than pressuring (e.g., "you must…", "if you do not …, then…", "I demand you to…") language (Mouratidis et al., 2010).

An autonomy-supportive motivating style is often contrasted with a more controlling one. The latter style involves dominantly taking action from the coaches' own point of view, thereby neglecting athletes' opinions and even forcing or manipulating athletes to get them in line with the coaches' viewpoint. As a consequence, athletes tend to feel coerced, rather than volitional, in their actions. Instead of appealing to internally motivating sources, this motivating style rather relies on externally pressuring factors. For instance, rewards or punishments (Deci, Koestner & Ryan, 1999), intimidation (Bartholomew et al., 2011) and shame- or guilt induction (Soenens & Vansteenkiste, 2010) can be used to force athletes to follow orders. Opportunities for athlete input are restricted, nipping every attempt towards it in the bud. Or choices are provided, but athletes are subsequently deprived from acting upon their choice. With regard to explanatory rationales, the request for a rationale is neglected or the provided rationale is not meaningful for athletes, and stresses the more powerful and authoritarian position of the coach, such that it thwarts autonomy need satisfaction. In a similar vein, athletes' negative affect is minimized or discarded. Finally, when controlling, coaches make use of coercive language with a conditional tone.

Studies making use of measures that tap into athletes' overall perceived autonomy support or that create an aggregated measure, consisting of several, of the above mentioned practices, support the assumption that autonomy-support is generally beneficial for a range of relevant outcomes.

Specifically, the more athletes perceived their coach as autonomy supportive, the more autonomy need satisfaction and well-being they reported (Adie et al., 2008), the more autonomously motivated and engaged they were (Amorose & Anderson-Butcher, 2007; Curran et al., 2016), the more enjoyment they experienced (Reinboth, Duda, & Ntoumanis, 2004), while they reported less physical symptoms (Joesaar, Hein, & Hagger, 2012) as well as less disaffection (Curran et al., 2016) and they were less likely to end their sport participation in the next two competitive seasons (Pelletier et al., 2001).

One criticism sometimes leveled against autonomy-supportive coaching is that it is too indulgent and interferes with the provision of rules and guidelines (Kohn, 2014). Autonomy support is then portrayed as an orientation where athletes need to enjoy unlimited freedom and decision power, thereby transforming the sport environment into a motley crew. However, it is a both a laymen misconception and a conceptual error to maintain that the setting of rules and guidelines is incompatible with an autonomy-supportive motivating style. Coaches' rules, expectations, and guidelines can, and ideally are, communicated in an autonomy-supportive fashion, in which case athletes are more likely to volitionally adopt and follow these rules and guidelines (Vansteenkiste et al., 2012). Such rules, which are said to be part of the notion of structure, may even help athletes to make progress and to develop their skills, both individually and as a team as a whole. Autonomy-supportive coaching does not exclude a structuring approach, on the contrary, both styles have been found to be fairly highly correlated (Delrue, Reynders et al., in press) and their combined presence was found to yield the strongest contribution to athlete engagement (Curran et al., 2013).

1.2.2. STRUCTURE VS. CHAOS

A structuring coaching style involves behaviors aimed at fostering athletes' sense of effectiveness and mastery, thereby supporting their competence need satisfaction (Farkas & Grolnick, 2010). The fundamental attitude underlying the provision of structure encompasses being *process-oriented* (Aelterman, De Muynck, Haerens, Vande Broek, & Vansteenkiste,

2017; Vansteenkiste & Soenens, 2015), being attuned to the athletes' emerging skills, qualities, and the potential of the athlete. Such an attitude allows coaches to align themselves with athletes' natural pace of development, thereby being focused on intra-individual progression instead of solely focusing on interpersonal comparisons. Similar to autonomy-support, several more specific structuring practices have been identified, which are also predominantly theory driven and derived from other context than the sport domain.

Prior to an activity, coaches can provide structure by communicating an *overview* of the activities to be performed, directions for appropriate behavior, performance expectations and guidelines to achieve these expectations (Sher-Censor, Assor, & Oppenheim, 2015). In doing so, the training or competition becomes predictable for athletes. Also, being aware of expectations is a crucial precondition to be able to meet those expectations and, as a consequence, to enable competence need satisfaction. In addition to providing a clear overview, structuring coaching is characterized by *expressing confidence* in athletes. This can be done either explicitly by actually conveying confidence (Reeve, 2006) or implicitly, for example, by setting challenging goals for athletes (Elston & Ginis, 2004).

During the activity, structuring coaching manifests in *process-related monitoring.* Such monitoring involves checking if athletes adhere to the directions for appropriate behavior and meet the discussed performance expectations (Enzle & Anderson, 1993; Grolnick & Ryan, 1989). Monitoring also allows coaches to deliberately highlight successes (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008), thereby fostering athlete competence need satisfaction, and to quickly identify when things go sideways, allowing coaches to *scaffold* their athletes' performance by providing a hint, by modelling successful performance or by reminding them of a helpful strategy (e.g., Feltz, Landers, & Raeder, 1979). In this regard, providing structure also means to realize when help is no longer necessary and to gradually withdraw as a coach (Felt, Short, & Sullivan, 2008).

Upon completion of an activity, structuring coaching is characterized by *encouraging athletes to self-reflect* on their performance in order to increase athletes' awareness of personal strengths and weaknesses. When athletes are capable of identifying their weaknesses and come up with a solution themselves, they are more likely to make progress in the future. However, when athletes are not able to successfully assess their own performance, they rely on *coach feedback*. Structuring coaches predominantly try to emphasize positive elements in the athlete's performance (Mouratidis et al., 2008). In addition, they prefer feedback about aspects of the performance that are under athletes' control, such as task execution (Tzetzis, Votsis, & Kourtessis, 2008), rather than competitive outcomes (Whitehead & Corbin, 1991), which are also determined by the performance level of opponents, teammates, or luck. When discussing weaker aspects of athletes' performance and when providing corrective feedback, coaches high on structure again take a process-oriented approach, pointing out specific behaviors that can be improved in future performance (Mouratidis et al., 2010)

The structuring motivating style is usually contrasted with a chaotic style, which reflects a lack of connection with the skills and qualities of athletes. With chaos, rules, guidelines and expectations are unclear or lacking all together, thereby precluding process-oriented monitoring during the activity. Because too little support is provided, athletes feel left to their own devices. Upon completion of an activity, chaotic coaching involves preventing athletes' self-reflection. Chaotic coaches especially stress negative aspects of the performance without providing advice for improvement, and sometimes even criticize the athlete as a person. As such, chaotic coaching results in insufficient opportunities for development or sometimes even in the active thwarting of athletes' competence need satisfaction.

Within the current SDT-based sport literature, the structuring motivating style received less attention compared to the autonomy-supportive one. However, the educational domain provides ample evidence relating more perceived structure to more competence need satisfaction, effective learning

strategies and positive affect, and less depressive feelings (Mouratidis, Vansteenkiste, Michou, & Lens, 2013). The available studies stemming from the sport domain so far confirm these findings by linking perceived structure to greater intrinsic motivation and reduced tension (Amorose & Horn, 2000) a greater preference for challenging activities (Black & Weiss, 1992), enhanced engagement and less disaffection (Curran et al., 2013)

1.3. ZOOMING IN ON SPECIFIC AUTONOMY SUPPORTIVE AND STRUCTURING PRACTICES IN SPORTS

To date, the SDT-based literature within the sport domain predominantly relied on rather global assessments of motivating styles and on correlational designs (e.g., Adie et al., 2008; Curran et al., 2013). Whereas these studies clearly show positive associations between coaches' autonomy-support and structure and athlete outcomes, these studies lack detailed information on specific coaching practices. Studies zooming in on specific practices are scarce, predominantly correlational in nature (e.g., Carpentier & Mageau, 2013), and based on non-athlete samples (e.g., Wulf & Toole, 1999). For a variety of practices, such as nurturing inner motivational resources (Digelidis et al., 2014), acknowledging negative effect (Reeve, 2009), providing meaningful rationales (Jang, 2008), and the provision of and overview of activities and guidelines for appropriate behavior (Sher-Censor et al., 2015), evidence can be obtained in the educational or parenting domain. Yet, the question raises whether these findings can be generalized to the sport domain. As a result, at this moment, it seems premature to draw causal conclusions about the effect of specific motivating coaching practices within the context of sports, a lacuna this dissertation aimed to help filling

The lack of sport-specific examinations of particular motivating practices (e.g., provision of choice) also precludes a more differentiated and in-depth examination of these practices. Little is known about intervening processes accounting for the (de)motivating effects of these more specific practices. Moreover, it is unclear to date under which conditions the effects of a particular motivating practice gets maximized, attenuated, or cancelled out.

In other words, there is a need to zoom in on specific practices to achieve a fuller understanding of which motivating practice works for whom, under which conditions, and why (Vansteenkiste, Resnicow, & Williams, 2012). The current dissertation aimed to provide a more differentiated view on three practices, that is, coaches' feedback provision, their communication style, and choice provision in the context of sports. Figure 3 graphically situates these practices within the broader SDT framework on motivating coaching. For each practice, the figure depicts the specific operationalization that is investigated, or the precise conditions under which the practice is examined. Methodologically, the current dissertation also aimed to strengthen extant research by implementing experimental field designs.

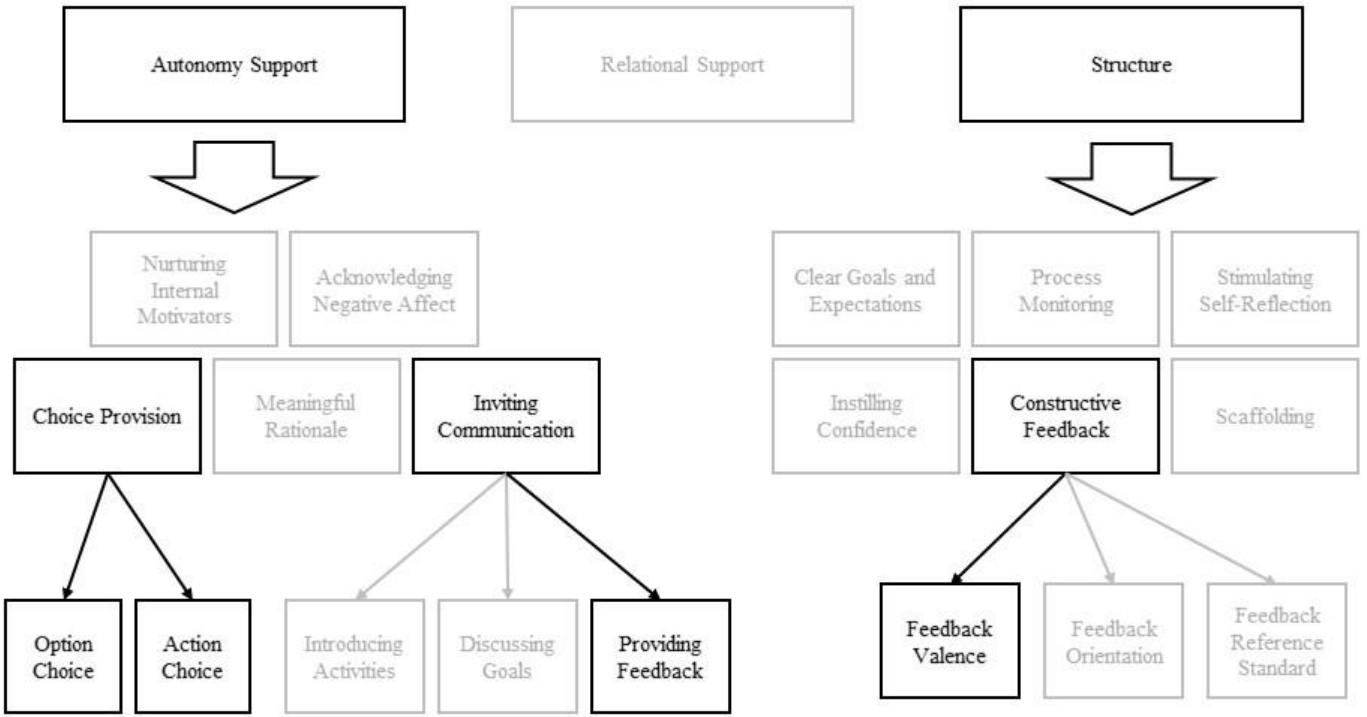

Figure 3. Graphical representation of how the practices and their particular aspects under examination in the current dissertation are situated within the broader SDT-framework on motivating coaching.

1.3.1. THE (DE)MOTIVATING IMPACT OF FEEDBACK

Feedback was selected as a specific motivating practice because it is inevitable in sports. Most coaches provide a considerable amount of feedback and feedback is also inherently in competitive outcomes, rankings and competition tables. An in-depth understanding of feedback requires a consideration of its valence, orientation, and reference standard.

Regarding *feedback valence*, three different types of feedback can be discerned, ranging from negative to positive feedback. In the case of negative feedback, athletes are explicitly told that they performed poorly (e.g., Whitehead & Corbin, 1991). Neutral feedback, on the other hand, conveys that athletes performed up to standards, not especially well, but not poor either. Finally, in the case of positive feedback, athletes are told that they performed well or that their skill execution was good (Mouratidis et al., 2008).

Although positive feedback is generally considered more beneficial than negative feedback, these effects are qualified by *feedback orientation*, as person- and process-oriented feedback yield different effects. In the case of person-oriented feedback, feedback is directed at athletes' traits, whereas process-oriented feedback is directed at athletes' behaviors and effort-expenditure. When negative feedback is person-oriented, it stresses the persons' failure to achieve an outcome, whereas process-oriented negative feedback stresses the aspects of the performance that were below expectations. Process-oriented feedback is often accompanied by a suggestion to improve the aspect that needs remediation (Amorose & Weiss, 1998). In the case of negative feedback, studies indicate that a process-orientation is able to somewhat buffer its detrimental effect (Mouratidis et al., 2010). In the case of positive feedback both person- and process-oriented feedback have similar effects upon competence need satisfaction, positive affect (i.e., vitality, and enjoyment) and negative affect (i.e., pressure and depressive feelings) directly upon feedback provision (Mouratidis et al., 2008, Study 2; Whitehead & Corbin, 1991). However, differences between both types of feedback may emerge on a later moment in time, as praising athletes for fixed traits has been

found to backfire in terms of motivation and performance when they subsequently experience failure (Mueller & Dweck, 1998).

Finally, feedback can be differentiated depending on its *reference standard*. In the case of task-based feedback, athletes' performance is compared with the correct execution of a particular task or set of skills (e.g., Tzetzis et al., 2008). Intrapersonal feedback compares a current performance of athletes with their own previous performances (e.g., Tenenbaum et al., 2001). Finally, normative feedback compares athletes' performance with the performance of others or with a norm table (e.g., Mouratidis et al., 2008, Study 1). Although task-based and intrapersonal feedback are recommended because athletes exert more control over correct skill execution and personal progress, as compared to competitive outcomes, most studies, including those within the current dissertation, examine normative feedback. This is because normative feedback is very common (and even inevitable) in the context of competitive sports and most suitable to be credibly manipulated in experimental studies.

1.3.2. (DE)MOTIVATING COMMUNICATION STYLE

Coaches' communication style was selected as a second specific motivating practice, as this aspect of motivating style is important to be simultaneously examined with feedback provision. Moreover, no studies to date have experimentally varied feedback valence and feedback communication style within the context of sports (but see Ryan, 1982; Mabbe, Soenens, De Muynck, & Vansteenkiste, 2018 for studies in the context of education).

Supportive evidence for the motivationally beneficial effects of an autonomy supportive communication style has been found in varying contexts, ranging from education (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004), healthcare (e.g., Martinez et al., 2016) to parenting (Van Petegem et al., 2017). These beneficial effects have also been demonstrated across different situations. To illustrate, beneficial effects were found for introducing tasks (Savard, Joussemet, Pelletier, & Mageau, 2013), communicating

maternal prohibitions (Van Petegem et al., 2017), introducing rules regarding TV watching (Bjelland et al., 2015), communicating goal contents (Vansteenkiste et al., 2004), discussing breast-cancer (Martinez et al., 2016), providing feedback (Mabbe et al., 2018; Mouratidis et al., 2010, Ryan, 1982), and monitoring individuals (Enzle & Anderson, 1992).

Within the sports domain in particular, autonomy supportive communication was examined in three correlational studies. In line with findings from other domains, these studies showed that the more feedback is communicated in an autonomy-supportive way, the less negative affect and the more need-satisfaction, well-being, self-esteem, and autonomous motivation athletes report (Carpentier & Mageau, 2013), while also indicating higher intentions to persist in the activity (Mouratidis et al., 2010). Furthermore, the more coaches were perceived to rely on controlling language during a pre-game speech and on-game coaching, the lower morality soccer players displayed during the game, as reported afterwards (Delrue et al., 2017). As no causal interpretations can be made upon correlational data, implementing an experimental design in the context of sport would strengthen the available literature.

1.3.3. THE (DE)MOTIVATING ROLE OF OFFERING CHOICE

The last specific motivating practice under examination in the current dissertation is choice provision. A more in-depth examination of choice provision is important because coaches are more reluctant to implement this practice, compared with other autonomy-supportive practices (Delrue et al., 2018) and because the advantages and pitfalls of choice are heavily debated from a theoretical point of view (Markus & Schwartz, 2010; Ryan & Deci, 2006). To date, however, studies dealing with choice in the context of sport are very scarce, while studies outside the sport domain show mixed findings. In education, for example, a meta-analysis found a generally positive effect of choice provision on intrinsic motivation and effort expenditure (Patall et al., 2008), although there was a wide variety of effect sizes and some studies even reported negative effects (Overskeid & Svartdal, 1996; Parker & Lepper,

1992). This heterogeneity might indicate that not all types of choice are equally motivating.

To provide a more differentiated examination in the context of sport, the current dissertation aimed at examining different types of choice provision, thereby distinguishing between option choice and action choice (Reeve, Nix, & Hamm, 2003). *Option choice* refers to choosing what to do, for example, by allowing choosers to pick an activity out of a predetermined list of multiple options (Schraw, Flowerday, & Reisetter, 1998). To the best of our knowledge, experimental studies regarding option choice are lacking in the sport domain. *Action choice*, on the other hand, refers to choice regarding how an activity is performed, for example, by choosing the order in which activities are performed or the rate in which they shift from one activity to the other (e.g., Mouratidis et al., 2011). Although action choice is also seldom examined in the context of sports, some initial indication of its effect, might be derived from studies in physical education or motor learning. These studies show beneficial effects of providing choice regarding the order of doing activities (Wulf & Adams, 2014), the pace of proceeding to the next exercise (Mouratidis et al., 2011), when to use assistance devices (Wulf & Toole, 1999), and when to receive feedback (Janelle, Kim & Singer, 1995). Note, however, that non-athlete samples were used in these studies, thereby limiting the generalization of effects towards sports coaching.

2. INTERVENING MECHANISMS EXPLAINING WHY MOTIVATING COACHING STYLES IMPACTS ON ATHLETE FUNCTIONING

Having discussed the general effects of autonomy support and structure, the question arises which mechanisms underlie the impact of these motivating styles and their more specific constituent motivating practices. SDT posits the basic psychological needs for autonomy and competence as intervening variables for autonomy support and structure, respectively (Deci & Ryan, 2000). These mechanisms are said to be domain-invariant such that they can be applied to all possible contexts ranging from parenting to the

organizational context. As such, research within a given domain, such as the sport context, could benefit from the examination of additional, somewhat more domain-specific, intervening mechanisms. One such candidate is self-talk, which will be examined in greater detail within the current dissertation.

2.1. AUTONOMY AND COMPETENCE NEED SATISFACTION.

Within SDT, basic psychological need satisfaction is often assumed to function as an intervening mechanism between socio-contextual factors and outcome variables (Mageau & Vallerand, 2003), but this assumption has received less empirical attention (Vansteenkiste et al., 2010). With regard to coaches' global autonomy-supportive motivating style, need satisfaction in general (Bartholomew et al., 2011) and *autonomy need satisfaction* in particular (e.g., Smith et al., 2011) were found to function as an intervening mechanism in the positive relationship with positive affect and vitality (Balaguer et al., 2012; Bartholomew et al., 2011), well-being (Adie et al., 2008) and intrinsic motivation (Reinboth et al., 2004), as well as in the negative relationship with negative affect and burnout (Balaguer et al., 2012; Bartholomew et al., 2011).

Similar to the intervening role of autonomy need satisfaction in the relationships of coach autonomy support, *competence need satisfaction* was found to be an explanatory variable for the relationships of a structuring motivating style. Because structure is less frequently examined in the sports than autonomy support, supportive evidence for the intervening role of competence need satisfaction comes largely from other domains. Within education and game learning, competence need satisfaction has been found to function as an intervening variable in the relationship between perceived structure and motivation (Taylor & Ntoumanis, 2007), positive and negative affect (Sheldon & Filak, 2008), and depressive symptoms (Mouratidis et al., 2013). Specifically, with regard to the sport domain, the limited available evidence shows that general need satisfaction functions as an intervening mechanism in the relationship between structure and both engagement and disaffection (Curran et al., 2013; Curran & Standage, 2017). It is important to

note that the vast majority of evidence for the intervening role of the needs in the sport domain is based on correlational studies. Few, if any, studies to date examined whether experimentally manipulated autonomy support and structure affect athletes' psychological need experiences, with these experiences in turn relating to athlete outcomes.

Further, although some evidence is available regarding the role of need satisfaction in relationships between coaches' more global motivating styles and athlete outcomes, similar evidence for more specific motivating practices (such as choice, feedback valence, and communication style) is far more limited. With regard to *feedback valence*, competence need satisfaction has been found to explain the beneficial effect of positive normative feedback on intrinsic motivation and behavioral challenge seeking in a puzzle task (Mabbe et al., 2018; Vansteenkiste & Deci, 2003). Furthermore, competence need satisfaction explained the enjoyment- and effort enhancing effect of positive, compared to negative, feedback during a shuttle run task (Whitehead & Corbin, 1991). Directly relevant for the current dissertation, competence need satisfaction has also been found to account for the effect of positive feedback on basketball players' intrinsic motivation (Fransen, Boen, Vansteenkiste, Mertens, & Vande Broek, 2018).

To our knowledge, the intervening role of autonomy need satisfaction in the effects of *communication style* in general and feedback communication style in particular, has been examined in only one study outside the context of sport (Mabbe et al., 2018). In this study, autonomy-supportive, compared to controlling feedback regarding a puzzle task enhanced children's autonomy need satisfaction, which, in turn, enhanced their intrinsic motivation (Mabbe et al., 2018). With regard to *choice provision*, option choice about which puzzle to work on was found to be unrelated to autonomy need satisfaction (Reeve et al., 2003) and, as a consequence, autonomy satisfaction could not function as an explanatory mechanism. However, action choice regarding the order in which puzzles could be solved and regarding the pace to shift from one puzzle to the other, was found to enhance children's autonomy

satisfaction, which, in turn, related to higher intrinsic motivation (Reeve et al., 2003).

2.2. SELF-TALK

2.2.1. DEFINITION AND TAXONOMY

Self-talk is defined as "statements, phrases or cue words that are addressed to the self which might be said automatically or strategically, either out loud or silently, phrased positively or negatively, having an instructional or motivational purpose, an element of interpretation, and incorporating some of the same grammatical features associated with everyday speech" (Hardy & Zourbanos, 2016). This definition indicates that self-talk can be classified according to multiple dimensions, of which origin and especially valence are of importance to the current dissertation.

Regarding to its *origin*, self-talk can be either instructed or spontaneous. In the case of instructed self-talk, athletes are asked to use a particular self-talk cue on a particular moment during performance or skill execution (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004). For example, a tennis coach could ask his pupil to say "legs" to himself prior to serving in order to remind himself to sufficiently push up from the legs during the serve. However, even without instructions of socialization figures, athletes fairly often use self-talk, constituting spontaneous self-talk. To illustrate, a tennis player might say "c'mon, keep on going" to himself after having played an exhausting rally. As contemporary research convincingly demonstrated the benefits of instructed self-talk (for a meta-analysis, see Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011) and as instructed self-talk is less likely to fluctuate depending on socio-contextual factors, the current dissertation examined the role of spontaneous self-talk.

Self-talk *valence* is of particular importance in the case of spontaneous self-talk, as instructed self-talk is by default positive in nature. Positive self-talk refers to self-statements encompassing praise ("nicely done"), instructions ("bend your knees"), self-confidence ("I can do it") or a

peptalk ("come'on, give 100%") (Zourbanos, Hatzigeorgiadis, Chroni, Theodorakis, & Papaioannou, 2009), whereas negative self-talk encompasses worrying thoughts (I won't make it), considerations of disengagement ("I better stop trying"), and verbalizations regarding somatic fatigue ("I am getting tired") (Hatzigeorgiadis & Biddle, 2000; Zourbanos et al., 2009). Note, however, that self-talk valence refers to its content rather than its effects (Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012). At least in theory, positive self-talk could undermine motivation and performance while negative self-talk may increase motivation and performance.

Regarding to its *function*, self-talk is assumed to have both an instructional and a motivational function (Hardy, Gammage, & Hall, 2001). The instructional function refers to self-verbalizations aimed at skill learning or strategy execution, whereas the motivational function refers to self-verbalizations to increase motivation for the task at hand (Zervas, Stavrou, & Psychountaki, 2007). The motivational function, which is particularly relevant for the current study, comprises three specific, lower order functions (Hardy et al., 2001). That is, an arousal regulation function (i.e., talking to oneself in order to increase arousal or relaxation), a motivational mastery function (i.e., talking to oneself in order to increase confidence), and a motivational drive function (i.e., talking to oneself to increase or maintain effort expenditure).

Despite this presumed motivational function, self-talk has not yet been examined using a motivational framework other than self-efficacy theory (Bandura, 1997). From an SDT perspective, self-talk should impact on psychological need satisfaction in order to fulfill a motivational function. The question whether self-verbalizations regarding arousal regulation, instilling confidence and maintain effort expenditure impact on psychological need satisfaction is still open. Therefore, connecting SDT with the self-talk literature might cause a fruitful cross-fertilization. In doing so, self-talk might strengthen the SDT literature in the sport domain because it is more domain specific and might give insight in how contextual factors impact on need-based experiences, or how these need based experiences relate with athlete

functioning. Likewise, SDT might bring the self-talk literature one step forward by providing a framework for a detailed investigation of its motivating function. Considering self-talk as an explaining mechanism in the context of sports is further considered useful, as self-talk is frequently observed in sports, especially in individual sports with frequent breaks in the action, such as racquet sports (e.g., tennis; Van Raalte, Cornelius, Brewer, & Hatten, 2000).

2.2.2. SELF-TALK MEASUREMENT

Because the investigation of spontaneous self-talk is challenging, particularly in terms of developing sound measures, as athletes report that at least a part of their self-talk is covert, not audible (Hardy et al., Hall, 2001), we discuss some of the strengths and weaknesses of available measures in the next part.

Because not all self-talk is audible, *self-reported procedures* are most evident to measure self-talk (De Guerrero, 2005), with especially self-talk inventories frequently being used (e.g., Zourbanos et al., 2009). Self-statement inventories, however, are not without limitations. First, due to their retrospective nature, they are unable to capture fluctuations in self-talk. Second, they rely on memory and are therefore at risk for biased recall. For example, athletes might more easily recall, and thus report, the positive self-talk after winning a game, while negative self-talk is more easily recalled after losing. The presence of a potential bias is supported by athletes self-reporting to use mainly positive self-talk (Hardy et al., 2001), while observers indicate that audible self-talk is predominantly negative (Van Raalte, Brewer, Rivera, & Petitpas, 1994).

Observations of audible self-talk allow for an examination of moment-to-moment fluctuations in self-talk and are not subject to biased recall, but also have their own drawbacks. For example, the differences in self-talk frequency between self-reported and observed self-talk described earlier (with self-reported self-talk being predominantly positive, whereas audible self-talk was predominantly negative) could also be attributed to the fact that

athletes' positive self-talk is more covert, while negative self-talk is more readily expressed externally (Hatzigeorgiadis, Zourbanos, Latinjak, & Theodorakis, 2014). To resolve this drawback, a thinking aloud paradigm (Blackwell & Galassi, Galassi, & Watson, 1985) can be implemented, asking athletes to verbalize their thoughts. However, this procedure does not guarantee that all thoughts are expressed, as some athletes indicated that they find it awkward and distracting to do (Masciana, Van Raalte, Brewer, Brandon, & Coughlin, 2001). Because both self-reported and observational procedures have their particular strengths and limitations, a valid assessment of self-talk calls for a *multi-informant approach*. Such a multi-informant approach will be examined and applied in the current dissertation. In addition, the usefulness of self-talk as an intervening variable in effects of the context on athlete outcomes will be examined.

2.2.3. THE POTENTIAL INTERVENING ROLE OF SELF-TALK

As self-talk is seldom examined as an intervening mechanism in the sport context (but for an exception, see Zourbanos et al., 2016) the current section focuses on both antecedents and consequences of self-talk. As for the antecedents, athletes' spontaneous self-talk valence is determined by both socio-contextual and personal factors, although research regarding the antecedents of self-talk is still scarce (Hatzigeorgiadis et al., 2014).

As for the *socio-contextual factors* impacting on athletes' self-talk, coaches' motivating styles and behaviors are of particular interest to the current dissertation. Supportiveness from coaches, which refers to instilling confidence, providing constructive feedback and helping to regulate emotions (Williams et al., 2003), has been found to relate positively to athletes' purposeful use of self-talk to enhance performance (Zourbanos, Theodorakis, & Hatzigeorgiadis, 2006), and with positive self-talk content (Zourbanos, Hatzigeorgiadis, Tsiakaras, Chroni, & Theodorakis, 2010). Furthermore, coaches' supportiveness has also been found to relate negatively to athletes' negative self-talk content (Zourbanos et al., 2011). In addition to coaches' supportiveness, which resembles the structuring motivating style as proposed

by SDT, an autonomy-supportive motivating style has also been found to impact on self-talk outside the sport context. Specifically, an experimenter providing participation where possible, giving a rationale when participation was unfeasible, and acknowledging participants' feelings, enhanced participants' positive self-talk and reduced their negative self-talk compared to a controlling experimenter (Oliver, Markland, Hardy, & Petherick, 2008).

On the other hand, coaches' negative activation, such as disruptive sideline behavior and use of negative statements (Williams et al., 2003; Zourbanos, Hatzigeorgiadis, & Theodorakis, 2007) was related to athletes' negative thinking (Zourbanos et al., 2006). Relationships between negative coach behaviors and athletes' positive self-talk valence have less frequently been reported in the literature, which led researches to suggest that negative self-talk may be more susceptible to social influences than positive self-talk (Theodorakis et al., 2012).

Among *personal factors*, self-talk has most frequently been related with athletes' achievement goal pursuit (Elliot, 2005), with the pursuit of personal progress to be positively related to positive, and negatively related to negative self-talk, whereas pursuing outperforming others was unrelated to positive self-talk and related positively to negative self-talk (Harwood, Cumming, & Fletcher, 2004; Zourbanos, Papaioannou, Argyropoulou, & Hatzigeorgiadis, 2014). Apart from achievement goal pursuit, a limited set of studies also assumed anxiety to be an antecedent of self-talk. For example, the more trait anxiety (i.e., being nervous and restless in general, across situations) undergraduate technology students reported, the more self-critical and the less self-reinforcing statements they used in general (Ren, Wang, & Jarold, 2016). Within the sport domain, qualitative investigations showed that athletes engage in both positive and negative spontaneous self-talk in anxiety-provoking situations (Latinjak, Hatzigeorgiadis, & Zourbanos, 2017). The finding regarding the negative spontaneous self-talk is further supported by quantitative evidence showing that cross-country runners' pre-competition anxiety, reported before the start of the run, relates positively to their negative

self-talk during the competition, as reported retrospectively (Hatzigeorgiadis & Biddle, 2008). On the basis of these findings, athletes' fear of failure, defined as the disposition to avoid incompetence because of the anticipated shame and humiliation upon failing (Atkinson, 1957) can be assumed to be a personal antecedent of self-talk valence, with individuals high in fear of failure engaging especially in more negative self-talk. However, research examining the relation between fear of failure and self-talk is limited, with the only evidence available using a rather unconventional self-talk classification taxonomy (Conroy & Coatsworth, 2007). Positive relationships between fear of failure and negative self-talk subcomponents such as self-blame, self-neglect, and self-attack were evident, whereas relationships were mixed regarding positive self-talk (Conroy & Coatsworth, 2007; Conroy & Metzler, 2004).

Apart from its antecedents, self-talk has been linked with various affective, behavioral, and cognitive, outcomes. *Affectively*, trait anxiety and pre-competition anxiety were already proposed as potential antecedents of self-talk. However, correlational evidence also showed that negative self-talk and two positive self-talk categories (i.e., anxiety control and instructions), were positively related with competitive state anxiety (Latinjak, Viladrich, Alcaraz, & Torregrossa, 2015), with the correlational nature of the study not allowing to determine the order of effects in these associations. Regarding positive emotions, previous research showed that the more positive, compared to negative, self-talk athletes use, the more pleasant affect they experience (Hardy, Hall, & Alexander, 2001). Furthermore, positive relationships were evident for positive self-talk and youth soccer players' self-efficacy, whereas negative self-talk appeared unrelated (Zourbanos et al., 2016). *Behaviorally*, performance is the most frequently examined outcome (see Hatzigeorgiadis et al., 2011), showing that positive self-talk (especially instruction and psych-up) enhances performance. However, the majority of these studies focused on instructed self-talk, leaving the self-talk-performance relationship understudied for spontaneous self-talk (but see Van Raalte et al., 1994).

Besides performance, self-talk is also related to exerted effort, with negative self-talk relating negatively to volleyball players' self-reported exerted effort (Hatzigeorgiadis & Biddle, 2001). Concentration is the most frequently examined *cognitive outcome*, with results indicating that negative self-talk is generally related to more distractions during sport performance (Hatzigeorgiadis & Biddle, 2001).

In summary, self-talk has been found to be impacted by both coaches' motivating styles and by personal characteristics. In turn, self-talk relates to athletes' motivational, behavioral and cognitive functioning. Furthermore, self-talk has been assumed to have a motivational function and to influence performance because of its motivational value (Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009). Unfortunately, self-talk has seldom been studied explicitly from a motivation-based theoretical perspective. Therefore, it is important to include self-talk as a possible intervening mechanism in motivational research and, more specifically, in effects of coach behaviors and personal characteristics on the basic psychological needs and subsequent athlete outcomes. One relevant study already showed that positive self-talk relates positively to basic psychological need satisfaction, and that negative self-talk relates negatively to it (Karamitrou, Comoutos, Hatzigeorgiadis, & Theodorakis, 2017). As such, the inclusion of self-talk might help to provide insight in how socio-contextual and personal factors impact on basic psychological need satisfaction or how the latter experiences relate to relevant outcomes. As such, the inclusion of self-talk may represent a further step to better understand what happens in the '*black box*' between contextual and personal characteristics and athlete outcomes.

3. INDIVIDUAL DIFFERENCES POSSIBLY ALTERING THE (DE)MOTIVATING EFFECTS OF PARTICULAR COACH BEHAVIORS

SDT posits that the basic psychological needs are innate, universal, and essential to optimal functioning (Vansteenkiste et al., 2010). As such, need supportive behaviors are supposed to be beneficial for all youth. Yet,

SDT does recognize that there is room for gradation in effects of need support and does not assume that all coach behaviors have an identical impact on all individuals. Indeed, the degree to which a motivating practice supports athletes' need satisfaction or the degree to which a demotivating style thwarts it, might depend upon individual characteristics (e.g., Soenens, Vansteenkiste, & Van Petegem, 2015). For example, physical education students with high autonomous motivation were found to benefit more from experimentally induced need-supportive physical education lesson in terms of vitality and enjoyment (Mouratidis et al., 2011). As the current dissertation predominantly focuses on feedback provision and the offering of choice as motivational practices, perfectionism and especially its self-critical subcomponent (Frost, Marten, Lahart, & Rosenblate, 1990), and dispositional indecisiveness (Germeijs & De Boeck, 2002) are two individual traits worth considering.

3.1. SELF-CRITICAL PERFECTIONISM

Perfectionism is defined as a multidimensional personality disposition characterized by the striving for flawlessness and the setting of extremely high performance standards, accompanied by exceedingly critical evaluations of one's behavior (Stoeber, 2018). As indicated by this definition, perfectionism encompasses two broad dimensions referred to as perfectionistic strivings (Stoeber & Otto, 2006) and self-critical perfectionism (Dunkley & Blankstein, 2000), which are positively interrelated (e.g., Lizmore, Dunn, & Dunn, 2017). First, *perfectionistic strivings* encompasses the setting of high personal standards and is associated with a mixed pattern of outcomes in the sport and exercise domain (Gotwals, Stoeber, Dunn, & Stoll, 2012) as it is generally positively related with desired outcomes such as need satisfaction (Jowett, Hill, Hall, & Curran, 2016) positive affect (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993), intrinsic motivation (Appleton & Hill, 2012), and performance (Stoeber, Uphill, & Hotham, 2009), but also related positively to less desirable outcomes as introjected regulation (Appleton & Hill) and burnout (Gustafsson, Hill, Stenling, & Wagnsson, 2016). Second, *self-critical perfectionism* is characterized by pervasive doubts about actions and concerns

over mistakes, and negative reactions to imperfection (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014). The pattern of outcomes for self-critical perfectionism in sports is more consistent, showing systematic associations with dysfunctional outcomes.

Especially the dimension of self-critical perfectionism is included in the current dissertation and will be elaborated upon. First, direct relationships between self-critical perfectionism and motivational, affective, behavioral, and moral functioning will be discussed in greater detail. Subsequently, self-critical perfectionism's potential to alter the effects of contextual factors will be discussed.

With regard to motivational functioning, self-critical perfectionism has been found to relate positively to psychological need frustration (Jowett et al., 2016) and controlled motivation (Harvey et al., 2015). Affectively, athletes reporting self-critical perfectionism reacted with more anger to mistakes, while reacting to a lesser degree with self-confidence and optimism (Lizmore et al., 2016). Furthermore, self-critical perfectionism has been found to relate positively to training distress, both measured concurrently and after a period of three months (Madigan, Stoeber, & Passfield, 2017). Behaviorally, self-critical perfectionism has been found to relate negatively with athlete engagement (Jowett et al., 2016), and relate positively to disengaging when encountered with a performance slump (Dunn, Dunn, Gamache, & Holt, 2014), although it was unrelated to objective performance (Stoeber et al., 2009; Stoll, Lau, & Stoeber, 2008). Finally, regarding moral functioning, self-critical perfectionism is assumed to be a risk factor as athletes' quest to avoid imperfection might push them towards immoral behaviors. The evidence is mixed, however, with some studies showing that self-critical perfectionism is not related to positive attitudes towards doping (Madigan, Stoeber, & Passfield, 2016), whereas other studies found positive relationships in athlete samples (e.g., Bahrami, Yousefi, Kaviani, & Ariapooran, 2014).

In addition to affecting athletes' psychological needs experiences and subsequent outcomes directly, self-critical perfectionism might also alter the

effect of social agents' behavior, including the impact of coach feedback. Research on personality in general (Fleeson, 2007) and on perfectionism in particular (e.g., Lizmore et al., 2016) has begun to consider the role of personality traits in interaction with contextual and situational factors. In this area of investigation, it is assumed that contextual factors might trigger personal vulnerabilities, which in turn modify the appraisal of the event and qualify the effects of contextual factors. For example, the interplay between parenting and perfectionism was examined with regard to adolescent athlete burnout, with findings suggesting that self-critical perfectionism aggravated the detrimental effects of parents emphasizing concerns about failure, and winning without full effort (Gustafsson et al., 2016). Research on the interplay between context and perfectionism are considered valuable because it provides information about the conditions under which self-critical perfectionism is (especially) problematic (Hill, Mallinson-Howard, & Jowett, 2018). Conversely, such research may help to identify athletes who are most likely to suffer most from the adverse consequences of demotivating coaching.

3.2. DISPOSITIONAL INDECISIVENESS

While self-critical perfectionism is mainly relevant in the context of athletes' responses to feedback, dispositional indecisiveness is more closely aligned with decision making and will be examined in this dissertation mainly in the context of the provision of choice. Dispositional indecisiveness is defined as a chronic problem with making decisions over situations and domains (Crites, 1969; Osipow, 1999). It manifests in needing a lot of time to make a choice, leaving the choice to others, and worrying about or even regretting what is chosen (Cooper, Fuqua, & Hartman, 1984; Frost & Shows, 1993). Evidence shows that dispositional indecisiveness impedes decision making in real life settings as indicated by reduced inquiry of the different options provided (Ferrari & Dovidio, 2000), more difficulties in choosing a college major (Germeijs, Verschueren, & Soenens, 2006), and more difficulties in making everyday decision such as which cloths to wear or what to eat (Germeijs & De Boeck, 2002).

Given that dispositional indecisiveness hampers decision making in various situations, it can be assumed that it might also modify the effects of choice provision. However, to date, we are not aware of empirical studies showing that choice provision is less beneficial or even detrimental for highly indecisive athletes. The current dissertation aims to provide a first step in filling this research gap.

4. RESEARCH OBJECTIVES AND OVERVIEW OF THE DISSERTATION

Based on the literature discussed in the previous sections, three broad research objectives are forwarded in the current dissertation, each of them aiming to provide a more differentiated insight in SDT-based research in the sports context. The first research objective is to examine the (de)motivating role of coaches' general motivating style (in combination with parents' motivating style) as well as of specific coach motivating practices (i.e., feedback, communication style, and choice provision) in athletic functioning. The second objective involves examining the intervening role of basic psychological need satisfaction and self-talk in the relationships between those (de)motivating practices and athlete functioning. The third and final objective involves examining whether personal characteristics (i.e., self-critical perfectionism and dispositional indecisiveness) modify the (de)motivating effect of coach behaviors. Figure 4 provides a graphical representation of the current dissertation's main objectives. In the following subsections, these objectives are discussed in greater detail and information is provided about how the current dissertation aims to provide differentiated insight to the SDT-framework within each of the objectives. Table 1, located at the end of this chapter, provides a summary of the design, sample, included variables, general objectives and specific research questions pursued in the different chapters of the dissertation.

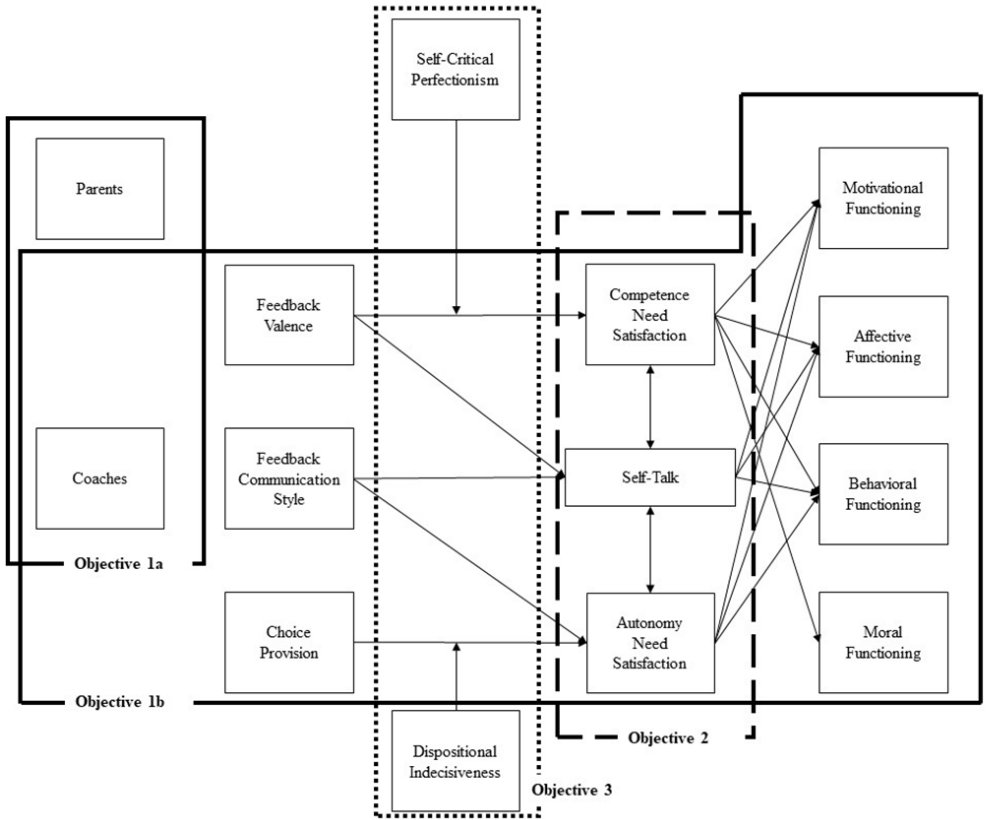

Figure 4. Schematic overview of the current dissertation's research objectives.

Table 1. Overview of the Empirical Studies

Chapter	Design	Sample			Independent Variables	Intervening Variables	Outcomes	Objectives	Research Questions
		Participants	M_{age}	*SD*					
2	Cross-sectional	255 Competitive Soccer Players	13.72	2.75	Need Support Need Thwart	/	Motivational Behavioral	1	1.1
3	Validation / Cross-sectional	120 Competitive Tennis Players	25.22	9.82	Fear of Failure	Self-Talk	Affective	2	2.2
4	Experimental				Feedback Valence Feedback Style	Competence Autonomy Self-Talk	Affective Behavioral	1, 2	1.2, 2.1 2.2 2.3
5	Experimental	90 Competitive Tennis Players	15.56	1.59	Feedback Valence Self-Critical Perfectionism	Competence	Affective Moral	1,2,3	1.2 2.1 3.1
6	Experimental	159 Recreational Rope Skippers	17.17	8.43	Type of Choice Provision Indecisiveness	Autonomy	Affective Behavioral	1,2,3	1.2 2.2 3.2

4.1. OBJECTIVE 1: EXAMINATION OF THE (DE)MOTIVATING IMPACT OF SPECIFIC COACH BEHAVIORS ON ATHLETE FUNCTIONING

The first research objective of this dissertation is twofold, as it involves (1) examining whether coach behaviors are related to youth athletes' motivation and engagement even when considering the role of parents' motivating style (Chapter 2), and (2) examining the (de)motivating effects of feedback (Chapters 4 and 5), communication style (Chapter 4), and choice provision (Chapter 5).

RESEARCH QUESTION 1.1: EXAMINING THE UNIQUE RELATIONSHIPS OF MOTIVATING COACHING AND PARENTING

There is ample evidence linking coaches' autonomy-supportive (Adie et al., 2008), structuring (Curran et al., 2013), or need-supportive behaviors in general (Pulido et al., 2018) with athletes' enduring motivation and engagement for sports. Research regarding the role of parental (de)motivating styles on their offspring's motivation in their leisure time activities is more limited, but shares the same conclusions (e.g., Gagné, Ryan, & Bargmann, 2003). To date, only a limited number of studies took into account both coach and parental behaviors simultaneously and, as a consequence, it is not possible to conclude whether a motivating coaching style yields an incremental contribution to athletes functioning above and beyond the contribution of a motivating parenting style. Potential interactions between coaches' and parents' motivating styles also have not been examined yet.

The few studies available that considered the role of both coaches and parents were based on the Achievement Goal Theory perspective (Nicholls, 1984), thus considering the motivational climates created by parents or coaches. In a study directly examining who is more influential, the authors concluded that both coaches' and parents' motivational climates relate to athlete functioning independently, with the parental motivational climate being most influential (O'Rourke, Smith, Smoll, & Cumming, 2014). Research from an SDT-perspective rather stressed their interaction, showing

that regarding motivation, flow states and self-reported achievement, one social agent can buffer for the detrimental impact of low autonomy support of the other (Gaudreau et al., 2016).

Given that the available evidence on this issue is scarce, Chapter 2 will examine the independent and combined relationships of coaches' and parents' need support on athletes' sport motivation and engagement. Although the motivational climate created by parents, compared to coaches, was more strongly related to athletes' functioning, coaches are hypothesized to play a more prominent role in the contribution to athletes' motivational functioning within sports, as coaches, compared to parents, share most time with athletes on the pitch. As such, coach behaviors are assumed to have the most pronounced relationships with athlete functioning. Confirming this hypothesis would further underscore the value of examining the (de)motivational impact of specific coach behaviors. In addition, interaction patterns between coach and parental need support will be examined in a more explorative fashion as to investigate whether coaches can buffer the presumed detrimental relationships between low parental need support and athlete functioning or the other way around, such that parents may buffer for lowered coach need support.

RESEARCH QUESTION 1.2: EXAMINING THE (DE)MOTIVATIONAL IMPACT OF COACHES' FEEDBACK, COMMUNICATION STYLE, AND CHOICE PROVISION

The SDT-based literature within the sport domain clearly documented the motivational impact of the more general motivating styles of autonomy-support and structure, and the demotivating impact of, respectively, control and chaos (e.g Bartholomew et al., 2011; Haerens et al., 2015). However, supportive evidence for more specific practices in this domain is often lacking. Most studies focusing on specific practices are correlational in nature or constitute experiments simulating sport-related situations (e.g., competition) in laboratories with non-athletes as participants. The current dissertation builds on the existing evidence base by examining coach feedback valence,

communication style and choice provision using experimental designs, while recruiting athletes as participants. Among the practices under investigation, a balance was sought between autonomy-supportive and structuring practices.

Chapter 4 will address the impact of normative feedback valence and communication style on competitive tennis players' affective (i.e., enjoyment), and behavioral (i.e., perseverance and performance) functioning. It is the first study to our knowledge to combine feedback valence and communication style in an experimental field study among athletes. The impact of feedback valence is further considered in Chapter 5, examining its impact on competitive tennis players' affective (i.e., engagement and experienced tension) and moral (i.e., objectively recorded cheating) functioning.

Finally, Chapter 6 involves the potentially motivating effect of choice provision on recreational rope skippers' affective (i.e., engagement) and behavioral (intended persistence) functioning. This chapter attempts to add to the literature by manipulating three different types of choice. Specifically, participants are provided with the opportunity to (1) repetitively choose one out of three single rope exercises which were very similar in attractiveness, with the order being predetermined, (2) repetitively choose one out of three single rope exercises which varied more in terms of attractiveness, again with a predetermined order, or (3) choose the order of three predetermined single rope exercises.

4.2. OBJECTIVE 2: UNCOVERING EXPLAINING MECHANISMS

The second research objective centers around potential intervening mechanisms that can explain the effects of specific motivating practices. Basic psychological needs were included as examinations of their intervening role regarding the impact of specific motivating practices is limited in the SDT-based literature in sport (Vansteenkiste et al., 2010). Given the examination of autonomy-supportive and structuring practices, only autonomy and competence (and not relatedness) need satisfaction were taken into account.

Next to basic psychological need satisfaction, athlete self-talk was considered as an additional intervening variable. This was done because SDT might benefit from the examination of intervening variables other than need satisfaction that may provide an additional insight in how socio-contextual variables impact on need satisfaction or why need satisfaction relates to outcomes. As such, the interrelationships between self-talk and need satisfaction will also be examined. From the viewpoint of the self-talk literature, SDT provides a useful framework to examine the motivational function of self-talk, which resembles the examination of the interrelationships between self-talk and need-based experiences. Finally, exploring self-talk as an intervening variable is considered useful from a practical perspective, as self-talk is perhaps more amenable to change than athletes' social context.

RESEARCH QUESTION 2.1: NEED SATISFACTION AS AN INTERVENING VARIABLE FOR THE EFFECTS OF FEEDBACK VALENCE AND CHOICE PROVISION

The third research question examined whether competence need satisfaction functions as an intervening mechanism. In Chapter 4, this was done for the relationships with tennis players' enjoyment, performance, and perseverance, whereas this was done for tennis players' engagement, tension, and cheating behavior in Chapter 5. Paralleling the presumed intervening role of competence need satisfaction in the effects of feedback valence, the third research question also involves examining the intervening role of autonomy need satisfaction in the effects of communication style and choice provision. In Chapter 4, the intervening role of autonomy need satisfaction will be examined in the relation between feedback communication style (i.e., autonomy-supportive vs. controlling) and performance, enjoyment, and perseverance, whereas in Chapter 6, autonomy need satisfaction will be examined as an intervening mechanism between choice provision on the one hand and both engagement and intended perseverance on the other.

RESEARCH QUESTION 2.2: THE INTERVENING ROLE OF SELF-TALK

Apart from competence and autonomy need satisfaction, the potential intervening role of self-talk valence was examined within a study involving tennis players, because self-talk is often observed in tennis (Van Raalte et al., 2000). As self-report measures of self-talk are not without limitations, the current dissertation aimed at providing additional evidence for the most frequently used self-reported self-talk valence measure (Zourbanos et al., 2009). This is done in Chapter 3 by examining the convergence of the self-reported measure with a live-recorded and subsequently coded measure of self-talk. When the association between self-reported and coded self-talk is sufficiently high, a multi-informant measure could be created. Such a multi-informant measure is assumed to be a more valid indicator of self-talk because it reflects the shared variance between two complementary assessment methods (Lodge, Tripp, & Harte, 2000). Furthermore, as such a multi-informant measure partly measures self-talk during the activity, as compared to self-talk reported after the activity, it is ideally suited to be used in examinations regarding self-talk's intervening role.

In Chapter 4, the intervening role of self-talk was examined between feedback valence and communication style on the one hand, and athletes' affective (i.e., enjoyment) and behavioral functioning (i.e., performance and perseverance) on the other hand. Especially feedback valence was hypothesized to impact on self-talk valence and most likely on negative self-talk as this type of self-talk was found to be most susceptible to social influences in previous studies (Theodorakis et al., 2012). Furthermore, interrelationships with competence and autonomy need satisfaction were examined to address the question whether self-talk impacts on basic psychological need satisfaction, or whether self-talk emerges as a by-product from experienced need frustration.

4.3. OBJECTIVE 3: CONSIDERING THE ROLE OF INDIVIDUAL DIFFERENCES

The final objective of the current dissertation is to examine whether particular coach practices are equally (de)motivating for all athletes, or

whether individual differences might alter their effect. This objective is pursued to provide a more differentiated point of view on the effectiveness of certain (de)motivating practices. SDT claims that basic psychological needs are universal and essential, thereby assuming that need satisfaction is beneficial for everyone. However, this assumption does not imply that each individual's needs will be satisfied to the same degree by the same motivating practice. As the current dissertation examines the impact of feedback valence and choice provision, self-critical perfectionism and dispositional indecisiveness, respectively, were chosen as central personality factors of interest.

RESEARCH QUESTION 3.1: DOES SELF-CRITICAL PERFECTIONISM ALTER THE EFFECTS OF FEEDBACK VALENCE?

Self-critical perfectionism will be considered in Chapter 5, regarding feedback valence, to examine whether contextual events may awaken or suppress vulnerabilities associated with a self-critical personality. Specifically, it was hypothesized that negative feedback may trigger the concern over mistakes and negative reactions to imperfection prevalent in self-critical perfectionism, thereby being especially harmful in terms of competence satisfaction for athletes characterized by high levels of self-critical perfectionism.

RESEARCH QUESTION 3.2: DOES DISPOSITIONAL INDECISIVENESS ALTER THE IMPACT OF CHOICE PROVISION?

In a similar vein, Chapter 6, regarding the effects of choice provision, included the role of dispositional indecisiveness, as this personality dimension was previously found to impact upon decision making. Herein, it was assumed that highly indecisive rope skippers would benefit less from choice provision in terms of autonomy need satisfaction.

5. REFERENCES

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion*, *32*(3), 189–199. https://doi.org/10.1007/s11031-008-9095-z

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise*, *13*(1), 51–59. https://doi.org/10.1016/j.psychsport.2011.07.008

Aelterman, N., De Muynck, G.-J., Haerens, L., Vande Broek, G., & Vansteenkiste, M. (2017). *Motiverend coachen in de sport*. Leuven: Acco.

Amorose, A. J., & Horn, T. S. (2000). Intrinsic motivation: Relationships with collegiate athletes' gender, scholarship status, and perceptions of their coaches' behavior. *Journal of Sport & Exercise Psychology*, *22*(1), 63–84. https://doi.org/10.1123/jsep.22.1.63

Amorose, A. J., & Weiss, M. R. (1998). Coaching feedback as a source of information about perceptions of ability: A developmental examination. *Journal of Sport & Exercise Psychology*, *20*(4), 395–420. https://doi.org/10.1123/jsep.20.4.395

Amorose, Anthony J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise*, *8*(5), 654–670. https://doi.org/10.1016/j.psychsport.2006.11.003

Appleton, P. R., & Hill, A. P. (2012). Perfectionism and athlete burnout in junior elite athletes: The mediating role of motivation regulations. *Journal of Clinical Sport Psychology*, *6*(2), 129–145. https://doi.org/10.1123/jcsp.6.2.129

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology*, *72*, 261–278. https://doi.org/10.1348/000709902158883

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, *64*(6, Pt.1), 359–372. https://doi.org/10.1037/h0043445

Bahrami, S., Yousefi, B., Kaviani, E., & Ariapooran, S. (2014). The prevalence of energetic drugs use and the role of perfectionism, sensation seeking and physical self-concept in discriminating bodybuilders with positive and negative attitude toward doping. *International Journal of Sport Studies*, *4*, 174–180.

Balaguer, I., Gonzalez, L., Fabra, P., Castillo, I., Merce, J., & Duda, J. L. (2012). Coaches' interpersonal style, basic psychological needs and the well- and ill-being of young soccer players: A longitudinal analysis. *Journal of Sports Sciences*, *30*(15), 1619–1629. https://doi.org/10.1080/02640414.2012.731517

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thogersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459–1473. https://doi.org/10.1177/0146167211413125

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's

executive functioning. *Child Development, 81*(1), 326–339. https://doi.org/10.1111/j.1467-8624.2009.01397.x

Bjelland, M., Soenens, B., Bere, E., Kovacs, E., Lien, N., Maes, L., … te Velde, S. J. (2015). Associations between parental rules, style of communication and children's screen time. *Bmc Public Health, 15*. https://doi.org/10.1186/s12889-015-2337-6

Black, S. J., & Weiss, M. R. (1992). The relationship among perceived coaching behaviors, perceptions of ability, and motivation in competitive age-group swimmers. *Journal of Sport & Exercise Psychology*, *14*(3), 309–325. https://doi.org/10.1123/jsep.14.3.309

Blackwell, R. T., Galassi, J. P., Galassi, M. D., & Watson, T. E. (1985). Are cognitive assessment methods equal: A comparison of think aloud and thought listing. *Cognitive Therapy and Research*, *9*(4), 399–413. https://doi.org/10.1007/BF01173089

Blatt, S. J. (1995). The destructiveness of perfectionism: Implications for the treatment of depression. *American Psychologist*, *50*(12), 1003–1020. https://doi.org/10.1037//0003-066X.50.12.1003

Boone, L., Vansteenkiste, M., Soenens, B., Van der Kaap-Deeder, J., & Verstuyf, J. (2014). Self-critical perfectionism and binge eating symptoms: A longitudinal test of the intervening role of psychological need frustration. *Journal of Counseling Psychology, 61*(3), 363–373. https://doi.org/10.1037/a0036418

Butcher, J., Lindner, K. J., & Johns, D. P. (2002). Withdrawal from competitive youth sport: A retrospective ten-year study. *Journal of Sport Behavior, 25,* 145–163.

Cambell, R., Boone, L., Vansteenkiste, M., & Soenens, B. (in press). Psychological need frustration as a transdiagnostic process in associations of self-critical perfectionism with depressive symptoms and eating pathology. *Journal of Clinical Psychology*.

Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at

autonomy-supportive feedback in sport. *Psychology of Sport and Exercise*, *14*(3), 423–435. https://doi.org/10.1016/j.psychsport.2013.01.003

Chen, B., Van Assche, J., Vansteenkiste, M., Soenens, B., & Beyers, W. (2015). Does psychological need satisfaction matter when environmental or financial safety are at risk? *Journal of Happiness Studies*, *16*(3), 745–766. https://doi.org/10.1007/s10902-014-9532-5

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., … Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Conroy, D. E., & Metzler, J. N. (2004). Patterns of self-talk associated with different forms of competitive anxiety. *Journal of Sport & Exercise Psychology*, *26*(1), 69–89. https://doi.org/10.1123/jsep.26.1.69

Conroy, David E., & Coatsworth, J. D. (2007). Coaching behaviors associated with changes in fear of failure: Changes in self-talk and need satisfaction as potential mechanisms. *Journal of Personality*, *75*(2), 383–419. https://doi.org/10.1111/j.1467-6494.2006.00443.x

Cooper, S. E., Fuqua, D. R., & Hartman, B. W. (1984). The relationship of trait indecisiveness to vocational uncertainty, career indecision, and interpersonal characteristics. *Journal of College Student Development*, *25*(4), 353–356.

Crites, J. O. (1969). *Vocational psychology*. New York, NY, US: McGraw-Hill.

Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of children's behavioral engagement and behavioral disaffection in sport based on self-determination theory. *Journal of Sport & Exercise Psychology*, *35*(1), 30–43. https://doi.org/10.1123/jsep.35.1.30

Curran, T., Hill, A. P., Ntoumanis, N., Hall, H. K., & Jowett, G. E. (2016). A three-wave longitudinal test of self-determination theory's mediation model of engagement and disaffection in youth sport. *Journal of Sport & Exercise Psychology*, *38*(1), 15–29. https://doi.org/10.1123/jsep.2015-0016

Curran, T., & Standage, M. (2017). Psychological needs and the quality of student engagement in physical education: Teachers as key facilitators. *Journal of Teaching in Physical Education*, *36*(3), 262–276. https://doi.org/10.1123/jtpe.2017-0065

De Guerrero, M. C. M. (2005). Methodology of research on inner speech. In *Inner Speech — L2: Thinking words in a second language* (pp. 89–118). Springer, Boston, MA. https://doi.org/10.1007/0-387-24578-2_4

DeCharms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York, NY, US: Academic Press.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, *125*(6), 627–668. https://doi.org/10.1037/0033-2909.125.6.627

Deci, E. L., La Guardia, J. G., Moller, A. C., Scheiner, M. J., & Ryan, R. M. (2006). On the benefits of giving as well as receiving autonomy support: Mutuality in close friendships. *Personality and Social Psychology Bulletin*, *32*(3), 313–327. https://doi.org/10.1177/0146167205282148

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Deci, E. L., Schwartz, A. J., Sheinman, L., & Ryan, R. M. (1981). An instrument to assess adults orientations toward control versus autonomy with children: reflections on intrinsic motivation and

perceived competence. *Journal of Educational Psychology*, *73*(5), 642–650. https://doi.org/10.1037/0022-0663.73.5.642

Delrue, J., Reynders, B., Aelterman, N., De Backer, M., Decroos, S., De Muynck, G.-J., … Vansteenkiste, M. (2018). Adopting a helicopter-perspective towards motivating and demotivating coaching: A circumplex approach. *Manuscript in Revision*.

Delrue, J., Vansteenkiste, M., Mouratidis, A., Gevaert, K., Vande Broek, G., & Haerens, L. (2017). A game-to-game investigation of the relation between need-supportive and need-thwarting coaching and moral behavior in soccer. *Psychology of Sport and Exercise*, *31*, 1–10. https://doi.org/10.1016/j.psychsport.2017.03.010

Digelidis, N., Karageorghis, C., Papapavlou, A., & Papaioannou, A. G. (2014). Effects of asynchronous music on students' lesson satisfaction and motivation at the situational level. *Journal of Teaching in Physical Education*, *33*(3), 326–341. https://doi.org/10.1123/jtpe.2013-0120

Dunkley, D. M., & Blankstein, K. R. (2000). Self-critical perfectionism, coping, hassles, and current distress: A structural equation modeling approach. *Cognitive Therapy and Research*, *24*(6), 713–730. https://doi.org/10.1023/A:1005543529245

Dunn, J. G. H., Dunn, J. C., Gamache, V., & Holt, N. L. (2014). A person-oriented examination of perfectionism and slump-related coping in female intercollegiate volleyball players. *International Journal of Sport Psychology*, *45*(4), 298–324. https://doi.org/10.7352/IJSP.2014.45.298

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck, *Handbook of competence and motivation* (pp. 52–72). New York, NY, US: Guilford Publications.

Elston, T. L., & Ginis, K. a. M. (2004). The effects of self-set versus assigned goals on exercisers' self-efficacy for an unfamiliar task. *Journal of*

Sport & Exercise Psychology, *26*(3), 500–504. https://doi.org/10.1123/jsep.26.3.500

Enzle, M. E., & Anderson, S. C. (1993). Surveillant intentions and intrinsic motivation. *Journal of Personality and Social Psychology*, *64*(2), 257–266. https://doi.org/10.1037/0022-3514.64.2.257

Farkas, M. S., & Grolnick, W. S. (2010). Examining the components and concomitants of parental structure in the academic domain. *Motivation and Emotion*, *34*(3), 266–279. https://doi.org/10.1007/s11031-010-9176-7

Feltz, D. L., Landers, D. M., & Raeder, U. (1979). Enhancing self-efficacy in high-avoidance motor tasks: A comparison of modeling techniques. *Journal of Sport Psychology*, *1*(2), 112–122. https://doi.org/10.1123/jsp.1.2.112

Feltz, D. L., Short, S. E., & Sullivan, P. J. (2008). *Self-efficacy in sport*. Champaign, IL, US: Human Kinetics.

Fleeson, W. (2007). Situation-based contingencies underlying trait-content manifestation in behavior. *Journal of Personality*, *75*(4), 825–861. https://doi.org/10.1111/j.1467-6494.2007.00458.x

Fransen, K., Boen, F., Vansteenkiste, M., Mertens, N., & Vande Broek, G. (2018). The power of competence support: The impact of coaches and athlete leaders on intrinsic motivation and performance. *Scandinavian Journal of Medicine & Science in Sports*, *28*(2), 725–745. https://doi.org/10.1111/sms.12950

Fraser-Thomas, J. L., Côté, J., & Deakin, J. (2005). Youth sport programs: An avenue to foster positive youth development. *Physical Education and Sport Pedagogy*, *10*(1), 19–40. https://doi.org/10.1080/1740898042000334890

Frost, R. O., Heimberg, R. G., Holt, C. S., Mattia, J. I., & Neubauer, A. L. (1993). A comparison of 2 measures of perfectionism. *Personality and Individual Differences*, *14*(1), 119–126. https://doi.org/10.1016/0191-8869(93)90181-2

Frost, R. O., & Shows, D. I. (1993). The nature and measurement of compulsive indecisiveness. *Behaviour Research and Therapy*, *31*(7), 683–692. https://doi.org/10.1016/0005-7967(93)90121-A

Gagne, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology*, *15*(4), 372–390. https://doi.org/10.1080/10413200390238031

Gaudreau, P., Morinville, A., Gareau, A., Verner-Filion, J., Green-Demers, I., & Franche, V. (2016). Autonomy support from parents and coaches: Synergistic or compensatory effects on sport-related outcomes of adolescent-athletes? *Psychology of Sport and Exercise*, *25*, 89–99. https://doi.org/10.1016/j.psychsport.2016.04.006

Germeijs, V., & De Boeck, P. (2002). A measurement scale for indecisiveness and its relationship to career indecision and other types of indecision. *European Journal of Psychological Assessment*, *18*(2), 113–122. https://doi.org/10.1027//1015-5759.18.2.113

Germeijs, Veerle, Verschueren, K., & Soenens, B. (2006). Indecisiveness and high school students' career decision-making process: Longitudinal associations and the mediational role of anxiety. *Journal of Counseling Psychology*, *53*(4), 397–410. https://doi.org/10.1037/0022-0169.53.4.397

Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in sport adaptive? A systematic review of confirmatory, contradictory, and mixed evidence. *Canadian Psychology-Psychologie Canadienne*, *53*(4), 263–279. https://doi.org/10.1037/a0030288

Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with childrens self-regulation and competence. *Journal of Educational Psychology*, *81*(2), 143–154. https://doi.org/10.1037/0022-0663.81.2.143

Grusec, J. E., & Davidov, M. (2010). Integrating different perspectives on socialization theory and research: A domain-specific approach. *Child Development*, *81*(3), 687–709. https://doi.org/10.1111/j.1467-8624.2010.01426.x

Gustafsson, H., Hill, A. P., Stenling, A., & Wagnsson, S. (2016). Profiles of perfectionism, parental climate, and burnout among competitive junior athletes. *Scandinavian Journal of Medicine & Science in Sports*, *26*(10), 1256–1264. https://doi.org/10.1111/sms.12553

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, *16*, 26–36. https://doi.org/10.1016/j.psychsport.2014.08.013

Hardy, J., Gammage, K., & Hall, C. (2001). A descriptive study of athlete self-talk. *Sport Psychologist*, *15*(3), 306–318. https://doi.org/10.1123/tsp.15.3.306

Hardy, J., Hall, C. R., & Alexander, M. R. (2001). Exploring self-talk and affective states in sport. *Journal of Sports Sciences*, *19*(7), 469–475. https://doi.org/10.1080/026404101750238926

Hardy, James, & Zourbanos, N. (2016). Self-talk: Where are we now? In R. J. Schinke, K. R. McGannon, & Smith (Eds.), *Routledge international handbook of sport psychology* (pp. 449–459). Oxfordshire, UK: Routledge.

Harvey, B., Milyavskaya, M., Hope, N., Powers, T. A., Saffran, M., & Koestner, R. (2015). Affect variation across days of the week: influences of perfectionism and academic motivation. *Motivation and Emotion*, *39*(4), 521–530. https://doi.org/10.1007/s11031-015-9480-3

Harwood, C., Cumming, J., & Fletcher, D. (2004). Motivational profiles and psychological skills use within elite youth sport. *Journal of Applied Sport Psychology*, *16*(4), 318–332. https://doi.org/10.1080/10413200490517986

Hatzigeorgiadis, A., & Biddle, S. J. H. (2000). Assessing cognitive interference in sport: Development of the thought occurrence questionnaire for sport. *Anxiety Stress and Coping*, *13*(1), 65–86. https://doi.org/10.1080/10615800008248334

Hatzigeorgiadis, A., & Biddle, S. J. H. (2001). Athletes' perceptions of how cognitive interference during competition influences concentration and effort. *Anxiety Stress and Coping*, *14*(4), 411–429. https://doi.org/10.1080/10615800108248364

Hatzigeorgiadis, A., Theodorakis, Y., & Zourbanos, N. (2004). Self-talk in the swimming pool: The effects of self-talk on thought content and performance on water-polo tasks. *Journal of Applied Sport Psychology*, *16*(2), 138–150. https://doi.org/10.1080/10413200490437886

Hatzigeorgiadis, Antonis, & Biddle, S. J. H. (2008). Negative self-talk during sport performance: Relationships with pre-competition anxiety and goal performance discrepancies. *Journal of Sport Behavior*, *31*(3), 237–253.

Hatzigeorgiadis, Antonis, Zourbanos, N., Galanis, E., & Theodorakis, Y. (2011). Self-talk and sports performance: A meta-analysis. *Perspectives on Psychological Science*, *6*(4), 348–356. https://doi.org/10.1177/1745691611413136

Hatzigeorgiadis, Antonis, Zourbanos, N., Latinjak, A., & Theodorakis, Y. (2014). Self-talk. In A. Papaioannou & D. Hackfort (Eds.), *Routledge companion to sport and exercise psychology: Global perspectives and fundamental concepts* (pp. 372–385). London, UK: Taylor & Francis.

Hatzigeorgiadis, Antonis, Zourbanos, N., Mpoumpaki, S., & Theodorakis, Y. (2009). Mechanisms underlying the self-talk-performance relationship: The effects of motivational self-talk on self-confidence and anxiety. *Psychology of Sport and Exercise*, *10*(1), 186–192. https://doi.org/10.1016/j.psychsport.2008.07.009

Hodge, K., & Gucciardi, D. F. (2015). Antisocial and prosocial behavior in sport: The role of motivational climate, basic psychological needs, and moral disengagement. *Journal of Sport & Exercise Psychology*, *37*(3), 257–273. https://doi.org/10.1123/jsep.2014-0225

Janelle, C., Kim, J., & Singer, R. (1995). Subject-controlled performance feedback and learning of a closed motor skill. *Perceptual and Motor Skills*, *81*(2), 627–634. https://doi.org/10.2466/pms.1995.81.2.627

Jang, H. (2008). Supporting students' motivation, engagement, and learning during an uninteresting activity. *Journal of Educational Psychology*, *100*(4), 798–811. https://doi.org/10.1037/a0012841

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology*, *102*(3), 588–600. https://doi.org/10.1037/a0019682

Joesaar, H., Hein, V., & Hagger, M. S. (2012). Youth athletes' perception of autonomy support from the coach, peer motivational climate and intrinsic motivation in sport setting: One-year effects. *Psychology of Sport and Exercise*, *13*(3), 257–262. https://doi.org/10.1016/j.psychsport.2011.12.001

Jowett, G. E., Hill, A. P., Hall, H. K., & Curran, T. (2016). Perfectionism, burnout and engagement in youth sport: The mediating role of basic psychological needs. *Psychology of Sport and Exercise*, *24*, 18–26. https://doi.org/10.1016/j.psychsport.2016.01.001

Karamitrou, A., Comoutos, N., Hatzigeorgiadis, A., & Theodorakis, Y. (2017). A self-determination approach to understanding of athletes'

automatic self-talk. *Sport Exercise and Performance Psychology*, *6*(4), 340–354. https://doi.org/10.1037/spy0000104

Kasser, V. G., & Ryan, R. M. (1999). The relation of psychological needs for autonomy and relatedness to vitality, well-being, and mortality in a nursing home. *Journal of Applied Social Psychology*, *29*(5), 935–954. https://doi.org/10.1111/j.1559-1816.1999.tb00133.x

Kohn, A. (2014). *The myth of the spoiled child. Challenging the conventional wisdom about children and parenting*. Da Capo Lifelong Books.

Latinjak, A. T., Hatzigeorgiadis, A., & Zourbanos, N. (2017). Goal-directed and spontaneous self-talk in anger- and anxiety-eliciting sport-situations. *Journal of Applied Sport Psychology*, *29*(2), 150–166. https://doi.org/10.1080/10413200.2016.1213330

Latinjak, A. T., Viladrich, C., Alcaraz, S., & Torregrosa, M. (2016). Spanish adaptation and validation of the automatic self-talk questionnaire for sports. *International Journal of Sport and Exercise Psychology*, *14*(4), 402–413. https://doi.org/10.1080/1612197X.2015.1055287

Lizmore, M. R., Dunn, J. G. H., & Dunn, J. C. (2016). Reactions to mistakes as a function of perfectionism and situation criticality in curling. *International Journal of Sport Psychology*, *47*(1), 81–101. https://doi.org/10.7352/IJSP2016.47.081

Lizmore, M. R., Dunn, J. G. H., & Dunn, J. C. (2017). Perfectionistic strivings, perfectionistic concerns, and reactions to poor personal performances among intercollegiate athletes. *Psychology of Sport and Exercise*, *33*, 75–84. https://doi.org/10.1016/j.psychsport.2017.07.010

Lodge, J., Tripp, G., & Harte, D. K. (2000). Think-aloud, thought-listing, and video-mediated recall procedures in the assessment of children's self-talk. *Cognitive Therapy and Research*, *24*(4), 399–418. https://doi.org/10.1023/A:1005575618941

Mabbe, E., Soenens, B., De Muynck, G.-J., & Vansteenkiste, M. (2018). The impact of feedback valence and communication style on intrinsic

motivation in middle childhood: Experimental evidence and generalization across individual differences. *Journal of Experimental Child Psychology*, *170*, 134–160. https://doi.org/10.1016/j.jecp.2018.01.008

Madigan, D. J., Stoeber, J., & Passfield, L. (2016). Perfectionism and attitudes towards doping in junior athletes. *Journal of Sports Sciences*, *34*(8), 700–706. https://doi.org/10.1080/02640414.2015.1068441

Madigan, D. J., Stoeber, J., & Passfield, L. (2017). Perfectionism and training distress in junior athletes: a longitudinal investigation. *Journal of Sports Sciences*, *35*(5), 470–475. https://doi.org/10.1080/02640414.2016.1172726

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, *21*(11), 883–904. https://doi.org/10.1080/0264041031000140374

Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem." *Journal of Personality and Social Psychology*, *92*(1), 42–55. https://doi.org/10.1037/0022-3514.92.1.42

Markus, H. R., & Schwartz, B. (2010). Does choice mean freedom and well-being? *Journal of Consumer Research*, *37*(2), 344–355. https://doi.org/10.1086/651242

Martinez, K. A., Resnicow, K., Williams, G. C., Silva, M., Abrahamse, P., Shumway, D. A., … Hawley, S. T. (2016). Does physician communication style impact patient report of decision quality for breast cancer treatment? *Patient Education and Counseling*, *99*(12), 1947–1954. https://doi.org/10.1016/j.pec.2016.06.025

Masciana, R. C., Van Raalte, J. L., Brewer, B. W., Brandon, M. G., & Coughlin, M. A. (2001). Effects of cognitive strategies on dart throwing performance. *International Sports Journal*, *5*, 31–39.

Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (Vol. 2). New York, NY, US: Guilford Press.

Mouratidis, A. A., Vansteenkiste, M., Sideridis, G., & Lens, W. (2011). Vitality and interest-enjoyment as a function of class-to-class variation in need-supportive teaching and pupils' autonomous motivation. *Journal of Educational Psychology*, *103*(2), 353–366. https://doi.org/10.1037/a0022773

Mouratidis, A., Lens, W., & Vansteenkiste, M. (2010). How you provide corrective feedback makes a difference: The motivating role of communicating in an autonomy-supporting way. *Journal of Sport & Exercise Psychology*, *32*(5), 619–637. https://doi.org/10.1123/jsep.32.5.619

Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education: Evidence for a motivational model. *Journal of Sport & Exercise Psychology*, *30*(2), 240–268. https://doi.org/10.1123/jsep.30.2.240

Mouratidis, A., Vansteenkiste, M., Michou, A., & Lens, W. (2013). Perceived structure and achievement goals as predictors of students' self-regulated learning and affect and the mediating role of competence need satisfaction. *Learning and Individual Differences*, *23*, 179–186. https://doi.org/10.1016/j.lindif.2012.09.001

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, *75*(1), 33–52. https://doi.org/10.1037/0022-3514.75.1.33

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, *91*(3), 328–346. https://doi.org/10.1037/0033-295X.91.3.328

Niemiec, C. P., Lynch, M. F., Vansteenkiste, M., Bernstein, J., Deci, E. L., & Ryan, R. M. (2006). The antecedents and consequences of

autonomous self-regulation for college: A self-determination theory perspective on socialization. *Journal of Adolescence*, *29*(5), 761–775. https://doi.org/10.1016/j.adolescence.2005.11.009

Ntoumanis, N., Pensgaard, A. M., Martin, C., & Pipe, K. (2004). An idiographic analysis of amotivation in compulsory school physical education. *Journal of Sport & Exercise Psychology*, *26*(2), 197–214. https://doi.org/10.1123/jsep.26.2.197

Ntoumanis, Nikos, Barkoukis, V., Gucciardi, D. F., & Chan, D. K. C. (2017). Linking coach interpersonal style with athlete doping intentions and doping use: A prospective study. *Journal of Sport & Exercise Psychology*, *39*(3), 188–198. https://doi.org/10.1123/jsep.2016-0243

Ntoumanis, Nikos, & Standage, M. (2009). Morality in mport: A self-determination theory perspective. *Journal of Applied Sport Psychology*, *21*(4), 365–380. https://doi.org/10.1080/10413200903036040

Oliver, E. J., Markland, D., Hardy, J., & Petherick, C. M. (2008). The effects of autonomy-supportive versus controlling environments on self-talk. *Motivation and Emotion*, *32*(3), 200–212. https://doi.org/10.1007/s11031-008-9097-x

O'Rourke, D. J., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2014). Relations of parent- and coach-initiated motivational climates to young athletes' self-esteem, performance anxiety, and autonomous motivation: Who is more influential? *Journal of Applied Sport Psychology*, *26*(4), 395–408. https://doi.org/10.1080/10413200.2014.907838

Osipow, S. H. (1999). Assessing career indecision. *Journal of Vocational Behavior*, *55*(1), 147–154. https://doi.org/10.1006/jvbe.1999.1704

Overskeid, G., & Svartdal, F. (1996). Effect of Reward on Subjective Autonomy and Interest When Initial Interest Is Low. *The Psychological Record*, *45*, 319–331.

Parker, L. E., & Lepper, M. R. (1992). Effects of fantasy contexts on childrens learning and motivation: Making learning more fun. *Journal of Personality and Social Psychology*, *62*(4), 625–633. https://doi.org/10.1037/0022-3514.62.4.625

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: A meta-analysis of research findings. *Psychological Bulletin*, *134*(2), 270–300. https://doi.org/10.1037/0033-2909.134.2.270

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*(4), 279–306. https://doi.org/10.1023/A:1014805132406

Podlog, L., & Eklund, R. C. (2007). The psychosocial aspects of a return to sport following serious injury: A review of the literature from a self-determination perspective. *Psychology of Sport and Exercise*, *8*(4), 535–566. https://doi.org/10.1016/j.psychsport.2006.07.008

Pulido, J. J., Sanchez-Oliva, D., Sanchez-Miguel, P. A., Amado, D., & Garcia-Calvo, T. (2018). Sport commitment in young soccer players: A self-determination perspective. *International Journal of Sports Science & Coaching*, *13*(2), 243–252. https://doi.org/10.1177/1747954118755443

Quested, E., Bosch, J. A., Burns, V. E., Cumming, J., Ntoumanis, N., & Duda, J. L. (2011). Basic psychological need satisfaction, stress-related appraisals, and dancers' cortisol and anxiety responses. *Journal of Sport & Exercise Psychology*, *33*(6), 828–846. https://doi.org/10.1123/jsep.33.6.828

Radel, R., Pelletier, L. G., Sarrazin, P., & Milyavskaya, M. (2011). Restoration process of the need for autonomy: The early alarm stage. *Journal of Personality and Social Psychology*, *101*(5), 919–934. https://doi.org/10.1037/a0025196

Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and why their students benefit. *Elementary School Journal*, *106*(3), 225–236. https://doi.org/10.1086/501484

Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of choice. *Journal of Educational Psychology*, *95*(2), 375–392. https://doi.org/10.1037/0022-0663.95.2.375

Reeve, Johnmarshall. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, *44*(3), 159–175. https://doi.org/10.1080/00461520903028990

Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, *28*(3), 297–313. https://doi.org/10.1023/B:MOEM.0000040156.81924.b8

Ren, X., Wang, T., & Jarrold, C. (2016). Individual differences in frequency of inner speech: Differential relations with cognitive and non-cognitive factors. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01675

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, *43*(3), 450–461. https://doi.org/10.1037//0022-3514.43.3.450

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality*, *63*(3), 397–427. https://doi.org/10.1111/j.1467-6494.1995.tb00501.x

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037//0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–33). Rochester, NY: Rochester University Press.

Ryan, Richard M., & Deci, E. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality*, *74*(6), 1557–1585. https://doi.org/10.1111/j.1467-6494.2006.00420.x

Ryan, Richard M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY, US: Guilford Press.

Ryan, Richard M., Deci, E. L., & Grolnick, W. S. (1995). Autonomy, relatedness, and the self: Their relation to development and psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology, Vol. 1: Theory and methods* (pp. 618–655). Oxford, England: John Wiley & Sons.

Ryan, Richard M., Deci, E. L., & Vansteenkiste, M. (2016). Autonomy and autonomy disturbances in self-development and psychopathology: Research on motivation, attachment, and clinical process. In D. Cicchetti (Ed.), *Developmental psychopathology: Theory and method* (3rd ed., Vol. 1, pp. 385–438). Hoboken, NJ, US: John Wiley & Sons Inc.

Savard, A., Joussemet, M., Pelletier, J. E., & Mageau, G. A. (2013). The benefits of autonomy support for adolescents with severe emotional and behavioral problems. *Motivation and Emotion*, *37*(4), 688–700. https://doi.org/10.1007/s11031-013-9351-8

Schraw, G., Flowerday, T., & Reisetter, M. F. (1998). The role of choice in reader engagement. *Journal of Educational Psychology*, *90*(4), 705–714. https://doi.org/10.1037//0022-0663.90.4.705

Schueler, J., Sheldon, K. M., Prentice, M., & Halusic, M. (2016). Do some people need autonomy more than others? Implicit dispositions

toward autonomy moderate the effects of felt autonomy on well-being. *Journal of Personality*, *84*(1), 5–20. https://doi.org/10.1111/jopy.12133

Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, *40*(7), 773–791. https://doi.org/10.1016/S0005-7967(01)00059-6

Shafran, R., & Mansell, W. (2001). Perfectionism and psychopathology: A review of research and treatment. *Clinical Psychology Review*, *21*(6), 879–906. https://doi.org/10.1016/S0272-7358(00)00072-6

Sheldon, K. M., & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, *47*, 267–283. https://doi.org/10.1348/014466607X238797

Sheldon, K. M., & Gunz, A. (2009). Psychological needs as basic motives, not just experiential requirements. *Journal of Personality*, *77*(5), 1467–1492. https://doi.org/10.1111/j.1467-6494.2009.00589.x

Sheldon, K. M., Zhaoyang, R. Y., & Williams, M. J. (2013). Psychological need-satisfaction, and basketball performance. *Psychology of Sport and Exercise*, *14*(5), 675–681. https://doi.org/10.1016/j.psychsport.2013.05.006

Sher-Censor, E., Assor, A., & Oppenheim, D. (2015). The interplay between observed maternal perspective taking and clear expectations: Links with male adolescents' externalizing and internalizing problems. *Journal of Child and Family Studies*, *24*(4), 930–936. https://doi.org/10.1007/s10826-014-9903-x

Smith, A. L., Ntoumanis, N., Duda, J. L., & Vansteenkiste, M. (2011). Goal striving, coping, and well-being: A prospective investigation of the self-concordance model in sport. *Journal of Sport & Exercise Psychology*, *33*(1), 124–145. https://doi.org/10.1123/jsep.33.1.124

Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of multidimensional sport performance anxiety in

children and adults: The sport anxiety scale-2. *Journal of Sport & Exercise Psychology*, *28*(4), 479–501. https://doi.org/10.1123/jsep.28.4.479

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence*, *34*(6), 589–604. https://doi.org/10.1007/s10964-005-8948-y

Soenens, Bart, & Vansteenkiste, M. (2010). A theoretical upgrade of the concept of parental psychological control: Proposing new insights on the basis of self-determination theory. *Developmental Review*, *30*(1), 74–99. https://doi.org/10.1016/j.dr.2009.11.001

Soenens, Bart, Vansteenkiste, M., & Van Petegem, S. (2015). Let us not throw out the baby with the bathwater: Applying the principle of universalism without uniformity to autonomy-supportive and controlling parenting. *Child Development Perspectives*, *9*(1), 44–49. https://doi.org/10.1111/cdep.12103

Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review*, *10*(4), 295–319. https://doi.org/10.1207/s15327957pspr1004_2

Stoeber, J., Uphill, M. A., & Hotham, S. (2009). Predicting race performance in triathlon: The role of perfectionism, achievement goals, and personal goal setting. *Journal of Sport & Exercise Psychology*, *31*(2), 211–245. https://doi.org/10.1123/jsep.31.2.211

Stoeber, Joachim. (2018). *The psychology of perfectionism. Theory, research, applications*. Abingdon, Oxon: Routledge.

Stoll, O., Lau, A., & Stoeber, J. (2008). Perfectionism and performance in a new basketball training task: Does striving for perfection enhance or undermine performance? *Psychology of Sport and Exercise*, *9*(5), 620–629. https://doi.org/10.1016/j.psychsport.2007.10.001

Taylor, I. M., & Ntoumanis, N. (2007). Teacher motivational strategies and student self-determination in physical education. *Journal of Educational Psychology*, *99*(4), 747–760. https://doi.org/10.1037/0022-0663.99.4.747

Tenenbaum, G., Hall, H. K., Calcagnini, N., Lange, R., Freeman, G., & Lloyd, M. (2001). Coping with physical exertion and negative feedback under competitive and self-standard conditions. *Journal of Applied Social Psychology*, *31*(8), 1582–1626. https://doi.org/10.1111/j.1559-1816.2001.tb02743.x

Theodorakis, Y., Hatzigeorgiadis, A., & Zourbanos, N. (2012). Cognitions: Self-talk and performance. In S. Murphy (Ed.), *Oxford handbook of sport and performance psychology. Part 2: Individual psychological processes in performance* (pp. 191–212). New York, NY, US: Oxford University Press.

Tzetzis, G., Votsis, E., & Kourtessis, T. (2008). The effect of different corrective feedback methods on the outcome and self confidence of young athletes. *Journal of Sports Science and Medicine*, *7*(3), 371–378.

Van Petegem, S., Vansteenkiste, M., Soenens, B., Zimmermann, G., Antonietti, J.-P., Baudat, S., & Audenaert, E. (2017). When do adolescents accept or defy to maternal prohibitions? The role of social domain and communication style. *Journal of Youth and Adolescence*, *46*(5), 1022–1037. https://doi.org/10.1007/s10964-016-0562-7

Van Raalte, J. L., Cornelius, A. E., Brewer, B. W., & Hatten, S. J. (2000). The antecedents and consequences of self-talk in competitive tennis. *Journal of Sport & Exercise Psychology*, *22*(4), 345–356. https://doi.org/10.1123/jsep.22.4.345

Van Raalte, Judy L., Brewer, B. W., Rivera, P. M., & Petitpas, A. J. (1994). The relationship between observable self-talk and competitive junior tennis players' match performances. *Journal of Sport and*

Exercise Psychology, *16*(4), 400–415. https://doi.org/10.1123/jsep.16.4.400

Vansteenkiste, M., & Deci, E. L. (2003). Competitively contingent rewards and intrinsic motivation: Can losers remain motivated? *Motivation and Emotion*, *27*(4), 273–299. https://doi.org/10.1023/A:1026259005264

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. A., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology*, *87*(2), 246–260. https://doi.org/10.1037/0022-3514.87.2.246

Vansteenkiste, Maarten, Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick, *The decade ahead: Theoretical perspectives on motivation and achievement* (Vol. 16A, pp. 105–165). Bingley, UK: Emerald.

Vansteenkiste, Maarten, & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280. https://doi.org/10.1037/a0032359

Vansteenkiste, Maarten, Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A., … Beyers, W. (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction*, *22*(6), 431–439. https://doi.org/10.1016/j.learninstruc.2012.04.002

Vansteenkiste, Maarten, & Soenens, B. (2015). *Vitamines voor groei: Ontwikkeling voeden vanuit de zelf-determinatie theorie*. Leuven: Acco.

Vansteenkiste, Maarten, Williams, G. C., & Resnicow, K. (2012). Toward systematic integration between self-determination theory and motivational interviewing as examples of top-down and bottom-up intervention development: Autonomy or volition as a fundamental theoretical principle. *International Journal of Behavioral Nutrition and Physical Activity*, *9*, 23. https://doi.org/10.1186/1479-5868-9-23

Ward, J., Wilkinson, C., Graser, S. V., & Prusak, K. A. (2008). Effects of choice on student motivation and physical activity behavior in physical education. *Journal of Teaching in Physical Education*, *27*(3), 385–398. https://doi.org/10.1123/jtpe.27.3.385

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, *66*(5), 297–333. https://doi.org/10.1037/h0040934

Whitehead, J. R., & Corbin, C. B. (1991). Youth fitness testing: The effect of percentile-based evaluative feedback on intrinsic motivation. *Research Quarterly for Exercise and Sport*, *62*(2), 225–231. https://doi.org/10.1080/02701367.1991.10608714

Williams, J. M., Jerome, G. J., Kenow, L. J., Rogers, T., Sartain, T. A., & Darland, G. (2003). Factor structure of the coaching behavior questionnaire and its relationship to athlete variables. *Sport Psychologist*, *17*(1), 16–34. https://doi.org/10.1123/tsp.17.1.16

Wulf, G., & Toole, T. (1999). Physical assistance devices in complex motor skill learning: Benefits of a self-controlled practice schedule. *Research Quarterly for Exercise and Sport*, *70*(3), 265–272. https://doi.org/10.1080/02701367.1999.10608045

Wulf, Gabriele, & Adams, N. (2014). Small choices can enhance balance learning. *Human Movement Science*, *38*, 235–240. https://doi.org/10.1016/j.humov.2014.10.007

Wylleman, P., Alfermann, D., & Lavallee, D. (2004). Career transitions in sport: European perspectives. *Psychology of Sport and Exercise*, *5*(1), 7–20. https://doi.org/10.1016/S1469-0292(02)00049-3

Zervas, Y., Stavrou, N. A., & Psychountaki, M. (2007). Development and validation of the self-talk questionnaire (S-TQ) for sports. *Journal of Applied Sport Psychology*, *19*(2), 142–159. https://doi.org/10.1080/10413200601185156

Zourbanos, N., Hatzigeorgiadis, A., Chroni, S., Theodorakis, Y., & Papaiciannou, A. (2009). Automatic self-talk questionnaire for sports (ASTQS): Development and preliminary validation of a measure identifying the structure of athletes' self-talk. *Sport Psychologist*, *23*(2), 233–251. https://doi.org/10.1123/tsp.23.2.233

Zourbanos, N., Hatzigeorgiadis, A., Goudas, M., Papaioannou, A., Chroni, S., & Theodorakis, Y. (2011). The social side of self-talk: Relationships between perceptions of support received from the coach and athletes' self-talk. *Psychology of Sport and Exercise*, *12*(4), 407–414. https://doi.org/10.1016/j.psychsport.2011.03.001

Zourbanos, N., Hatzigeorgiadis, A., & Theodorakis, Y. (2007). A preliminary investigation of the relationship between athletes' self-talk and coaches' behaviour and statements. *International Journal of Sports Science & Coaching*, *2*, 57–66. https://doi.org/10.1260/174795407780367195

Zourbanos, N., Hatzigeorgiadis, A., Tsiakaras, N., Chroni, S., & Theodorakis, Y. (2010). A multimethod examination of the relationship between coaching behavior and athletes' inherent self-talk. *Journal of Sport & Exercise Psychology*, *32*(6), 764–785. https://doi.org/10.1123/jsep.32.6.764

Zourbanos, N., Haznadar, A., Papaioannou, A., Tzioumakis, Y., Krommidas, C., & Hatzigeorgiadis, A. (2016). The relationships between athletes' perceptions of coach-created motivational climate, self-talk, and self-efficacy in youth soccer. *Journal of Applied Sport*

Psychology, *28*(1), 97–112. https://doi.org/10.1080/10413200.2015.1074630

Zourbanos, N., Papaioannou, A., Argyropoulou, E., & Hatzigeorgiadis, A. (2014). Achievement goals and self-talk in physical education: The moderating role of perceived competence. *Motivation and Emotion*, *38*(2), 235–251. https://doi.org/10.1007/s11031-013-9378-x

Zourbanos, N., Theodorakis, Y., & Hatzigeorgiadis, A. (2006). Coaches' behaviour, social support and athletes' self-talk. *Hellenic Journal of Psychology, 3,* 117–133.

CHAPTER 2

The Unique and Interactive Contribution of (De)motivating Coaching and Parenting to Youth Soccer Players' Motivation and Engagement[1]

[1] De Muynck, G-J., Morbée, S., Soenens, B., Haerens, L., Vermeulen, O., Vande Broek, G., & Vansteenkiste, M. (2018). The unique and interactive contribution of (de)motivating coaching and parenting to youth soccer players' motivation and engagement. *Manuscript submitted for publication.*

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Although much is known about the (de)motivating effects of coaching and parenting style, the unique and interactive contribution of coaches and parents to youth athletes' motivational functioning received less attention. The present cross-sectional study among male youth soccer players (N = 255; M_{age} = 13.72; SD_{age} = 1.97) examined associations between perceived need-supportive and need-thwarting coaching and parenting, and soccer players' motivation and engagement. Examined separately, coaching and parenting showed a similar pattern of associations, with need support being positively associated with autonomous motivation and engagement, and need thwarting relating positively to amotivation and disaffection. Controlled motivation was associated with both need-supportive and need-thwarting styles, although associations with need-thwarting were more pronounced. When considered in combination, need-supportive coaching, but not parenting, related positively to soccer players' autonomous motivation and engagement, whereas need-thwarting coaching and parenting related uniquely, and positively to amotivation. Also, a number of interactions emerged in the contribution of soccer players' motivation, with these interactions being predominantly compensatory in nature. That is, high need support from one socialization figure seemed to buffer the detrimental contribution of low need support from the other socialization figure, and low need thwarting from one socialization figure seemed to buffer the detrimental association of high need thwarting from the other socialization figure. The discussion highlights the complex ways in which motivating coaching and parenting may interact in relation to youth athletes' motivational functioning.

INTRODUCTION

"*So, how was today's training session?*" and "*How did you experience the game yourself?*" are questions that both coaches and parents often ask to infer youth athletes' motivation for and functioning within competitive sport participation. Supporting youth athletes' motivation for sports is important for athletes' enduring sport participation (Pelletier, Fortier, Vallerand, & Briere, 2001), with both parents and coaches playing an important role in the development of high-quality motivation. In turn, sport participation comes with a host of physical (e.g., improved cardiovascular fitness), psychological (e.g., improved self-esteem), and social (e.g., better cooperative skills) benefits (Fraser-Thomas, Coté, & Deakin, 2005). Although both coaches and parents are two primary socializing agents who can potentially impact athletes' motivation, either positively or negatively (Gaudreau et al., 2016), the question whether they both uniquely and in combination contribute to youth athletes' motivation and engagement has been rarely addressed (but see O'Rourke, Smith, Smoll, & Cumming, 2014). Grounded in Self-Determination Theory (SDT; Ryan & Deci, 2017), the present study among youth soccer players aims to fill this gap in the literature.

SPORT MOTIVATION AND ENGAGEMENT

For parents and coaches to infer how satisfying youth athletes experience their sport endeavors, one possibility is to ask questions regarding their motives for participation. SDT, one of the leading motivational frameworks in the context of sports (Hagger & Chatzisarntis, 2007), attends to the quality of athletes' motives for sport participation, thereby discriminating between autonomous and more controlled forms of motivation (Deci & Ryan, 2000). In the case of autonomous motivation, athletes' regulation of behavior is characterized by experiences of volition, psychological freedom and reflective self-endorsement, such that the behavior has a perceived internal locus of causality (Vansteenkiste, Niemiec, &

Soenens, 2010). Specifically, autonomous motivation entails the endorsement of an activity out of personal relevance (i.e., identified regulation), such as an athlete performing a warming up because he personally values healthy sport participation and injury prevention. Next to personal relevance, autonomous motivation also encompasses behaviors that are inherently enjoying, challenging or interesting (i.e., intrinsic motivation). When an athlete gives full effort during a training drill because he loves the drill, his behavior is intrinsically motivated.

Controlled motivation, on the other hand, involves the regulation of behavior on the basis of pressured reasons. Athletes then experience obligation or even coercion to think, feel, or act in particular ways, such that the behavior is performed with an external perceived locus of causality (Vansteenkiste et al., 2010). Controlled motivation entails the regulation of behavior by external pressures, such as punishments or rewards, as motives for behaviors (i.e., external regulation). This form of behavioral regulation is evident when athletes' reasons for putting effort in a training drill is to avoid criticism from their coach or to be selected for the team. A second component of controlled motivation involves the use of internal pressures (i.e., introjected regulation). In this case, external contingencies are partially internalized, causing athletes to experience more pride and self-worth when contingencies are met, while experiencing shame and guilt when they are not. An athlete doing injury prevention exercises out of guilt is an illustration of this regulation type.

Next to controlled and autonomous motivation, which both reflect high involvement in an activity, amotivation reflects a total lack of intentionality. Amotivation might result from feeling incapable, not valuing the activity at hand, or from not believing that the activity will result in desired outcomes (Deci & Ryan, 1985; Vansteenkiste et al., 2010). Previous research has found amotivation and autonomous motivation to yield, respectively, the poorest and best outcomes, while the correlates for controlled motivation are in-between. Such a pattern of findings has emerged for outcomes as diverse

as experiences of flow (Valenzuela, Codina, & Pestana, 2018), positive affect and vitality (Assor, Vansteenkiste, & Kaplan, 2009; Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008), negative affect and depressive feelings, (Assor et al., 2009) boredom (Amado, Sanchez-Oliva, Gonzalez-Ponce, Pulido-Gonzalez, & Sanchez-Miguel, 2015) and feelings of burnout (Barcza-Renner, Eklund, Morin, & Habeeb, 2016), moral behavior (Hodge & Lonsdale, 2011; Ntoumanis & Standage, 2009), performance (Gillet, Berjot, & Gobance, 2009), and enduring sport participation (Pelletier et al., 2001).

Apart from asking questions as to infer how satisfying youth athletes experience their sport endeavor, coaches and parents can also observe youth athletes' engagement, which can be considered as the most easily observable indicator of athletes' functioning within training and competition (Tessier, Sarrazin, & Ntoumanis, 2010), and has been found to be lowly or moderately related to athletes autonomous motivation in the organizational (Datu, King, & Valdez, 2018) and educational domain (De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012). Engagement is defined as the degree of active involvement in an activity (Christenson, Reschly, & Wylie, 2012) and encompasses four dimensions. First, emotional engagement refers to the display of emotions signifying motivated involvement such as interest and enjoyment (Skinner, Kindermann, & Furrer, 2009). Second, behavioral engagement refers to athletes' working attitude, effort and persistence when participating in activities (Skinner et al., 2009). Third, cognitive engagement encompasses employing sophisticated learning strategies and self-regulation strategies (Wolters, 2004). Fourth, agentic engagement refers to athletes' constructive contribution into the flow of instruction they receive by, amongst others, offering suggestions, asking questions, and communicating likes and dislikes (Reeve & Tseng, 2011). In contrast to being engaged, athletes can also be disaffected, as indicated by athletes feeling discouraged, bored, nervous or frustrated (i.e., emotional disaffection) or their motivated withdrawal from activities and lack of effort while on the pitch (i.e., behavioral disaffection).

(DE)MOTIVATING COACHING AND PARENTING

In order to provide youth with positive, healthy and lifelong sport experiences, socialization figures face the task to fuel their autonomous motivation and engagement, while reducing their controlled motivation, amotivation, and disaffection. For youth athletes, coaches and parents are the most prominent socialization figures (Wylleman, Alfermann & Lavallee, 2004). Coaches play a central role as they are responsible for, among others, setting and communicating club rules and behavioral expectations, organizing training sessions, monitoring and supporting skill development, and, in the case of most team sports, deciding on tactical issues and line-ups in competition.

Compared to coaches, parents may at first sight take a somewhat more distant role: they have less to say about what happens on the pitch, yet, their involvement may manifest in different ways. Parental roles range from providing tangible support (e.g., transportation and buying equipment), informational support (e.g., giving nutritional information), and emotional support (e.g., helping children deal with losing competitions; Van Yperen, 1998), over encouraging sportsmanship and valuing effort, to being a role model (Harwood & Knight, 2015). As such, it should come as no surprise that research increasingly addresses parents' role in youth athletes' sport experiences (e.g., Holt & Knight, 2014).

Although the specific roles of coaches and parents may differ, within each of these roles coaches and parents can be more or less supportive of athletes' autonomous motivation and engagement. From the SDT-perspective, taking up a motivating role implies supporting athletes' basic psychological needs (Ryan & Deci, 2017) for autonomy (i.e., experience of volition), competence (i.e., experience of mastery) and relatedness (i.e., experience of connection). A need-supportive socialization style then involves the provision of autonomy-support, structure, and relational support, with each of these motivating styles involving a different set of motivating practices (Mageau & Vallerand, 2003; Soenens, Deci, & Vansteenkiste, 2017).

Grounded in a basic attitude of curiosity and receptivity, autonomy-supportive socializing agents try to nurture a sense of volition and initiative during sport participation. They can do so by taking into account athletes' preferences and interests, building in desired choice, offering an athlete-centered rationale for boring or difficult activities, acknowledging athletes' resistance and negative affect, and making use of an inviting communication style (Reeve, 2009). The need-thwarting counterpart of autonomy support is control, which involves the use of various pressuring strategies such that athletes feel forced to act, think, and feel in prescribed ways. Such pressure can be conveyed through the use of contingent rewards or punishments, guilt induction, suppression of athletes' preference and encountered negative affect, and the use of a forceful, evaluative, and threatening communication style (Soenens & Vansteenkiste, 2010).

Each of these strategies can be used by both coaches and parents, although the operational specificities may differ in some cases. To illustrate, while parents may provide choice about whether the sporting equipment is arranged the night before or in the morning, coaches may allow athletes to choose to do the more difficult exercises at the beginning, halfway, or by the end of the training. On the other hand, after a lost game, both coaches and parents could empathize with the athletes' disappointment and frustration or instead ignore or even suppress athletes' point of view.

Provision of structure starts with a process-oriented attitude aimed at fostering athletes' sense of effectiveness. Prior to an activity, structure implies the provision of an overview of the activities and clear guidelines, so that athletes know what is expected, as well as the affirmation of athletes' ability to meet these expectations. During activity engagement, structuring socializing agents monitor athletes' functioning in a process-focused way, thereby providing appropriate help and scaffolding, encouragement, and corrective and positive feedback, while also promoting athletes' self-reflection afterwards (Haerens et al., 2013; Mouratidis, Vansteenkiste, Michou, & Lens, 2013; Reeve, 2006). The counterpart of structure involves

chaos, which is reflected in behaviors that block or hinder athletes to achieve desired outcomes, such as the absence of rules and guidance, the lack of feedback or only stressing what went wrong (Delrue et al., 2018; Egeli, Rogers, Rinaldi, & Cui, 2015).

As structure aims at enhancing youth athletes' effectiveness, coaches seem to be in a key position to install structure as they prepare training and competitions, have the sport-specific knowledge to guide athletes, and are present during sport endeavors of their athletes most of the time, so that they can reflect on athletes' performances. Probably, parents will provide structure to a lesser extent, compared to coaches, although parents might also discuss upcoming or past performances. In doing so, they might stress their children's assets and convey a sincere sense of confidence in their ability to achieve desired outcomes in upcoming training sessions or competitive games, or rather point towards their faults during past performance, thereby highlighting their weakness and expressing doubts about their children's capabilities to adequately handle the challenges in upcoming sport activities.

Finally, relatedness support, which is far less examined compared to autonomy support and structure, at least in the context of sport, originates from a genuine respect and caring for athletes as persons. It encompasses the expression of affection and unconditional regard to athletes, and being emotionally available and supportive (Skinner, Johnson, & Snyder 2005). In contrast, relational rejection is apparent in behaviors that neglect or even thwart athletes' need for relatedness by displaying a cold and distant attitude, aversion, hostility, and harshness (Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017).

As for this motivating style, parents seem to be in the predominant position to implement the embedded strategies. Compared to coaches, parents have more frequent one-on-one interactions with their children, providing exquisite opportunities to express affection, attune to their emotions and provide genuine support where needed. This, however, does not mean that coaches are unable to provide relational support. Coaches can express their

care in communications before or after a training session, during a break in the training, or they can organize collective activities outside the sporting club as to better get to know their athletes.

UNIQUE AND COMBINED EFFECTS OF PARENTING AND COACHING

In the context of sports, the role of a need-supportive coaching style has been extensively examined, with dozens of studies demonstrating that perceived need-supportive coaching predicts athletes' performance (Freeman, Rees, & Hardy, 2009), positive affect and subjective well-being (Mouratidis et al., 2008) and athletes' autonomous sport motivation (Mageau & Vallerand, 2003). While some studies have examined the notion of need-supportive coaching, encompassing the three dimensions of a motivating style simultaneously (e.g., Pulido, Sanchez-Oliva, Sanchez Miguel, Amado, & Garcia-Calvo, 2018), other studies have focused on one of the three specific constituting dimensions of coach autonomy-support (Adie, Duda, & Ntoumanis, 2008), coach structure (Curran, Hill, & Niemiec, 2013) and coach relational support (Gonzalez & Chiviacowsky, 2018). The findings emerging from these various studies have been remarkably consistent highlighting the important role of a motivating coaching style for youth sport participation. At the same time, it should be noted that the percentage of variance in psychological variables accounted for by coach behaviors is rather small (Black & Weiss, 1992). This finding suggests that other factors, among which other socializing agents such as parents, might also contribute to youth athletes' sport experiences and motivation.

Yet, the number of SDT-grounded studies that focused on the role of parents in athletes' motivation are much more limited. While gymnasts' perceived autonomy-supportive parenting style contributed positively to children's autonomous motivation (Gagné, Ryan, & Bargmann, 2003), parental pressure related negatively to adolescent athletes' psychological need satisfaction and intrinsic motivation (Amado et al., 2015). In comparison to the findings reported for coaches, relationships for parental behaviors were

less robust, with need-supportive behaviors more frequently turning out to be unrelated to athletes' need satisfaction (Amado et al., 2015) and motivation for sport (Gaudreau et al., 2016).

Although not necessarily framed from an SDT-perspective, several other studies have examined the contribution of diverse parental behaviors in the prediction of youth-athletes' motivation. Such studies showed that the more parents value enjoyment, effort, and self-referenced progress in sport, the more motivated their children are (O'Rourke, Smith, Smoll, & Cumming, 2013). Also, the more children indicated that their parents supported, encouraged and showed interest in their sport participation, the less they reported symptoms of anxiety (Bois, Lalanne, & Delforge, 2009), the more they enjoyed their sport (Averill & Power, 1995), and were satisfied with themselves (Leff & Hoyle, 1995). Finally, a greater level of perceived parental support also contributed to a more cooperative attitude towards the coach (Averill & Power, 1995). On the other hand, to the extent parents are perceived to put pressure on their children to win, promote social comparison, and show conditional regard, children report poorer motivation (Babkes & Weiss, 1999), more anxiety (Bois et al., 2009), less enjoyment (Brustad, 1988), and they were inclined to put less effort in their sport endeavors (Averill & Power, 1995).

While the contribution of parents' and (especially) coaches' motivating styles have been intensively studied in isolation, few studies have considered them in combination. An investigation of the combined role of parents and coaches is important for two reasons. First, given that perceived coach and parental need-supportive behaviors have been found to be positively correlated (e.g., Amorose, Anderson-Butcher, Newman, Fraina, & Iachini, 2016; Gaudreau et al., 2016), the observed relation of coach or parent need-supportive behavior, when studied in isolation, may have been spurious. That is, a significant contribution of coach behavior may drop to non-significance when partialling out the variance with parent behavior and vice versa. Second, the study of the role of both socializing agents simultaneously

allows one to shed light on their potentially interactive role, such that the contribution of coaches may be amplified or attenuated depending on the perceived contribution of parents and vice versa.

The number of studies to date that speak to these two issues is limited and the findings are inconclusive. With respect to their unique role, perceived parental and coach autonomy support yielded unique positive relationships with the autonomous motivation of adolescent athletes coming from a variety of team and individual sports (Amorose et al., 2016). In contrast, only parental, but not coach autonomy support related positively to the autonomous motivation of pre-adolescent soccer players under 12, while only coach (but not parental) autonomy support related positively to the autonomous motivation of highly competitive gymnasts ranging between 9 and 18 years of age (Gaudreau et al., 2016).

With respect to possible interactions between the two socializing figures, a number of alternative hypotheses have been put forward, including a synergistic and a compensatory-protective interaction (Gaudreau et al., 2016). In the case of synergistic interaction, the perceived presence of both coach and parental need support would work in synergy to produce an extra motivational and engagement benefit not accounted for by the main effects alone (Fergus & Zimmerman, 2005). In the case of a compensatory-protective interaction, either coach or parental need support would serve as a buffer, thereby compensating for the presence of either low need support or high need-thwarting by the other socializing agent (Fergus & Zimmerman, 2005). Evidence to date predominantly supports the latter interaction, in which one highly need supportive socialization figure buffers potentially detrimental effects of low need support of other socialization figures on athletes' outcomes (Amorose et al., 2016; Gaudreau et al., 2016). This interaction was, however, not always found across different outcomes, as 10 out of 16 (62,5%) of the interactions turned out significant in these two studies.

THE PRESENT STUDY

The current study aimed at examining the unique and combined contribution of coach and parental need support and need thwarting in the prediction of youth-soccer players' different types of motivation (i.e., autonomous, controlled, amotivation), and their engagement. The inclusion of a need-thwarting style constitutes a significant advancement compared to past work that focused on both socialization figures simultaneously, as these studies only included measures of need support. The following two hypotheses and two more exploratory research questions are proposed.

First, congruent with SDT, when studying coaching behaviors and parental behaviors in isolation, we expected both behaviors to be related to soccer players' motivation and engagement. That is, it is hypothesized that perceived coach and parental need support will relate primarily to autonomous motivation and engagement (Hypothesis 1a), while perceived coach and parental need thwarting will relate primarily to controlled motivation, amotivation, and disaffection (Hypothesis 1b). In a more explorative way, the interaction between need supportive and need thwarting behavior from the same socialization figure will be examined (Research Question 1). Because the present study is among the first to test such interactions, it is difficult to formulate a priori hypotheses. One possibility is that a need-supportive style buffers effects of a need-thwarting style such that athletes who perceive socialization figures as high on both need thwarting and need support display less maladaptive outcomes compared to athletes who perceive socialization figures as high on need thwarting and low on need support.

Second, when considering the role of parents and coaches simultaneously, we hypothesized that the perceived coaching behavior, especially when need-supportive, may yield a stronger and more unique relation, as the coach is the most prominent socialization figure for youth soccer players in the context of their sport participation (Hypothesis 2a). Yet, because previous studies found that parents can especially do damage to children's motivation and engagement (Amado et al., 2015), their need-

thwarting style may also be uniquely related to poor motivational outcomes and disaffection (Hypothesis 2b). Finally, in a more explorative way, potential interactions between coach and parental behaviors were examined, thereby both considering the possibility of synergistic and compensatory-protective interactions (Research Question 2). To examine the unique and combined roles of parents' and coaches' motivating styles in a fair and balanced fashion, we relied on a recently developed measure tapping into generic perceptions of contextual need support (i.e., the Interpersonal Behaviours Questionnaire; Rocchi et al., 2017). Because the items from this measure can be applied to different socialization figures, the scores derived from this measure can be used to directly compare effects of perceived parenting and coaching.

METHOD

PARTICIPANTS AND RECRUITMENT PROCEDURES

For the current study, 255 male youth competitive soccer players were recruited from 16 different Flemish football clubs. Participating teams within the same club ranged from one to three. Soccer players were between 10 and 20 years of age (M = 13.72, SD = 1.97), had on average 8.10 (SD = 2.75) years of experience in soccer (range 1-16 years), and trained on average 1.43 years under their current coach (SD = .92, range 1-7). The soccer players were active on three different levels: 21 (8.2%) of them played at a lowly competitive level, 144 (56.5%) at a moderate competitive level, and 90 (35.3%) at a highly competitive level.

Participating soccer players were recruited via their clubs. First, 25 coaches out of 25 clubs were informed by the study, with 16 of them accepting to participate. After coaches provided informed consent, the soccer players they trained were informed about the study and signed an informed consent form prior to completing the questionnaires on site following a training session. For under-aged participants, active parental informed consent was

also attained. The procedure was approved by the ethics committee of the first authors' department.

MEASURES AND MATERIALS

After providing information about background characteristics (i.e., club, age, experience, years under current coach, competition level) participants completed a questionnaire tapping into four different variables. All items were answered on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*).

Need-Supportive and Need-Thwarting Behavior of Coaches and Parents. The Interpersonal Behaviours Questionnaire (IBQ; Rocchi et al., 2017) was adapted to fit into the context of soccer and to be understandable for the younger participants within the current sample. Because we wanted to directly compare the role of coaches and parents, the IBQ is ideally suited as the stem preceding the item is fairly general instead of being task- or context-specific, that is, '*with regard to my soccer participation, my coach/parent…*'. Moreover, the items themselves are generic, that is, identical for parents and coaches. All questions were answered twice, once for coach behaviors and once for parental behaviors. Need-supportive behavior was measured by a composite scale of autonomy-supportive (4 items; e.g., "…supports my choices"), structuring (4 items; e.g., "…encourages me to do better") and relational supportive behaviors (4 items; e.g., "… is interested"). The internal consistency of this measure was good for both coaches (α = .82) and parents (α = .75). Need-thwarting behavior was measured by a composite score of controlling (4 items; e.g., "…forces me to listen"), chaotic (4 items; e.g., "… tells me I'm probably not capable of doing well") and relational rejecting behaviors (4 items; e.g., "… gives me little attention"). Again, the Cronbach's alphas for both coaches (α = .80) and parents (α = .79) were good.

Sport Motivation. A slightly adapted version (Assor et al., 2009) of the Behavioral Regulation in Sport Questionnaire (Lonsdale et al., 2008) was used to tap into soccer players' behavioral regulation for their sport-related

effort-expenditure. A general stem "*I put effort in playing soccer…*" preceded the 28 items of the questionnaire. Autonomous motivation was measured by a composite scale of intrinsic motivation (4 items; e.g., "…because I like soccer") and identified regulation (4 items; e.g., "…because it is personally meaningful to me"). The reliability of this composite scale was acceptable (α = .78). Controlled motivation was measured by combining the subscales for introjected regulation (8 items; e.g., "… because I would be ashamed if I give up") and external regulation (8 items; e.g., "… because others appreciate me more if I do so") and showed good internal reliability (α = .89). Finally, amotivation was measured using 4 items (e.g., "…but I wonder why"; α = .73).

Engagement. To measure soccer players' engagement, 17 items were used tapping into four different forms of engagement; that is, behavioral, emotional, cognitive and agentic. Items were adapted to the soccer context and made accessible for young athletes. The general stem "*During soccer practice…*" was used before all items. The Engagement Versus Disaffection with Learning measure (Skinner et al., 2009) was used to measure behavioral (4 items, e.g., "… I listen very attentively to the coach") and emotional engagement (4 items, e.g., "… I have fun"). The Agentic Engagement Scale (Reeve, 2013; Reeve & Tseng, 2011) was used with regard to agentic engagement (5 items, e.g., "… I ask questions that help me to learn".) Finally, the Metacognitive Strategies Questionnaire (MSQ; Wolters, 2004) was used to assess cognitive engagement using 4 items (e.g., "… I try to find coherence between what I learn and my own experiences"). The composite scale for engagement, encompassing these four subcomponents, showed a good internal consistency (α = .84).

Disaffection. Regarding disaffection, the Engagement Versus Disaffection with Learning measure (Skinner et al., 2009) was used to measure behavioral and emotional disaffection. Again, items were adapted to the soccer context, made accessible for young athletes and preceded by the stem "*During soccer practice*". Behavioral (e.g., "… I only pretend to give

maximum effort") and emotional (e.g., "… I often get bored") disaffection were measured by 5 items each. The internal reliability of this composite scale was good (α = .85).

PLAN OF ANALYSES

After inspection whether background characteristics were related to the variables of interest, a series of two-level multilevel regression analyses with soccer players nested within coaches was performed using MLwiN[2]. Then, variance components models (i.e., Model 0; Rasbash et al., 2014) were tested to estimate how much of the variance in each of the outcomes is explained at the level of differences between soccer players (i.e., Level 1) and at the level of differences between coaches (i.e., Level 2). Next, relevant covariates (i.e., age, years under current coach and performance level) were added and (de)motivating coach behaviors and parental behaviors were examined separately in two different steps. Additionally, within socialization figure interactions (need support x need thwart) were include in their respective model to examine their contribution. Subsequently, in a third step, the perceived motivating styles from both socialization figures were included in the same model to examine their unique and combined contribution to athlete motivation and engagement.

[2] A three-level model, with soccer players nested within coaches within clubs, was not considered because due to the recruitment procedure the distribution of coaches across sports clubs was very unbalanced. For 11 out of the 16 clubs only one coach participated.

RESULTS

PRELIMINARY ANALYSES

Table 1 presents descriptive statistics of and bivariate correlations between variables. Older soccer players perceived their coaches and parents as less need-supportive, were less autonomously motivated and less engaged during their sport. The longer soccer players were training under their current coach, the less controlled motivation they reported.

Regarding soccer players' competition level, Analysis of Variance (ANOVA) showed differences in controlled motivation ($F(2,253) = 4.72$, $p = .01$), with soccer players playing at a high competitive level reporting more controlled motivation ($M = 3.87$, $SD = 1.16$) compared to soccer athletes playing at either a low ($M = 3.39$, $SD = .83$) or moderately high competitive level ($M = 3.43$, $SD = 1.13$). Based on these preliminary analyses, age, years playing under the current coach, and competition level were included as covariates in further analyses.

Table 2 presents bivariate correlations between the different dimensions of coaches' and parents' motivating styles and the outcomes. The correlations with the outcome variables showed very similar patterns across the three facets of both the need-supportive and need-thwarting styles, which justifies the use of aggregated scores for need-supportive and need-thwarting styles (see Niemiec et al., 2006 for a similar procedure). To examine the mean level differences in these different facets as a function of socialization figure (coach vs. parents), we ran six independent sample t-tests (one for each (de)motivating style). Youth soccer players perceived coaches, as compared to parents as providing less autonomy support, structure, and relational support, while being perceived as more controlling. Hence, the participants had more favorable perceptions of their parents compared to their coaches (Table 3).

Table 1. Descriptive Statistics and Bivariate Correlations for All Included Variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11
Covariates													
1.Age	13.72	1.97											
2.Experience	8.10	2.75	.43**										
3.Years under current coach	1.43	0.92	-.09	-.03									
Coach													
4.Need-supportive behavior	5.20	0.94	-.15*	-.04	.10								
5.Need-thwarting behavior	2.94	1.03	-.05	-.07	-.06	-.17**							
Parent													
6.Need-supportive behavior	5.65	0.84	-.17**	-.00	.01	.46**	-.04						
7.Need-thwarting behavior	2.63	1.03	-.01	-.07	-.04	-.12	.69**	-.19**					
Outcomes													
8.Autonomous motivation	6.12	0.75	-.22**	-.10	-.05	.39**	.01	.24**	-.17**				
9.Controlled motivation	3.58	1.13	-.05	-.03	-.17**	.13*	.27**	.08	.24**	.24**			
10.Amotivation	1.99	1.22	.04	-.02	-.02	-.06	.39**	-.13*	.42**	-.26**	.35**		
11.Engagement	5.19	.84	-.21**	-.08	.01	.42**	.03	.22**	-.04	.38**	.17**	-.08	
12.Disaffection	2.54	1.16	.07	-.01	-.04	-.23**	.19**	-.16*	.26**	-.29**	.04	.39**	-.21**

Note. $^{*}p < .05$, $^{**}p < .01$;

Table 2. Bivariate Correlations with Outcomes for Separate Coach and Parental (De)motivating Styles

	Need-supportive behavior			Need-thwarting behavior		
Coach	**Autonomy Support**	**Structure**	**Relational Support**	**Control**	**Chaos**	**Rejection**
1. Autonomous motivation	.32**	.44**	.25**	.09	-.08	.03
2. Controlled motivation	.06	.13*	.13*	.24**	.21**	.19**
3. Amotivation	-.04	-.11	-.03	.26**	.42**	.28**
4. Engagement	.33**	.39**	.34**	.10	-.01	-.04
5. Disaffection	-.17*	-.23**	-.19**	.09	.23**	.14*

	Need-supportive behavior			Need-thwarting behavior		
Parent	**Autonomy Support**	**Structure**	**Relational Support**	**Control**	**Chaos**	**Rejection**
1. Autonomous motivation	.20**	.22**	.16*	-.08	-.20**	-.12
2. Controlled motivation	-.03	.10	.12	.24**	.16*	.20**
3. Amotivation	-.16*	-.15*	-.02	.35**	.43**	.25**
4. Engagement	.15*	.18**	.20**	.01	-.06	-.05
5. Disaffection	-.19**	-.11	-.10	.15*	.28**	.19**

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

Table 3. Means and Standard Deviations for Coach and Parental (De)motivating Styles, and t test Regarding Mean Level Differences

	Need-supportive behavior			**Need-thwarting behavior**		
Coach	Autonomy support	Structure	Relational support	Control	Chaos	Rejection
M	5.11	5.53	4.96	3.90	2.18	2.77
SD	1.11	1.05	1.19	1.28	1.26	1.27
Parent						
M	5.96	5.78	5.22	3.06	2.09	2.74
SD	.98	1.03	1.14	1.24	1.31	1.29
Coach vs. parent mean level differences						
t(238)	-10.76	-3.68	-3.28	10.33	1.55	.39
p	<.001	<.001	<.01	<.001	.12	.70

PRIMARY ANALYSES

The comparison between one-level and two-level models indicated that a two-level model, differentiating the between-coach from the between-athlete level, should be preferred for all outcomes except for amotivation (χ^2=3.23, *df*=1, *p*=0.07). Calculation of the Intraclass Correlation Coefficient (ICC; Lüdtke & Robitzsch, 2009), which indicates the percentage of variance lying at the between-coach level as a proportion of the total variance, revealed the lowest variance at the between-coach level for amotivation (5.17%) and controlled motivation (6.17%) while the highest between-coach variances was found for autonomous motivation (12.30%). For all other of the studied variables, values fell in between. To be consistent across the outcome variables and to control for coach-level variance even when this variance was not significant, we ran two-level models for all outcome variables (including amotivation).

Contributions of (de)motivating parenting and coaching in separation. When considered separately, need-supportive coaching (see Model 1, Table 4) and parenting (see Model 2, Table 4) were significantly and positively related to adaptive outcomes among soccer players (i.e., autonomous motivation and engagement). Surprisingly, both coaches' and parents' need support were also related to controlled motivation. The need-thwarting behaviors of both coaches and parents were significantly and positively related to negative outcomes in soccer players (i.e., controlled motivation, amotivation and disaffection). As the positive relationship between coach and parental need support with controlled motvation was surprising, more refined analyses were conducted on the two subcomponents of controlled motivation (i.e., external and introjected regulation). Results showed that coach and parental need support were positively related to introjected regulation in particular (resp. β =.35, $p < .001$; β = .33, $p < .001$), while being uncorrelated with external regulation (resp. β =.13, p = .16; β = .10, p = .33). Moreover, the associations between the need-thwarting styles and controlled motivation were clearly more pronounced than the associations

between the need-supportive styles and controlled motivation. Overall then, the three motives discerned within SDT appeared to display a gradual pattern of associations with the contextual variables, with autonomous motivation being related only to need-supportive motivating styles, with controlled motivation being related to an ambiguous mixture of need-supportive and, primarily, need-thwarting styles, and with amotivation being related only to need-thwarting styles.

To examine the interactions between the need supportive and need thwarting styles within coaches or parents, this interaction term was separately added to Models 1 and 2, respectively. As such, 10 interactions were examined in a model also including covariates and main effects of need support and need thwart of the socialization agent under examination (i.e., 2 socialization figures with 1 interaction each, for 5 outcomes). Only one out of ten interactions turned out to be significant (10%; see Table 5). Specifically, the interaction between coach need support and coach need thwarting was related significantly to soccer players' engagement. Visual inspection of the interaction plot showed that high levels of coaches' need thwarting suppressed the positive association between coaches' need support and soccer players' engagement, although this relationship remained significant even at high levels of need-thwarting coaching (Figure 1).

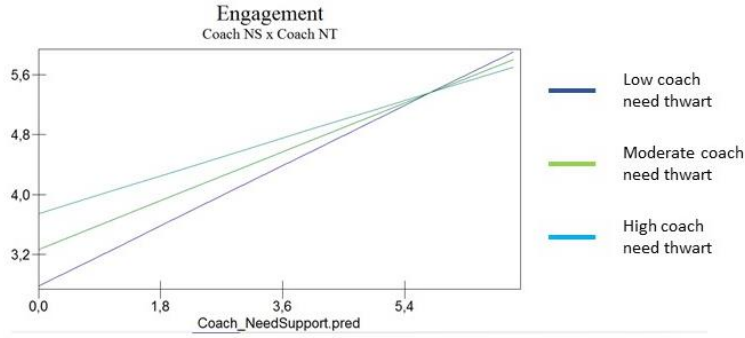

Figure 1. Significant interaction between perceived coach need support and need thwarting in relation with soccer players' engagement

Table 4. Results for the Two-Level Multilevel Analyses Regarding Coaches' and Parents' Need-Supportive and Need-Twharting Behaviors

PARAMETER	Autonomous motivation			Controlled motivation			Amotivation		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
FIXED PART	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*
Intercept	5.94 (.21)	5.99 (.20)	5.95(.21)	3.49 (.25)	3.57 (.27)	3.54 (.26)	1.75 (.31)	1.73 (.26)	1.71 (.27)
Covariates									
Age	-.05 (.03)	-.05 (.03)	-.05 (.03)	-.00 (.04)	.00 (.04)	.00 (.04)	.04 (.05)	.03 (.04)	.03 (.04)
Years under current coach	-.10 (.05)	-.08 (.05)	-.10 (.05)	-.20 (.08)**	-.20 (.08)*	-.20 (.08)**	.04 (.08)	.02 (.08)	.03 (.08)
Moderate competitive level[a]	.19 (.23)	.14 (.22)	.17 (.22)	-.04 (.28)	-.09 (.29)	-.08 (.28)	.22 (.34)	.28 (.28)	.28 (.29)
High competitive level[a]	.22 (.23)	.14 (.23)	.21 (.23)	.19 (.28)	.06 (.30)	.11 (.29)	.13 (.35)	.16 (.29)	.20 (.30)
Predictors									
Coach need-supportive behavior	.25 (.05)***		.24 (.06)***	.24 (.08)**		.17 (.10)	.06 (.08)		.11 (.10)
Coach need-thwarting behavior	-.01 (.04)		.07 (.07)	.31 (.07)***		.14 (.11)	.49 (.07)***		.28 (.11)*
Parent need-supportive behavior		.19 (.06)**	.05 (.07)		.22 (.09)*	.11 (.11)		-.05 (.09)	-.15 (.11)
Parent need-thwarting behavior		-.04 (.05)	-.11 (.08)		.35 (.07)***	.23 (.12)		.52 (.08)***	29 (.12)*
RANDOM PART REFERENCE MODEL	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)
Coach level variance	.07 (.03)	.07 (.03)	.03 (.02)	.08 (.06)	.08 (.06)	.01 (.03)	.08 (.06)	.08 (.06)	.00 (.00)
Soccer player level variance	.49 (.05)	.49 (.05)	.41 (.04)	1.20 (.11)	1.20 (.11)	1.04 (.10)	1.41 (.13)	1.41 (.13)	1.07 (.10)
RANDOM PART TEST MODEL	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)
Coach level variance	.04 (.02)	.03 (.02)	.03 (.02)	.00 (.00)	.01 (.03)	.00 (.03)	.06 (.05)	.00 (.00)	.01 (.03)
Soccer player level variance	.38 (.04)	.41 (.04)	.38 (.04)	1.05 (.10)	1.04 (.10)	1.03 (.10)	1.06 (.10)	1.07 (.10)	1.04 (.10)
Test of significance									
IGLS deviance reference model	557.91	557.91	458.25	779.89	779.89	667.23	815.99	815.99	671.29
IGLS deviance test model	447.08	458.25	442.86	687.42	667.23	663.85	677.79	671.29	665.51
X^2 *(df)*	110.83(2)***	99.66(2)***	15.39(2)***	92.47(2)***	112.66(2)***	3.38(2)	138.20(2)***	144.70(2)***	5.78(2)

Table 4. Continued

PARAMETER	Engagement			Disaffection		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
FIXED PART	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*
Intercept	4.99 (.18)	5.05 (.20)	4.98 (.19)	2.11 (.37)	2.09 (.35)	2.12 (.35)
Covariates						
Age	-.07 (.03)*	-.07 (.03)*	-.07 (.03)*	-.02 (.05)	-.02 (.05)	-.02 (.05)
Years under current coach	-.03 (.06)	-.01 (.06)	-.03 (.06)	-.02 (.09)	-.04 (.09)	-.02 (.09)
Moderate competitive level[a]	.19 (.20)	.15 (.21)	.19 (.20)	.52 (.40)	.56 (.37)	.52 (.37)
High competitive level[a]	.23 (.20)	.25 (.22)	.24 (.21)	.32 (.41)	.40 (.39)	.35 (.39)
Predictors						
Coach need-supportive behavior	.33 (.06)***		.34 (.07)***	-.17 (.08)		-.17 (.10)
Coach need-thwarting behavior	.04 (.05)		.08 (.08)	.24 (.07)**		.07 (.12)
Parent need-supportive behavior		.20 (.07)**	.00 (.08)		-.13 (.09)	-.05 (.11)
Parent need-thwarting behavior		.03 (.06)	-.05 (.09)		.28 (.08)***	.23 (.13)
RANDOM PART REFERENCE MODEL	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)
Coach level variance	.05 (.03)	.05 (.03)	.00 (.00)	.15 (.08)	.15 (.08)	.09 (.06)
Soccer player level variance	.65 (.06)	.65 (.06)	.61 (.06)	1.18 (.11)	1.18 (.11)	1.09 (.11)
RANDOM PART TEST MODEL	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)	σ^2 (S.E.)
Coach level variance	.00 (.00)	.00 (.00)	.00 (.00)	.12 (.07)	.09 (.06)	.09 (.06)
Soccer player level variance	.55 (.05)	.61 (.06)	.55 (.05)	1.07 (.11)	1.09 (.11)	1.07 (.11)
Test of significance						
IGLS deviance reference model	619.19	619.19	537.80	777.30	777.30	685.52
IGLS deviance test model	513.80	537.80	513.30	686.05	685.52	681.09
X^2 *(df)*	105.39(2)***	81.39(2)***	24.50(2)***	91.25(2)***	91.78(2)***	4.43(2)

Note. *p < .05; **p < .01; ***p < .001. [a]Reference category = low competitive level.

Table 5. Interactions Between Need-Supportive and Need-Thwarting Behaviors of Coaches and Parents in Contributing to Soccer Players' Motivation and Engagement

	Autonomous Motivation	Controlled Motivation	Amotivation	Engagement	Disengagement
	B (S.E.)	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*	*B (S.E.)*
Coach NS * Parent NS Behavior	.01 (.04)	.19 (.07)**	.20 (.08)**	.05 (.05)	.08 (.07)
Coach NT * Parent NT Behavior	.06 (.03)*	.05 (.05)	.09 (.04)*	.05 (.03)	-.08 (.05)
Coach NS * Parent NT Behavior	.03 (.04)	.08 (.07)	.08 (.07)	-.09 (.05)	-.13 (.07)
Coach NT * Parent NS Behavior	-.01 (.05)	.04 (.07)	.02 (.07)	-.06 (.05)	-.01 (.08)
Coach NS * Coach NT Behavior	-.05 (.04)	.07 (.06)	.11 (.06)	-.08 (.04)*	.01 (.06)
Parent NS * Parent NT Behavior	-.02 (.05)	.05 (.07)	.13 (.07)	-.06 (.05)	-.05 (.08)

*Note. *p < .05; **p < .01; ***p < .001. Tested in a model including covariates and main effects of need-supportive (NS) and need-thwarting (NT) behavior of coaches and parents.*

The unique and combined contribution of (de)motivating coaching and parenting. To examine the unique relationships of the coaching and parenting behaviors with the outcomes, both types of behaviors were included as simultaneous predictors in the same model (see Model 3, Table 4). Results showed that only need-supportive coaching was then related significantly and uniquely to the two beneficial outcomes (autonomous motivation and engagement). As for the need-thwarting behaviors, both parents' and coaches' reliance on need thwarting behaviors were related positively and uniquely to amotivation, yet were unrelated to controlled motivation and disaffection. Apparently, the simultaneous introduction of both need-thwarting predictors cancelled out the role they played in isolation.

Finally, interactions between socialization agents were examined. To do so, interactions between coach and parental behaviors were added to Model 3 one by one. From the 20 tested interactions (two parent by two coach predictors by five outcomes), 4 turned out to be significant (20%; see Table 5). Two interactions involved coach and parental need support, while the other two involved parental and coach need thwarting-behaviors. All four interactions involved relationships with soccer players' motivation, while no interactions emerged with regard to their engagement or disaffection.

The interaction between need-supportive coaching and parenting was significant in the contribution to controlled motivation and amotivation. Visual inspection showed that coach need-supportive behavior was generally, positively related to soccer players' controlled motivation but that this relation was canceled out in the case of low parental need support. Thus, soccer players experienced the most controlled motivation in case they perceive both their coach and parents as high in need-supportive behavior (see Figure 2 Panel A). To further examine this interaction, interaction effects were examined for both introjected and external regulation separately, which both turned out to be significant (resp. β = .17, p = .018; β = .23, p = .009). For introjected regulation, the interaction mirrored the interaction found for controlled motivation in general (see Figure 3, Panel A). As for external regulation, the

more coach need support soccer players perceived, the less external motivation they reported, with this relationship being reversed in the case of high parental need support, leading soccer players to experience most external regulation when low need-supportive coaching is combined with low need-supportive parenting (see Figure 3, Panel B). Concerning amotivation, coach need-support contributed to soccer players' lowered amotivation with this relation being canceled out in the case of high parental need support, such that the least amotivation was evident in the case low need-supportive coaching was combined with low need-supportive parenting (See Figure 2, Panel B).

As for the interaction between need-thwarting coaching and parenting, interaction terms turned out significant for autonomous motivation and amotivation. Coach need-thwarting behavior contributed to soccer players' lowered autonomous motivation, although this relation was canceled out in the case of high parental need thwarting, causing soccer players to experience the most autonomous motivation in case they perceived both their coach and their parents as low in need-thwarting behavior (See Figure 2, Panel C). Finally, need-thwarting coaching contributed to soccer players' amotivation, with low parental need thwarting buffering this effect, such that the highest amount of amotivation was evident for soccer players who perceived both coaches and parents to be high in need thwarting (see Figure 2, Panel D).

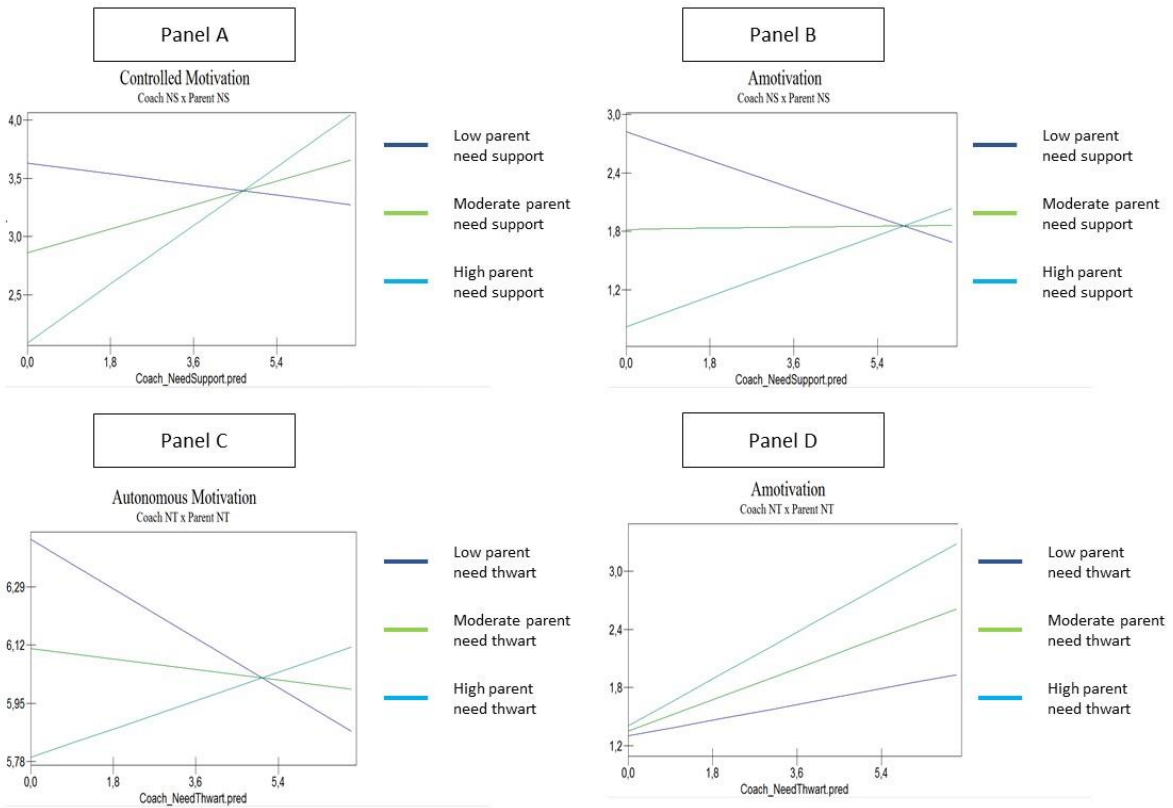

Figure 2. Significant interactions between perceived coach and parenting (de)motivating styles in relation with soccer players' engagement

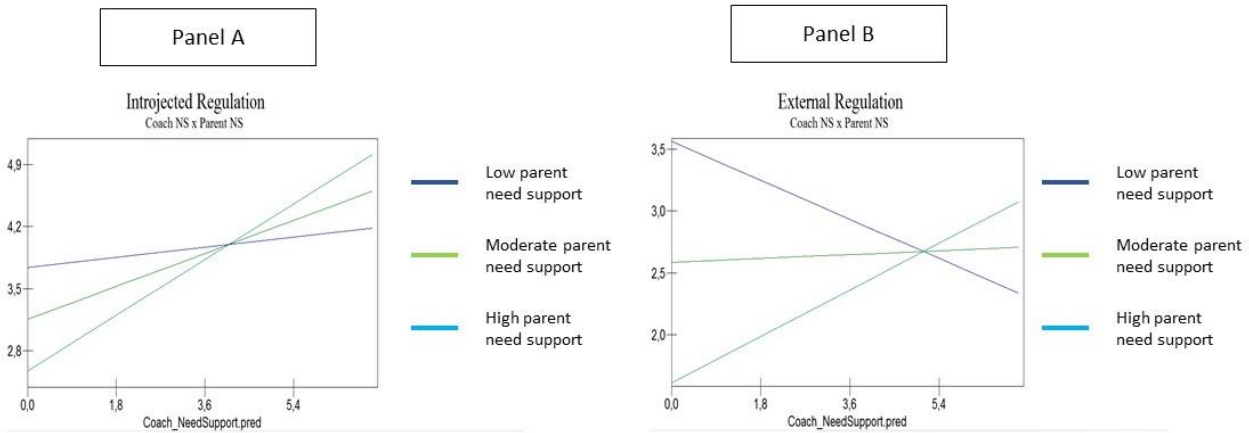

Figure 3. Refined examination of the interaction between coach- and parent need support in the contribution to controlled motivation.

DISCUSSION

Given the importance of high-quality motivation for lasting sport participation (Pelletier et al., 2001), which brings about a host of physical, psychological and social benefits (Fraser-Thomas et al., 2004), the current cross-sectional study examined the role of both coaches and parents in youth soccer players' motivation and engagement. Specifically, the unique and combined contribution of coach and parental need-supportive and need-thwarting behaviors were examined.

SEPARATE CONTRIBUTIONS OF PERCEIVED PARENTING AND COACHING TO YOUTH SOCCER PLAYERS' MOTIVATION AND ENGAGEMENT

When examined apart from each other, both coaches' and parents' (de)motivating styles showed a similar contribution to youth soccer players' motivation and engagement. The more coaches and parents were perceived as being need-supportive, the more autonomous motivation and engagement their soccer players reported. On the other hand, the more soccer players' perceived their coaches and parents as need thwarting, the more amotivation and disaffection they displayed. These findings are in accordance with previous studies examining only motivating coaching in the context of sports (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011) or regarding parenting in other live domains (Niemiec et al., 2006).

A somewhat unexpected finding emerged for controlled motivation, as not only higher levels of need-thwarting, but also higher levels of need supportive coaching went hand in hand with more controlled motivation, a finding that was mirrored when parents' contribution was separately examined. A closer look at controlled motivation's subcomponents showed that need supportive coaching and parenting especially related to soccer players' introjected regulation, but not with their external regulation. This is in accordance with previous studies in the educational context (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015; Zhou, Ma, &

Deci, 2009). Importantly, need-thwarting motivating styles were also related significantly to controlled motivation, with associations being even more pronounced than with need-supportive styles. Apparently, controlled motivation (and introjected regulation in particular) arises in a context where socialization figures are primarily perceived as need-thwarting yet as also being need-supportive from time to time. This ambiguous mixture of need-supportive and need-thwarting behaviors might elicit internal pressures in soccer players, who feel compelled to please socialization figures who generally thwart their needs, yet who occasionally also showed positive involvement and genuine care about soccer players' sports participation.

Finally, the findings from the analyses examining coaching and parenting styles separately are in line with previous studies in the coaching (Bartholomew et al., 2011) and parenting (Costa, Ntoumanis, & Bartholomew, 2015; Mabbe, Soenens, Vansteenkiste, & Van Leeuwen, 2016; Silk, Morris, Kanaya, & Steinberg, 2003) domain positing that need-thwarting behaviors are not the exact opposite of need-supportive behaviors. Rather, need supportive and need thwarting styles should be viewed as distinct but related dimensions (Haerens et al., 2015) displaying an asymmetric interrelation (Vansteenkiste & Ryan, 2013). The relation between need-support and need-thwarting is said to be asymmetric because the lack of need support does not necessarily imply the presence of need thwarting (e.g., a coach or parent asking a soccer player to perform a rather uninteresting activity without providing a meaningful rationale), whereas the need thwarting behaviors do automatically also imply low need support (e.g., a coach of parent intimidating a soccer player in order to make him do something he does not want to himself). Note that in the current study, need support and need thwarting are related to a different set of outcomes, with need support being related primarily to beneficial outcomes (with the exception of controlled motivation) and with need thwarting being related primarily to detrimental outcomes. This pattern of findings is in line with findings from the educational context showing that need support and need

thwarting relate to motivational experiences through unique pathways (i.e., a bright and dark pathway, respectively; Haerens et al., 2015), and is, to the best of our knowledge, the first study to support this claim in the context of youth-sport parenting.

THE UNIQUE AND COMBINED CONTRIBUTIONS OF (DE)MOTIVATING COACHING AND PARENTING

Analyses taking into account simultaneously (de)motivating coaching and parenting showed that coaches' need support was uniquely related to soccer players' autonomous motivation and engagement. Both coaches' and parents' need-thwarting styles were related to amotivation. This pattern of findings resembles findings from the educational domain showing that teachers' need support is more robustly related to motivation for school and job search than parental need support (Soenens & Vansteenkiste, 2005), and findings indicating that especially presumed detrimental parental behaviors play a role in their children's sport practice (Amado et al., 2015) Overall, the coaches' motivating style appeared to have more consistent unique associations with soccer players' outcomes.

It is noteworthy, however, that associations between perceived coaching and parenting were quite robust and that several strong relationships of (de)motivating coaching or parenting, when examined in isolation, disappeared when coaching and parenting were considered simultaneously. The positive association between perceived coaching and parenting is intriguing and may emerge through several mechanisms. First, this association could be explained at least partly through perceiver bias, with soccer players differing in their tendency to perceive different socialization figures similarly in terms of motivating style. Such a bias could, in turn, be affected by several factors. For instance, soccer players' personality may play a role, with players scoring high on agreeableness perhaps having a more benign appraisal of their social environment (Mabbe et al., 2016). Another possibility is that individuals' motivation and engagement affect their perception of

socialization figures. While soccer players high on autonomous motivation and engagement would then perceive parents and coaches in a more favorable light, players high on amotivation and disaffection would hold a generally negative view of their socialization figures. This possibility entails a different order of effects than the order assumed in the current study, with motivation and engagement affecting soccer players' appraisal of their socialization figures rather than the other way around. Longitudinal research, ideally including measures of both observed and perceived motivating styles, is needed to examine the chronology within the relationship. Yet another possibility is that parents' perceived motivating style affects soccer players' perception of their coach. The motivating style experienced by soccer players at home would then serve as a template or mental representation coloring these players' perception of other socialization figures outside the home context.

A second mechanism possibly linking perceived parenting to perceived coaching (in addition to perceiver bias) involves more evocative processes. Soccer players who perceive parents as need-supportive and who have their psychological needs met on a more regular basis may elicit more need-supportive behaviors among other socialization figures (including coaches). Perhaps because these players display more energy, flexibility, and openness to the coaches' viewpoint during training, it is easier for coaches to interact with these players in a need-supportive fashion. Both in the case that soccer players with more perceived need-supportive parents appraise coaches' behavior more positively and in the case that these players elicit more need-supportive coaching behaviors, coaching style may represent an intervening mechanism in association between perceived parenting and soccer players' outcomes. Thus, while the current results suggest at first sight that parents are less important than coaches for soccer players' motivation and engagement, there is a possibility that parents are indirectly important (through their effect on perceptions and behaviors of the coach). Again, longitudinal research is needed to test such more complex and dynamic forms of interplay between parents and coaches. Theoretically, testing these more complex possibilities is

important because they are consistent with the transcontextual model of motivation, according to which motivational dynamics occurring in one context (e.g., at home) may affect motivation in a different context (e.g., the sport club) (Hagger & Chatzisarantis, 2007).

Third, a more down-to-earth explanation is that the strong association between coaching and parenting is caused (or at least enhanced) not only by the mono-informant approach (resulting in the perception bias discussed above) but also by the mono-method approach in the current study, where exactly the same items were used to rate both perceived parenting and coaching. Indeed, to be able to directly compare coaching and parenting, the same questionnaire was used for both socialization figures. As such, it included only generic and situation-aspecific items (e.g., "My coach/parent provided me with options and choice"), thereby failing to grasp operational specificities that are evident in reality. Future research would do well to use also more specific questionnaires tailored to either coaches or parents, so as to examine whether the strong correlation between perceived coaching and parenting is due to the use of a generic questionnaire. Content-wise, such research may also provide more knowledge about the relationship-specific manifestations of a motivating style. While a motivating style is likely to share some basic attitudes and behaviors across types of relationships, it also has more specific features that differ depending on the type of relationship involved. For example, coaches will provide choice most often during a training session (e.g., with whom to perform an exercise), whereas parents will likely provide choice before or after sports participation (e.g., when to arrange equipment). When such situational specificity is taken into account, athletes will probably be able to more easily differentiate between the (de)motivating styles of various socialization figures. As such, future research might rely on a vignette-based measurement of (de)motivating styles (for an example, see Delrue et al., 2018). Such a type of measurement allows researchers to tailor motivating styles to specific situations in the coach-athlete

and parent-athlete interaction, thereby increasing the ecological validity of the study.

Note that the relationship between undesirable (i.e., need-thwarting) coach and parental behaviors turned out to be stronger, compared to the relationship between desirable (i.e., need-supportive) coaching and parenting, a finding that mirrored previous studies regarding motivational climates. Indeed, studies have shown stronger correlations among parental and coach performance climates, as compared to task-climates (Caglar, Asci, & Uygurtas, 2017). Although it is premature to make strong conclusions, this finding suggests that several of the mechanisms discussed before (with poor quality of motivation for instance affecting soccer players' perception of both coaches and parents or with perceptions of parents coloring the perception of coaches) play a stronger and more pronounced role within the so-called dark motivational pathway (Haerens et al., 2015). At a more general level, this finding is consistent with the broader notion in social psychology that 'bad is stronger than good' (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) According to this notion, bad events (including need-thwarting social behaviors) have a stronger salience and more profound impact compared to good events (such as need-supportive behaviors). Thus, when experiencing need-thwarting behaviors in one type of relationship, soccer players may easily perceive behaviors in other relationships as equally need-thwarting, with this 'projection' mechanism playing a lesser role in the case of need-supportive behaviors. Given that the current study is among the first to demonstrate this effect, this explanation is speculative at this point

Apart from examining unique contributions of coaching and parenting, taking both socializing agents simultaneously into account also allowed us to examine their potential interactions. The current study showed that all coach-x-parent interactions concerned soccer players' motivation, with twenty percent of the tested interactions turning out to be significant. In line with previous work, these interactions were predominantly compensatory in nature (Amorose et al., 2016; Gaudreau et al. 2016), indicating that high need

support from one socializing agent might buffer low need support from the other. Similarly, low need thwarting in one type of relationship might buffer against the detrimental contribution of need thwarting in the other type of relationship.

In an even more explorative way, interactions of need-supportive and need-thwarting behavior were examined within the same socialization figures. This kind of interaction turned out not to be robust, as only one out of ten possible interactions turned out significant. Specifically, in case soccer players' perceived their coaches as highly need-thwarting, the positive relationship between perceived need-supportive coaching and athlete engagement was buffered, but not canceled out. Future research could further examine this interplay by relying on a person-centered approach (for an example in the educational domain, see Soenens, Vansteenkiste, & Sierens, 2009). Although need support and need thwarting are, on average, negatively interrelated, soccer players might also perceive socialization figures as high on both (e.g., being need supportive before games, but being need thwarting afterwards) or low on both (e.g., a lack of involvement) need support and need thwarting. Using a person-centered approach might examine whether need support is able to buffer the detrimental contribution of need thwarting from another point of view.

LIMITATIONS

Some of the limitations of this study (such as the use of a generic measure) were already mentioned in the previous section. Here we discuss a number of more general limitations. A first limitation encompasses the cross-sectional design used in the current study, which does not allow us to draw causal conclusions. Because direct experimental manipulations of coaching and parenting behaviors are not feasible (but for indirect approaches to induce parental behavior, see Grolnick, Gurland, DeCourcey, & Jacob, 2002; Wuyts, Vansteenkiste, Mabbe, & Soenens, 2017), a longitudinal design is to be preferred. Such a design can determine variable patterns over time and would

allow researchers to detect whether changes in (de)motivational coaching and parenting are related to, and even precede, changes in soccer players' motivation and engagement. Furthermore, such a design would also allow to examine whether coaches or parents adapt their (de)motivating style, based on the style they perceive the other socializing agent to use. For example, a parent noticing the coach of their offspring to be need thwarting, might take a more need-supportive stance in order to compensate, or, instead, may take over the style used by the coach and, as a result, also become increasingly need thwarting.

A second limitation involved having only included a single informant. Asking parents and coaches to also report on their own (de)motivating styles and observable aspects of soccer players' engagement could have increased the validity of the assessment in the current study. Indeed, previous work has indicated that coaches' and athletes' perceptions regarding how (de)motivating coaches differ for one another (Delrue et al., 2018). Similarly, children and parents have been found to be in disagreement when it comes to parental attitudes and behaviors with regard to children's soccer participation (Babkes & Weiss, 1999). In addition, a multi-informant procedure might also reduce shared method variance, as it rules out projections of one socializing agents' behaviors on that of others. Still, assessments based on soccer players' perceptions also have advantages because research has shown that athletes' perceptions of coaching behavior are more predictive of outcomes than the objective coaching behavior per se (Babkes & Weiss, 1999).

A third limitation is that we tapped only into soccer players' perception of their most involved parent's parenting style. As a consequence, the current study could not examine the (dis)similarities of maternal and paternal (de)motivating styles in their contribution to soccer players' motivation and engagement. Previous research has shown that mothers are apt to tune in more towards enjoyment, whereas fathers are more tuned in towards ability and effort (Averill & Power, 1995). However, studies who included both paternal and maternal autonomy support suggest that both parents'

autonomy support is related to athletes' motivation in very similar ways (Amorose et al., 2016). Future research might want to examine whether this finding holds true for structure and chaos, and also take need-thwarting behaviors into account. In a similar vein, the impact of peers could be simultaneously examined from an SDT-perspective (see for an example regarding motivational climates: Atkins, Johnson, Force, & Petrie, 2015). The inclusion of peers in future research would serve as a valuable addition, as they represent a more horizontal interpersonal relationship for athletes, whereas coaches and parents can be considered to be in a more vertical relationship, as a consequence of the authority that comes along with the role of parent and coach.

A fourth and last limitation concerns the generalizability of the findings, given only youth soccer players were sampled. As such, it remains unclear whether the unique and combined contribution of (de)motivating coaching and parenting would be similar for individual athletes and in team sports other than soccer. In individual sports, parents are more often present during competitions, compared to team sports where transportation to the games is often regulated by a rotation system. Hence, parents in individual sports are presumed to have more opportunities to affect their children's sport participation (Bois et al., 2009)

CONCLUSION

This cross-sectional study indicated that (de)motivating parenting and coaching show a very similar pattern of relationships to soccer players' motivation and engagement when considered separately. The more soccer players perceived their coach or parent to be need-supportive, the more autonomous motivation and engagement they reported. In contrast, perceived need-thwarting coaching and parenting were positively related to amotivation and disaffection. When considered simultaneously, coaches' motivating style displayed more unique associations with motivation and engagement compared to parents' motivating style. This was particularly the case in the contribution to adaptive motivation and engagement. Although interactions between coach and parental motivating styles were limited, the few significant interactions obtained were generally compensatory in nature, such that one socialization figure could buffer against a potential detrimental contribution from the other. Future research, preferably relying on longitudinal designs and multi-informant assessments of motivating style, is needed to unravel the undoubtedly complex ways in which parents and coaches shape, and are influenced by, athletes' motivation and engagement.

REFERENCES

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion*, *32*(3), 189–199. https://doi.org/10.1007/s11031-008-9095-z

Amado, D., Sanchez-Oliva, D., Gonzalez-Ponce, I., Pulido-Gonzalez, J. J., & Antonio Sanchez-Miguel, P. (2015). Incidence of parental support and pressure on their children's motivational processes towards sport practice regarding gender. *Plos One*, *10*(6), e0128015. https://doi.org/10.1371/journal.pone.0128015

Amorose, A. J., Anderson-Butcher, D., Newman, T. J., Fraina, M., & Iachini, A. (2016). High school athletes' self-determined motivation: The independent and interactive effects of coach, father, and mother autonomy support. *Psychology of Sport and Exercise*, *26*, 1–8. https://doi.org/10.1016/j.psychsport.2016.05.005

Assor, A., Vansteenkiste, M., & Kaplan, A. (2009). Identified versus introjected approach and introjected avoidance motivations in school and in sports: The limited benefits of self-worth strivings. *Journal of Educational Psychology*, *101*(2), 482–497. https://doi.org/10.1037/a0014236

Atkins, M. R., Johnson, D. M., Force, E. C., & Petrie, T. A. (2015). Peers, parents, and coaches, oh my! The relation of the motivational climate to boys' intention to continue in sport. *Psychology of Sport and Exercise*, *16*, 170–180. https://doi.org/10.1016/j.psychsport.2014.10.008

Averill, P. M., & Power, T. G. (1995). Parental attitudes and childrens experiences in soccer: correlates of effort and enjoyment. *International Journal of Behavioral Development*, *18*(2), 263–276. https://doi.org/10.1177/016502549501800205

Babkes, M. L., & Weiss, M. R. (1999). Parental influence on children's cognitive and affective responses to competitive soccer participation. *Pediatric Exercise Science*, *11*(1), 44–62. https://doi.org/10.1123/pes.11.1.44

Barcza-Renner, K., Eklund, R. C., Morin, A. J. S., & Habeeb, C. M. (2016). Controlling coaching behaviors and athlete burnout: Investigating the mediating roles of perfectionism and motivation. *Journal of Sport & Exercise Psychology*, *38*(1), 30–44. https://doi.org/10.1123/jsep.2015-0059

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thogersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459–1473. https://doi.org/10.1177/0146167211413125

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*(4), 323–370. https://doi.org/10.1037/1089-2680.5.4.323

Black, S. J., & Weiss, M. R. (1992). The relationship among perceived coaching behaviors, perceptions of ability, and motivation in competitive age-group swimmers. *Journal of Sport & Exercise Psychology*, *14*(3), 309–325. https://doi.org/10.1123/jsep.14.3.309

Bois, J. E., Lalanne, J., & Delforge, C. (2009). The influence of parenting practices and parental presence on children's and adolescents' pre-competitive anxiety. *Journal of Sports Sciences*, *27*(10), 995–1005. https://doi.org/10.1080/02640410903062001

Brustad, R. J. (1988). Affective outcomes in competitive youth sport: the influence of intrapersonal and socialization factors. *Journal of Sport & Exercise Psychology*, *10*(3), 307–321. https://doi.org/10.1123/jsep.10.3.307

Caglar, E., Asci, F. H., & Uygurtas, M. (2017). Roles of perceived motivational climates created by coach, peer, and parent on

dispositional flow in young athletes. *Perceptual and Motor Skills*, *124*(2), 462–476. https://doi.org/10.1177/0031512516689404

Christenson, S. L., Reschly, A. L., & Wylie, C. (Eds.). (2012). *Handbook of research on student engagement*. New York: Springer Science.

Costa, S., Ntoumanis, N., & Bartholomew, K. J. (2015). Predicting the brighter and darker sides of interpersonal relationships: Does psychological need thwarting matter? *Motivation and Emotion*, *39*(1), 11–24. https://doi.org/10.1007/s11031-014-9427-0

Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of children's behavioral engagement and behavioral disaffection in sport based on self-determination theory. *Journal of Sport & Exercise Psychology*, *35*(1), 30–43. https://doi.org/10.1123/jsep.35.1.30

Datu, J. A. D., King, R. B., & Valdez, J. P. M. (2018). Psychological capital bolsters motivation, engagement, and achievement: Cross-sectional and longitudinal studies. *Journal of Positive Psychology*, *13*(3), 260–270. https://doi.org/10.1080/17439760.2016.1257056

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology*, *104*(4), 1006–1021. https://doi.org/10.1037/a0027800

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Delrue, J., Reynders, B., Aelterman, N., De Backer, M., Decroos, S., De Muynck, G.-J., … Vansteenkiste, M. (2018). Adopting a helicopter-

perspective towards motivating and demotivating coaching: A circumplex approach. *Manuscript in Revision*.

Egeli, N. A., Rogers, W. T., Rinaldi, C. M., & Cui, Y. (2015). Exploring the factor structure of the revised-parent as a social context questionnaire. *Parenting-Science and Practice*, *15*(4), 269–287. https://doi.org/10.1080/15295192.2015.1053334

Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health*, *26*, 399–419. https://doi.org/10.1146/annurev.publhealth.26.021304.144357

Fraser-Thomas, J. L., Côté, J., & Deakin, J. (2005). Youth sport programs: An avenue to foster positive youth development. *Physical Education and Sport Pedagogy*, *10*(1), 19–40. https://doi.org/10.1080/1740898042000334890

Freeman, P., Rees, T., & Hardy, L. (2009). An intervention to increase social support and improve performance. *Journal of Applied Sport Psychology*, *21*(2), 186–200. https://doi.org/10.1080/10413200902785829

Gagne, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology*, *15*(4), 372–390. https://doi.org/10.1080/10413200390238031

Gaudreau, P., Morinville, A., Gareau, A., Verner-Filion, J., Green-Demers, I., & Franche, V. (2016). Autonomy support from parents and coaches: Synergistic or compensatory effects on sport-related outcomes of adolescent-athletes? *Psychology of Sport and Exercise*, *25*, 89–99. https://doi.org/10.1016/j.psychsport.2016.04.006

Gillet, N., Berjot, S., & Gobance, L. (2009). A motivational model of performance in the sport domain. *European Journal of Sport Science*, *9*(3), 151–158. https://doi.org/10.1080/17461390902736793

Gonzalez, D. H., & Chiviacowsky, S. (2018). Relatedness support enhances motor learning. *Psychological Research-Psychologische Forschung*, *82*(3), 439–447. https://doi.org/10.1007/s00426-016-0833-7

Grolnick, W. S., Gurland, S. T., DeCourcey, W., & Jacob, K. (2002). Antecedents and consequences of mothers' autonomy support: An experimental investigation. *Developmental Psychology*, *38*(1), 143–155. https://doi.org/10.1037//0012-1649.38.1.143

Haerens, L., Aelterman, N., Van den Berghe, L., De Meyer, J., Soenens, B., & Vansteenkiste, M. (2013). Observing physical education teachers' need-supportive interactions in classroom settings. *Journal of Sport & Exercise Psychology*, *35*(1), 3–17. https://doi.org/10.1123/jsep.35.1.3

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, *16*, 26–36. https://doi.org/10.1016/j.psychsport.2014.08.013

Hagger, M. S., & Chatzisarantis, N. L. (2007a). *Intrinsic motivation and self-determination in exercise and sport*. Champaigne, IL: Human Kinetics.

Hagger, M. S., & Chatzisarantis, N. L. D. (2007b). The trans-contextual model of motivation. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 53–70). Champaign, IL, US: Human Kinetics.

Harwood, C. G., & Knight, C. J. (2015). Parenting in youth sport: A position paper on parenting expertise. *Psychology of Sport and Exercise*, *16*, 24–35. https://doi.org/10.1016/j.psychsport.2014.03.001

Hodge, K., & Lonsdale, C. (2011). Prosocial and antisocial behavior in sport: The role of coaching style, autonomous vs. controlled motivation, and moral disengagement. *Journal of Sport & Exercise Psychology*, *33*(4), 527–547. https://doi.org/10.1123/jsep.33.4.527

Holt, N. L., & Knight, C. J. (2014). *Parenting in youth sport: From research to practice* (1st ed.). Abingdon, Oxon: Routledge.

Leff, S. S., & Hoyle, R. H. (1995). Young athletes perceptions of parental support and pressure. *Journal of Youth and Adolescence*, *24*(2), 187–203. https://doi.org/10.1007/BF01537149

Lonsdale, C., Hodge, K., & Rose, E. A. (2008). The behavioral regulation in sport questionnaire (BRSQ): Instrument development and initial validity evidence. *Journal of Sport & Exercise Psychology*, *30*(3), 323–355. https://doi.org/10.1123/jsep.30.3.323

Luedtke, O., & Robitzsch, A. (2009). Assessing within-group agreement: A critical examination of a random-group resampling approach. *Organizational Research Methods*, *12*(3), 461–487. https://doi.org/10.1177/1094428108317406

Mabbe, E., Soenens, B., Vansteenkiste, M., & Van Leeuwen, K. (2016). Do personality traits moderate relations between psychologically controlling parenting and problem behavior in adolescents? *Journal of Personality*, *84*(3), 381–392. https://doi.org/10.1111/jopy.12166

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, *21*(11), 883–904. https://doi.org/10.1080/0264041031000140374

Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education: Evidence for a motivational model. *Journal of Sport & Exercise Psychology*, *30*(2), 240–268. https://doi.org/10.1123/jsep.30.2.240

Mouratidis, A., Vansteenkiste, M., Michou, A., & Lens, W. (2013). Perceived structure and achievement goals as predictors of students' self-regulated learning and affect and the mediating role of competence

need satisfaction. *Learning and Individual Differences, 23*, 179–186. https://doi.org/10.1016/j.lindif.2012.09.001

Niemiec, C. P., Lynch, M. F., Vansteenkiste, M., Bernstein, J., Deci, E. L., & Ryan, R. M. (2006). The antecedents and consequences of autonomous self-regulation for college: A self-determination theory perspective on socialization. *Journal of Adolescence, 29*(5), 761–775. https://doi.org/10.1016/j.adolescence.2005.11.009

Ntoumanis, N., & Standage, M. (2009). Morality in sport: A self-determination theory perspective. *Journal of Applied Sport Psychology*, *21*(4), 365–380. https://doi.org/10.1080/10413200903036040

O'Rourke, D. J., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2013). Parent-initiated motivational climate and young athletes intrinsic-extrinsic motivation: Cross-sectional and longitudinal relations. *Journal of Child and Adolescent Behavior, 1*(2), 1–8. https://doi.org/10.4172/2375-4494.1000109

O'Rourke, D. J., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2014). Relations of parent- and coach-initiated motivational climates to young athletes' self-esteem, performance anxiety, and autonomous motivation: Who is more influential? *Journal of Applied Sport Psychology*, *26*(4), 395–408. https://doi.org/10.1080/10413200.2014.907838

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*(4), 279–306. https://doi.org/10.1023/A:1014805132406

Pulido, J. J., Sanchez-Oliva, D., Sanchez-Miguel, P. A., Amado, D., & Garcia-Calvo, T. (2018). Sport commitment in young soccer players: A self-determination perspective. *International Journal of Sports Science*

& Coaching, *13*(2), 243–252. https://doi.org/10.1177/1747954118755443

Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and why their students benefit. *Elementary School Journal*, *106*(3), 225–236. https://doi.org/10.1086/501484

Reeve, Johnmarshall. (2013). How students create motivationally supportive learning environments for themselves: The concept of agentic engagement. *Journal of Educational Psychology*, *105*(3), 579–595. https://doi.org/10.1037/a0032690

Reeve, Johnmarshall, & Tseng, C.-M. (2011). Agency as a fourth aspect of students' engagement during learning activities. *Contemporary Educational Psychology*, *36*(4), 257–267. https://doi.org/10.1016/j.cedpsych.2011.05.002

Rocchi, M., Pelletier, L., Cheung, S., Baxter, D., & Beaudry, S. (2017). Assessing need-supportive and need-thwarting interpersonal behaviours: The interpersonal behaviours questionnaire (IBQ). *Personality and Individual Differences*, *104*, 423–433. https://doi.org/10.1016/j.paid.2016.08.034

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY, US: Guilford Press.

Silk, J. S., Morris, A. S., Kanaya, T., & Steinberg, L. (2003). Psychological control and autonomy granting: Opposite ends of a continuum or distinct constructs? *Journal of Research on Adolescence*, *13*(1), 113–128. https://doi.org/10.1111/1532-7795.1301004

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*(3), 493–525. https://doi.org/10.1177/0013164408323233

Skinner, E., Johnson, S., & Snyder, T. (2005). Six dimensions of parenting: A motivational model. *Parenting*, *5*(2), 175–235. https://doi.org/10.1207/s15327922par0502_3

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence*, *34*(6), 589–604. https://doi.org/10.1007/s10964-005-8948-y

Soenens, Bart, Deci, E. L., & Vansteenkiste, M. (2017). How parents contribute to children's psychological health: The critical role of psychological need support. In M. L. Wehmeyer, K. A. Shogren, T. D. Little, & S. J. Lopez (Eds.), *Development of self-determination through the life-course* (pp. 171–187). New York, NY, US: Springer. https://doi.org/10.1007/978-94-024-1042-6_13

Soenens, Bart, & Vansteenkiste, M. (2010). A theoretical upgrade of the concept of parental psychological control: Proposing new insights on the basis of self-determination theory. *Developmental Review*, *30*(1), 74–99. https://doi.org/10.1016/j.dr.2009.11.001

Soenens, Bart, Vansteenkiste, M., & Sierens, E. (2009). How are parental psychological control and autonomy-support related? A cluster-analytic approach. *Journal of Marriage and Family*, *71*(1), 187–202. https://doi.org/10.1111/j.1741-3737.2008.00589.x

Tessier, D., Sarrazin, P., & Ntoumanis, N. (2010). The effect of an intervention to improve newly qualified teachers' interpersonal style, students motivation and psychological need satisfaction in sport-based physical education. *Contemporary Educational Psychology*, *35*(4), 242–253. https://doi.org/10.1016/j.cedpsych.2010.05.005

Valenzuela, R., Codina, N., & Vicente Pestana, J. (2018). Self-determination theory applied to flow in conservatoire music practice: The roles of perceived autonomy and competence, and autonomous and

controlled motivation. *Psychology of Music*, *46*(1), 33–48. https://doi.org/10.1177/0305735617694502

van Yperen, N. W. (1998). Being a sport parent: Buffering the effect of your talented child's poor performance on his or her subjective well-being. *International Journal of Sport Psychology*, *29*(1), 45–56.

Vansteenkiste, M., Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick, *The decade ahead: Theoretical perspectives on motivation and achievement* (Vol. 16A, pp. 105–165). Bingley, UK: Emerald.

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280. https://doi.org/10.1037/a0032359

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology*, *96*(2), 236–250. https://doi.org/10.1037/0022-0663.96.2.236

Wuyts, D., Vansteenkiste, M., Mabbe, E., & Soenens, B. (2017). Effects of social pressure and child failure on parents' use of control: An experimental investigation. *Contemporary Educational Psychology*, *51*, 378–390. https://doi.org/10.1016/j.cedpsych.2017.09.010

Wylleman, P., Alfermann, D., & Lavallee, D. (2004). Career transitions in sport: European perspectives. *Psychology of Sport and Exercise*, *5*(1), 7–20. https://doi.org/10.1016/S1469-0292(02)00049-3

Zhou, M., Ma, W. J., & Deci, E. L. (2009). The importance of autonomy for rural Chinese children's motivation for learning. *Learning and Individual Differences*, *19*(4), 492–498. https://doi.org/10.1016/j.lindif.2009.05.003

CHAPTER 3

Strengthening the Assessment of Self-Talk in Sports Through a Multi-Informant Approach: Does Self-Reported Self-Talk Converge with Coded Verbally Expressed Thoughts?[1]

[1] De Muynck, G-J., Soenens, B., Delrue, J., Comoutos, N., & Vansteenkiste, M. (2018). Strengthening the assessment of self-talk in sports through a multi-informant approach: Does self-reported self-talk converge with coded verbally expressed thoughts?

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Although self-talk during competitive sports is common and predictive of athletes' motivation, experiences, and performance, it is difficult to assess self-talk accurately. An important, yet underexplored, next step in the assessment of self-talk is to rely on a multi-informant approach. The present study sought to examine whether tennis players' self-talk assessed either via self-reports or via a live-recorded procedure, would relate to each other. Competitive tennis players (N =120; M_{age} = 25.22; SD_{age} = 9.82) were asked to perform multiple tennis exercises while verbalizing their thoughts, which were audio recorded and subsequently coded. Prior to exercise engagement, they indicated their fear of failure, while after exercise engagement, they reported on their experienced pressure and self-talk using questionnaires. There was substantial correspondence between the coded and self-reported measurement, allowing the estimation of a latent factor representing a multi-informant assessment of self-talk. Moreover, both latent factors representing negative and positive self-talk were related to a hypothesized antecedent (i.e., fear of failure), with negative self-talk also relating to a hypothesized consequence (i.e., perceived pressure). Overall, the present study shows that athletes' self-talk can be measured reliably through different methods. Guidelines for the assessment of self-talk in future research are provided.

INTRODUCTION

When attending a tennis competition, one can often hear tennis players talking to themselves. Some of these self-verbalizations are positive, such as "Come on, you can do this!", whereas others are negative and even self-destructive, such as "You have already made this mistake a thousand times, what is happening?!". The stream of thoughts expressed by athletes to themselves while performing is referred to as self-talk (Hatzigeorgiadis, Zourbanos, Latinjak, & Theodorakis, 2014). Athletes often engage in inner or private speech through self-talk (Hardy, 2006) with the aim of regulating their attention, influencing their behavior (Meichenbaum, 1977) and ultimately optimizing their performance (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011). Athletes' self-talk is also intertwined reciprocally with their experienced affect (Hardy, Hall, & Alexander, 2001).

Scholars in the field of sports have devoted increasing attention to athletes' self-talk and thought-related processes more generally (Hardy, Oliver, & Tod, 2008). Although multiple measures are available (for an overview, see Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012), most of these measures are questionnaire-based. Because questionnaire-based measures could be biased or based on distorted recollections in athletes' memory, it is not clear whether such measures accurately reflect athletes' actual self-talk. Moreover, these measures primarily tap into the function or use of self-talk, rather than into the content of self-talk per se, thereby failing to capture what exactly athletes tell themselves (e.g., Hardy, Roberts, Thomas, & Murphy, 2010). One exception is the Automatic Self-Talk Questionnaire for Sports (ASTQS; Zourbanos, Hatzigeorgiadis, Chroni, Theodorakis, & Papaioannou, 2009), which taps into different types of self-talk and which has primarily been used as a self-report instrument. To date, the exact relationship between athlete self-reports of self-talk and objectively recorded and subsequently coded self-talk (hereafter called self-reported and coded self-talk, respectively) is unknown. To gain insight in the validity of self-report

measures of self-talk and to explore the usefulness of a multi-informant approach to the assessment of self-talk, the primary aim of the present contribution is to examine the convergence between self-reported and coded measures to tap into self-talk.

SELF-TALK: CONCEPTUALIZATION AND EFFECTS

Self-talk is defined as statements, phrases or cue words that are addressed to the self which might be said automatically or strategically, either out loud or silently, phrased positively or negatively, having an instructional or motivational purpose, an element of interpretation, and incorporating some of the same grammatical features associated with everyday speech (Hardy & Zourbanos, 2016). This encompassing definition indicates that self-talk can be classified along four different dimensions, that is, its origin, expression, functionality, and valence.

With respect to its origin, self-talk can emerge spontaneously, without other persons intervening, or it can be (experimentally) induced, with others asking athletes to use particular cues in a given situation (Hatzigeorgiadis, Zourbanos, & Theodorakis, 2007). Because of its direct practical value, the majority of studies to date examined whether training athletes to use particular self-talk cues fosters performance (for a meta-analysis, see. Hatzigeorgiadis et al., 2011). Such research does not require one to measure self-talk, as it suffices to include a manipulation check to examine whether athletes followed the experimental instructions regarding self-talk use.

As for its expression, self-talk can be expressed externally, in which case it is audible, or internally, in which case an inner voice inside athletes' mind expresses thoughts silently. Both internal and external self-talk can take the form of a statement (e.g., "I will have to bend my knees to a greater extent in order to get the ball over the net"), a phrase (e.g., "bend your knees") or a cue word (e.g., "knees").

Regarding functionality, self-talk is categorized as being either goal-directed or goal-undirected (Latinjak, Zourbanos, Lopez-Ros, &

Hatzigeorgiadis, 2014). Goal-directed self-talk is deliberately used to solve a problem or make progress on a task (Christoff, Gordon, & Smith, 2011). Athletes intentionally use this type of self-talk with the aim of enhancing their concentration, effort-expenditure, or performance (e.g., Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2014). Meta-analytic evidence confirms that the goal-directed use of self-talk is effective to enhance performance (Hatzigeorgiadis, et al., 2011), with a further differentiation being made between instructional and motivational self-talk (Kolovelonis, Goudas, & Dermitzaki, 2011; Theodorakis, et al., 2012). Whereas instructional self-talk is meant to prompt a more focused task-engagement, motivational self-talk is meant to encourage oneself to exert additional effort in the task at hand (Zourbanos, Hatzigeorgiadis, Bardas, & Theodorakis, 2013). Goal-undirected self-talk, on the other hand, refers to thoughts athletes experience almost automatically during sport participation and that do not necessarily have a deliberate purpose (Van Raalte, Cornelius, Copesky, & Brewer, 2014). Compared with goal-directed self-talk, goal-undirected self-talk is usually more reactive than proactive in nature. Van Raalte, Vincent, and Brewer (2016) related this distinction to the dual process theory (Kahneman, 2003; Stanovich & West, 2000). They suggested that goal-directed self-talk results from the slower, consciously monitored and decontextualized processing mechanism that relies on reasoning, while goal-undirected self-talk results from the fast, effortless, emotionally charged and contextualized processing mechanism that relies on intuition.

Finally, the valence of self-talk can be positive or negative. Positive self-talk refers to self-statements with a positive content, such as statements involving praise, encouragement, and instructions, whereas negative self-talk encompasses self-statements with a more negative content, such as statements involving criticism and self-preoccupation (Moran, 1996; Zourbanos et al., 2009). Past correlational research has especially examined the valence dimension of spontaneous self-talk. Positive self-talk was found to relate to more positive affective experiences during sport participation (Hardy et al.,

2001). In contrast, negative spontaneous self-talk, such as athletes' expression of worries (e.g., "During the game I had thoughts about previous mistakes I have made") or thoughts about disengagement (e.g., "During the game I had thoughts about stopping"), have been found to relate negatively to concentration in volleyball players (Hatzigeorgiadis & Biddle, 2001) and to impair performance in young tennis players (Van Raalte, Brewer, Rivera, & Petitpas, 1994). Note, however, that the valence of self-talk (i.e., negative or positive) should not be equated with its presumed effect as it has been argued that both positive and negative self-talk may have either a facilitative or a debilitative effect (Theodorakis et al., 2012). For instance, worrying thoughts related positively to effort among university volleyball players when performance expectancies were high, whereas they were related negatively to effort when performance expectancies were low (Hatzigeorgiadis & Biddle, 2001).

SELF-TALK MEASURES IN SPORT

Measuring athletes' spontaneous self-talk is difficult because athletes do not have perfect access to their cognitions, do not necessarily verbalize all inner thoughts, and may report cognitive activities on the basis of their likelihood instead of their actual occurrence (Dobson & Dozois, 2003). Nonetheless, a variety of self-reported and coded measures of self-talk have been developed (Theodorakis et al., 2012).

Two categories of self-report measures have been used, that is, thought listing procedures and self-statement inventories. Both types of measures require retrospective introspection. In the case of thought listing (Cacioppo, von Hippel, &Ernst, 1997; Cacioppo & Petty, 1981), athletes are asked to write down their most frequently experienced thoughts on a blank sheet of paper (e.g., Hardy, Gammage, & Hall, 2001). This procedure has been used in relation to a specific event, thus constituting a state-like measure, or it has been used to tap into athletes' thoughts during their sport participation more generally, thus constituting a more trait-like measure.

In the case of self-statement inventories, respondents are provided with several self-statements they need to rate in terms of frequency (e.g., Hatzigeorgiadis & Biddle, 2000). Although multiple self-report measures have been developed to tap into functions of spontaneous self-talk (e.g., Mahoney, Gabriel, & Perkins, 1987; Thomas, Murphy, & Hardy 1999), only two available measures tap directly into the content of athletes' spontaneous self-talk. The Thought Occurrence Questionnaire for Sports (Hatzigeorgiadis & Biddle, 2000) exclusively taps into negative self-talk during a particular game or competition. The Automatic Self-Talk Questionnaire for Sports (Zourbanos et al., 2009) is a more encompassing measure tapping into both negative and positive self-talk and tapping into thoughts athletes generally have during competitions (Zourbanos et al., 2011). In 3 samples, involving more than 1500 athletes from diverse team and individual sport disciplines, exploratory and confirmatory factor analyses pointed to two broader underlying self-talk categories, that is, negative and positive self-talk[2]. While negative self-talk consists of three subcategories, that is worrying thoughts, considerations about disengagement, and thoughts about somatic fatigue, positive self-talk consists of four subcategories, that is, confidence-related statements, self-instructions, thoughts related to control anxiety, and energizing statements for psyching up oneself. Correlations with a variety of measures in the nomological network of self-talk provided evidence for the validity of the questionnaire. Specifically, negative self-talk categories correlated positively with other self-report measures of negative self-talk (Hatzigeorgiadis & Biddle, 2000), with athletes' perceived anxiety, concentration disruption (Smith, Smoll, & Schutz, 1990), and boredom (Kakkos & Zervas, 1997). Furthermore, negative self-talk yielded negative relations with self-report measures of positive self-talk (Thomas et al., 1999),

[2] In addition to these two broad categories, a third category could be identified, constituting irrelevant thoughts. Irrelevant thoughts are sometimes viewed as a category on their own, constituting neutral self-talk. However, due to its positive correlations with negative self-talk, it is also sometimes incorporated in neutral self-talk. In the current study, these irrelevant thoughts are not taken into account.

as well as with athletes' perceived competence (Smith et al., 1990) and vigor (Kakkos & Zervas, 1997). A similar, yet opposite, pattern of correlations was found for positive self-talk.

Additional research using the ASTQS also examined potential contextual (e.g., coach behaviors) and personal (e.g., goal strivings) antecedents of self-talk. In general, supportive coach behaviors (e.g., displaying confidence) were positively related to positive self-talk, while relating negatively to negative self-talk. These relationships were found among young-adult wrestlers (Zourbanos, Hatzigeorgiadis, Tsiakaras, Chroni, & Theodorakis, 2010), in heterogeneous samples of young-adult athletes participating in individual and team sports (Zourbanos et al., 2011), and among adolescent soccer players (Zourbanos, et al., 2016).

Fear of failure, referring to the disposition to avoid incompetence because of the anticipated shame and humiliation upon failing (Atkinson, 1957), constitutes a viable personal antecedents of self-talk that is understudied up to date. Fear of failure has been found to relate to elevated psychological stress and increased burnout in competitive junior athletes (Gustafsson, Sagar, & Stenling, 2017). Moreover, it has been reported as one of the major sources of stress among sport performers (Hardy, 1992). Regarding self-talk, positive relationships between fear of failure and negative self-talk subcomponents such as self-blame, self-attack, and self-neglect were consistently found (Conroy & Coatsworth, 2007; Conroy & Metzler, 2004). However, the findings regarding positive self-talk were more mixed, with some subcategories, such as self-affirm (corresponding with confidence from the self-talk categorization used in the current study) relating negatively and others, such as self-control, (which corresponds to instructions) relating positively to fear of failure (Conroy & Metzler, 2004). Unfortunately, no study to date relied on the self-talk categorization of the ASTQS to identify relations with fear of failure, a gap this study aims to fill.

Because only athletes have access to their own thoughts, questionnaires seem the pre-eminent method to tap into inner speech (De

Guerrero, 2005). However, due its retrospective nature, questionnaires fail to capture ongoing fluctuations in self-talk (Caciaoppo & Petty, 1981). Also, questionnaires necessarily rely on memory, such that some thoughts may be forgotten or recalled inaccurately. To illustrate, athletes may access, respectively, positive and negative thoughts more easily after winning versus losing a competition, thus leading to biased recall of inner speech.

To overcome some of the disadvantages of questionnaire-based measurements, objectively-recorded and subsequently coded measures have been proposed, aiming to capture self-talk in vivo during sports activities. Rather unfortunately, this method is seldom used in self-talk research. One such coded self-talk measure relies on live voice recordings of incoming thoughts (Genest & Turk, 1981). In this case, participants are prompted through a thinking aloud procedure to verbalize all incoming thoughts, which are then audiotaped for subsequent evaluation. This procedure allows one to capture fluctuations in self-talk during the activity itself and enhances athletes' awareness of their thoughts, which facilitates its expression (Blackwell, Galassi, Galassi, & Watson, 1985). While such a coded measure can serve to strengthen the assessment of self-talk, no studies to date actually examined the convergence between self-reported and coded self-talk nor the possibility of modeling the common variance between both methods as a multi-informant assessment of self-talk.

THE PRESENT STUDY

To examine the validity of self-report measures of self-talk and to explore the possibility of a multi-informant approach to the assessment of self-talk, the present study sought to complement tennis players' self-reported self-talk with coded self-talk. We sampled tennis players as they are known to talk fairly often to themselves, presumably because tennis is a technical and individual sport with repetitive small breaks between consecutive rallies and games (Van Raalte et al., 1994). We used the ASTQS as a self-report measurement, as it is the most encompassing measure of spontaneous self-talk

available. We slightly adapted the stem of the questionnaire in order to refer to self-talk used in a particular moment, rather than self-talk generally used during competitions. This was done to ensure that both self-reported and coded self-talk had the same frame of reference. For coded self-talk, we used a thinking aloud procedure to prompt the verbalization of self-talk (Blackwell et al., 1985).

The study aimed to examine the degree of correspondence between self-reported and coded self-talk in two ways. First, we aimed to inspect correlations of self-reported positive and negative categories of self-talk and the corresponding categories of coded self-talk. Second, using principal component analysis we examined whether self-reports and coded ratings of negative self-talk categories would load on one factor, while self-reports and coded ratings of positive self-talk categories would load on a distinct factor.

When the convergence between self-reported and coded self-talk is sufficiently high, it becomes possible to estimate a latent variable representing the variance shared between the two methods. This common variance can be assumed to represent a more valid assessment of the 'real' degree of self-talk athletes engage in, compared to an assessment based only on self-reports or coding. Research in other areas of research such as parenting (e.g., Simons, Whitbeck, Conger, & Wu, 1991) and problem behaviors (e.g., Kerr, Lunkenheimer, & Olson, 2007) has shown that it is indeed possible to capture the variance common to different methods through a latent factor, if at least there is sufficient convergence between methods, and that this latent factor relates to external variables in theoretically meaningful ways. When such a latent factor relates to hypothesized external variables, researchers are more confident that the relationships indicate true effects because the latent factor represents the variance shared by different methods rather than the variance unique to each method, with the latter variance representing bias and limitations inherent in each method.

The present study is the first to examine whether self-reported and coded assessments of self-talk can be combined into a latent factor and

whether such a latent factor relates to a hypothesized antecedent and consequence in expected ways. Specifically, we focused on fear of failure as a presumed personal antecedent of self-talk and on perceived pressure during the activity as a presumed affective consequence of self-talk. For negative self-talk, we hypothesized a negative relationship with fear of failure and a positive relationship with perceived tension. For positive self-talk, no clear hypotheses were put forward as some subcategories were previously found to relate negatively, while others related positively to fear of failure. With regard to reported stress after activity engagement, a null or negative relationship was assumed.

METHOD

PARTICIPANTS

Data for the current study were collected as part of an experimental study, the findings of which have been reported before (De Muynck et al., 2017)[3]. Participants were 120 competitive Belgian tennis players between 13 and 51 years of age (M = 25.22; SD = 9.82). The sample comprised 81 male (67.5%) and 39 (32.5%) female tennis players. Seventy players were lowly ranked (58.3%), 28 were middle ranked (23.3%), and 22 (18.4%) had a high national ranking. Participants practiced on average 3 hours a week, with some

3 The current study presents results based on a sample that was also used in another publication (cf., Chapter 4). Chapter 4 focuses on the effects of manipulated feedback valence (positive vs. negative) and style (inviting vs. coercive) on tennis players' enjoyment, perseverance and performance, with basic psychological need satisfaction and self-talk as intervening variables. As the effects of feedback valence and style are discussed in Chapter 4, none of these are mentioned in the current paper. The originality of the current paper is further evident in (a) using none of the variables reported in Chapter 4, except for self-talk. (b) the focus of the current paper on different self-talk measurement procedures, their underlying factor structure and correspondence, instead of focusing on feedback effects. Hereby, both the questionnaire-based and objectively-recorded questionnaire are uniquely used in this chapter.

tennis players not practicing on a weekly basis and others practicing up to 16 hours weekly.

PROCEDURE

Tennis players were recruited from 12 different tennis clubs in Flanders, the Dutch Speaking part of Belgium. Initially, tennis coaches were contacted, informed about the scope of the study and invited to participate. Coaches who agreed to participate signed an informed consent form and arranged contact with tennis players they coached. Subsequently, tennis players were informed about the study and those willing to participate signed an informed consent form. For underage participants, active informed consent from a parent or guardian was also obtained. The research ethics committee of Ghent University approved the study.

Upon agreement of all people involved, tennis players participated in a two-phase experimental design. The pre-experimental phase involved filling out a questionnaire tapping into participants' background characteristics and achievement motivation, whereas the experimental phase, taking place at least one day later, involved performing two tennis exercises and receiving manipulated feedback from the experimenter (see De Muynck et al., 2017). Directly following completion of these exercises, participants filled out a questionnaire tapping into their self-talk and perceived pressure during the exercises.

The experimental phase was performed individually and took place at the tennis club of the participant. The tennis exercises involved hitting balls coming from a tennis ball machine towards a court divided into different zones. Forehands and backhands were performed in a random order held constant across participants. Awarded points for each stroke depended on the zone in which the ball bounced for the first time, with most points being earned for strokes close to the baseline. During play, the thinking aloud paradigm was implemented to prompt self-talk by asking tennis players to verbalize all of their thoughts. Verbalizations were audio-recorded by

attaching a voice-recorder to their non-dominant upper arm. More detailed information about the experimental set-up is available from the first author upon request (see also De Muynck et al., 2017).

Upon arrival at the tennis club, participants were instructed about the goal of the tennis exercise and asked to verbalize their thoughts so that they could be recorded by a voice recorder attached to the non-dominant upper arm. They were also informed that they would receive performance feedback following each of the two tennis exercises, with their performance being compared to other tennis players of their age and skill level. Following the instructions, tennis players performed an exercise trial of ten strokes as means of warming up and familiarization with thought verbalization. At the end of this trial, tennis players were provided the opportunity to ask questions in case something was unclear. Participants then performed the first tennis exercise, encompassing six rallies of ten strokes each. Subsequently, tennis players gathered the balls and received condition-congruent manipulated feedback (see De Muynck et al., 2017). After two minutes of rest, participants engaged in a second tennis exercise, which also comprised six rallies of ten strokes each, but on a higher difficulty level. The difficulty of the tennis exercises was adjusted according to the skill level of the tennis players as to ensure that the exercises were equally challenging for all participants. This was done by increasing the width or power of the tennis balls fired from the ball machine and by reducing the time between consecutive strokes. After completion of the second exercise, participants again received condition-congruent manipulated feedback.

Following the second feedback delivery, tennis players were presented the opportunity to perform a third exercise. If they decided to continue playing, they could choose the difficulty level of the last exercise themselves. This so called free choice paradigm (Deci, Koestner, & Ryan, 1999) was used as a behavioral measure of perseverance and was reported by De Munyck et al. (2017). Finally, at the end of the tennis exercises tennis players completed a questionnaire tapping into their engaged self-talk and

perceived pressure during the second exercise. Upon completion of the self-report questionnaire, participants were individually debriefed, revealing the deception with manipulated feedback, and thanked for their participation.

MEASUREMENTS

Coded Self-Talk. Athletes objectively-recorded self-talk was transcribed verbatim and categorized according to the classification of the ASTQS (Zourbanos et al., 2009) by two independent coders familiar with the self-talk literature. For each participant, expressed self-talk was divided in separate statements, which were subsequently grouped in one out of seven self-talk subcategories using the MAXQDA 11 software. As such, the coded positive self-talk indicator reflects the amount of participants' confidence related statements, self-instructions, thoughts related to control anxiety and energizing statements. Similarly, negative coded self-talk represents the frequency of worrying thoughts, considerations of disengagement and thoughts about somatic fatigue participants' verbalized. The seven subcategories were treated as mutually exclusive, so that statements could not be grouped in multiple self-talk subcategories. Because inter-rater reliability after coding one third of the participants was very good (κ = .83), only one coder categorized the self-talk of the remaining two-thirds of the participants.

A principal component analysis (PCA) with promax rotation on the seven coded self-talk subcategories showed a two-factor structure underlying coded self-talk, which could clearly be interpreted as positive and negative self-talk. Factor loadings varied between .56 and .78, with no cross loadings emerging. In total, these two factors explained 51.1% of the variance.

Self-Reported Self-Talk. The ASTQS (Zourbanos et al., 2009) was slightly adapted to fit within the tennis context and administered to participants upon completion of the tennis exercises. Participants indicated the frequency with which they had experienced each of the self-statements during the second tennis exercise on a five-point Likert scale ranging from 0 (Seldom) to 4 (Often). Four categories of positive self-talk were assessed:

confidence refers to self-statements assuring being skilled and in a state of readiness (5 items; e.g., "I believe in my abilities"; α = .81). Instruction entails statements in which athletes remind themselves to focus on technique or the task at hand (5 items; e.g., "focus on what you need to do now"; α = .73), while in the case of anxiety control, athletes instruct themselves to overcome anxiety symptoms or to achieve desired cognitive and emotional states (4 items; e.g., "Relax"; α = .71). Finally, psych up includes self-statements reflecting energizing oneself and maximizing effort (5 items; e.g., "Do your best"; α = .61). The internal reliability of the global self-reported positive self-talk indicator, encompassing all 19 items of the four subcategories described above was good (α = .78)

Negative self-talk encompasses three categories. Worries refer to statements indicating fear of not reaching goals and negative evaluations of their own performance (7 items; e.g., "I am not going to reach my goal"; α = .86). Disengagement includes withdrawal-related self-statements, indicating that it might be better to stop the activity at hand (5 items; e.g., "I think I'll stop trying"; α = .61). Finally, somatic fatigue encompasses self-statements reflecting athletes' experience of tiredness and unpleasant bodily sensations (5 items; e.g., "I am tired"; α = .71). The internal reliability of the global self-reported negative self-talk indicator, encompassing all 17 items of the three subcategories described above was good (α = .91).

To examine the underlying factor structure of self-reported self-talk, a second order PCA was performed on the subcategory scores (e.g., confidence, worries,…). Results showed that two factors should be retained, explaining in total 69.9% of the variance. These factors could clearly be interpreted as positive and negative self-talk, with factor loadings ranging from .74 to .84, with one negative cross loading, -.50, being evident for confidence and negative self-talk.

Fear of Failure. To tap into their fear of failure, participants filled out the fear of failure scale from the shortened Achievement Motives Scale (AMS; Fries & Lang, 2006). This scale (α = .80) included five items rated on

a four point Likert scale ranging from 1 (totally disagree) to 5 (totally agree). An example item is "I feel uneasy to do something if I am not sure of succeeding".[4]

Perceived Tension. The pressure/tension subscale from the Intrinsic Motivation Inventory (IMI; Ryan, 1982) was used to tap into participants' perceived pressure during the second tennis exercise. This subscale included 5 items that were slightly adapted to the tennis context (e.g., "I felt anxious during the second tennis exercise"). All items were scored using a five-point Likert scale ranging from 1 (Totally disagree) to 5 (totally agree). Reliability analyses showed good internal consistency (α = .75).

RESULTS

CORRESPONDENCE BETWEEN THE TWO METHODS FOR ASSESSING SELF-TALK

To examine the correspondence between different self-talk measures, self-reported positive and negative self-talk subcategories were related to their parallel categories of coded self-talk[5]. As can be noticed in Table 1, both assessment procedures clearly corresponded, with correlations between the corresponding self-reported and coded self-talk category being significant and ranging between .26 and .37 (average r = .30). The only exception concerns the psych-up category, for which a non-significant association was found.

To further address the correspondence between both assessment procedures, we examined whether self-reports and ratings of negative self-talk categories would load on one factor, while self-reports and ratings of positive self-talk categories would load on a distinct factor when entered together in a

[4] Although need for achievement was also measured, it turned out unrelated to any of the other variables in the current study. For reasons of clarity, need for achievement was excluded in the remainder of the chapter.

[5] Means and Standard deviations for the specific self-talk subcategories can be found in Supplementary Table 1.

Principal Components Analysis. Although confirmatory factor analytic methods are generally advised to identify the structure and relationships between latent constructs (Floyd & Widaman, 1995), the sample size of the current study was too small (i.e., below the absolute minimum ratio of 5 participants per estimated parameter; Kline, 2005) to perform a CFA. When CFA is not feasible, PCA is believed to be a useful alternative method to identify the numbers of factors that should be interpreted (Kline, 2005; Tabachnick & Fidell, 1996).

Table 1. Correlations between Multiple Self-Talk Measurement Procedures

	1	2	3	4	5	6	7	8	9
1. Positive self-talk	**.33****	.74**	.79**	.51**	.78**	-.02	-.05	-.13	.09
2. Confidence	.74**	**.32****	.39**	.42**	.36**	-.12	-.12	-.11	-.01
3. Instructions	.79**	.39**	**.37****	.45**	.42**	-.10	-.11	-.09	.01
4. Anxiety control	.77**	.37**	.51**	**.35****	.20*	.14	.15	.03	.04
5. Psych up	.82**	.49**	.56**	.55**	**.11**	.12	.08	-.12	.19*
6. Negative self-talk	.14	-.28**	.17	.31**	.28**	**.41****	.92**	.38**	.50**
7. Worries	.24**	-.16	.24**	.36**	.33**	.92**	**.36****	.25**	.14
8. Disengagement	.06	-.26**	.07	.26**	.17	.82**	.65**	**.37****	.15
9. Somatic fatigue	-.02	-.36**	.06	.11	.14	.78**	58**	.49**	**.26****

Note**.** Upper half of the table shows correlations for coded self- talk.
Lower half of the table shows correlations for self-reported self-talk.
The diagonal of the table shows the correspondence between both self-talk measurements.
* $p < .05$; ** $p < .01$

Because we expected both factors to be related (Delrue et al., 2016), Promax rotation was used. Inspection of the scree plot indicated that both a two- and three-component solution was plausible. While the three-component solution was more difficult to interpret, the two-component solution, explaining 44.3% of the variance, comprised a factor including all self-reported and coded components of positive self-talk and a factor including all self-reported coded components of negative self-talk. The only exception to this pattern was the coded indicator of somatic fatigue, which loaded on neither of the two components (see Table 2). Because the two components were generally content-based, rather than method-based, this analysis provided further support for the convergence between different methods to assess dimensions of self-talk.[6]

[6] In addition to the PCA a Multi-Trait-Multi-Method (MTMM) model (Kenny & Kashy, 1992) using Structuring Equations Modeling (SEM) was performed in MPlus (Muthén & Muthén, 2010). In this model, two latent method factors (i.e., questionnaire based self-talk and coded self-talk) and two latent traits (i.e., positive and negative self-talk) were created. Both positive and negative questionnaire-based self-talk subcomponents (e.g., confidence, worries) were used as indicators for a latent questionnaire-based method variable. Likewise, all coded self-talk subcomponents served as indicators for a latent observed self-talk indicator. With regard to the latent traits, both questionnaire-based and thinking-aloud measures of confidence, instruction, anxiety control, and psych up were used as indicators of a latent positive self-talk variable. Similarly, both type of measurements for worries, disengagement, and somatic fatigue were used as indicators of a latent negative self-talk variable. Unfortunately, this model could not reach convergence, a problem often associated with MTMM models (Kline, 2005). A possible alternative for MTMM-models, is a Correlated Uniqueness (CU) model. In this kind of model, only latent trait variables are created, with all error terms of the same measurement set to inter-correlate (Kline, 2005). As this model includes 42 intercorrelations between error terms, in addition to 16 paths between indicators and latent variables, a minimal sample size of 280 persons is required (i.e., 5 for each path; Kline, 2005), which we did not have. Therefore, we concluded that CFA on the current dataset is not feasible.

Table 2. Pattern Matrices for the Three Self-Talk Measurement Procedures

	Positive self-talk	Negative self-talk
Psych up		
Self-reported	.61	
Coded	.48	
Anxiety control		
Questionnaire	.67	
Coded	.59	
Instructions		
Questionnaire	.75	
Coded	.62	
Confidence		
Questionnaire	.64	-.42
Coded	.61	
Worries		
Questionnaire		.78
Coded		.63
Disengagement		
Questionnaire		.77
Coded		.53
Somatic fatigue		
Questionnaire		.81
Coded		
Explained variance	23.88	20.43

Because both self-reported and coded self-talk measures show considerable interrelationships between the corresponding self-talk categories, and are grouped content-wise when entered simultaneously in a PCA, it was considered possible to estimate a latent factor representing positive and negative self-talk on the basis of self-reported and coded indicators, thus constituting a multi-informant indicator. To test this possibility, we relied on Structural Equation Modeling (SEM) with latent variables. The descriptive statistics and correlations between the variables involved in this SEM-model are shown in Table 3.[7]

Table 3. Descriptive Statistics and Correlations between the Variables Involved in the SEM-Model

	M	SD	Range	1	2	3	4	5
1. SR negative self-talk	1.06	.73	.06 - 3.94					
2. CO negative self-talk	7.83	5.83	0 - 31	.26**				
3. SR positive self-talk	2.15	.64	.26 - 3.32	.14	.04			
4. CO positive self-talk	22.30	18.05	0 - 94	.01	-.02	.33**		
5. Fear of failure	2.20	.62	1 - 4	.12	.06	.19*-	-.03	
6. Tension	2.20	.81	1 – 4.60	.29**	.22*	.21*	-.02	.30**

Note. CO = Coded self-talk indicator, SR = Self-reported self-talk indicator.
* p <.05; **p <.01

[7] Supplementary Table 2 provides additional information about how different measures of self-talk (sub)components relate to external variables.

RELATIONSHIPS FOR A MULTI-INFORMANT MEASURE OF SELF-TALK

MPlus 7 (Muthén & Muthén, 2010) was used to conduct the SEM-analyses regarding the interrelationships between fear of failure, self-talk, and perceived tension. The solutions were generated on the basis of maximum likelihood estimation. Four latent variables were constructed, two of them relying on item parceling. Both fear of failure and perceived tension were modelled by three parcels. As items stemmed from a common pool, random parceling was used, resulting in balanced factor loadings because the parcels contain roughly equal amounts of common factor variance (Little, Cunningham, Shahar, & Widaman, 2002). Both negative and positive self-talk were modelled by the standardized scores of their respective self-reported and coded indicator. Goodness of fit was evaluated using the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the comparative fit index (CFI). Combined cut-off scores of .06 for RMSEA, .08 for SRMR, and .95 for CFI were used as criteria for good fit (Hu & Bentler, 1999).

First, the measurement models goodness of fit was examined using a confirmatory factor analysis modelling the four study variables using ten indicators in total. Results showed a good fit ($\chi 2(30) = 34.03$; $p = .28$; RMSEA = .03; SRMR = .05; CFI = .98) with all indicators loading moderately to strongly on the latent factors, ranging from .39 to .96 (mean $\lambda = .68$; all $p < .001$). Second, fear of failure and perceived tension were modelled as, respectively, an antecedent and outcome of both positive and negative self-talk. In doing so, a total of eighteen parameters had to be estimated, resulting in approximately seven participants per sample, which is considered sufficient (Kline, 2005). Results regarding this structural model showed a good fit ($\chi 2(32) = 40.67$; $p = .14$; RMSEA = .05; SRMR = .06; CFI = .97), with all paths except the path from positive self-talk to perceived tension being significant (see Figure 1). Finally, tests of indirect effects showed that negative ($\beta = .20$, $p = .03$), but not positive ($\beta = .03$, $p = .32$) self-talk

functioned as an intervening variable between tennis players fear of failure and experienced tension.

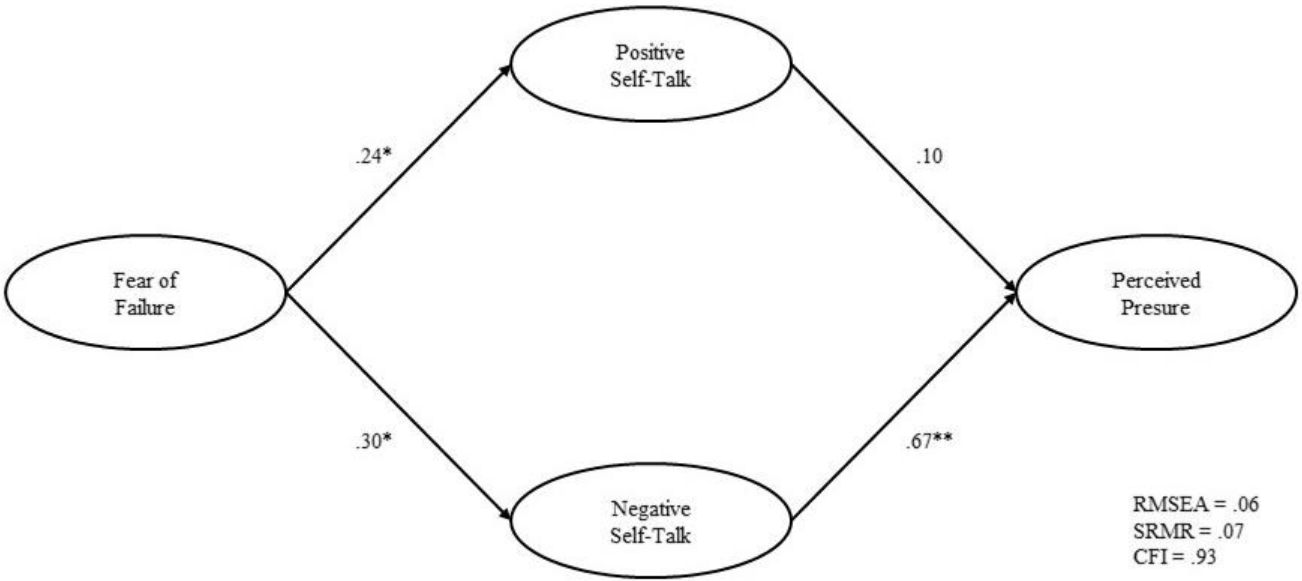

Figure 1. Structural model tested in SEM analysis. *$p < .05$, **$p < .01$

DISCUSSION

Self-talk is found to be intertwined with athletes' emotional and motivational functioning, while also relating to participants' performance (De Muynck et al., 2017; Hardy, Oliver, & Tod, 2009). Given the central role self-talk plays in athletes' sport experiences, developing valid measures of athletes' spontaneous self-talk is an important endeavor. To date, the ASTQS is one of the most frequently used and most encompassing instruments to tap into athletes' self-talk during sport participation (Zourbanos et al., 2009). Rather unfortunately, it is unknown whether athletes' disclosed thoughts on a self-report measure correspond with what they effectively said to themselves in reality. Therefore, an important aim of the present study was to examine whether athletes' self-reported and actual verbally expressed thoughts correspond with one another during a specific event. Indeed, this is a pressing issue as questionnaire-based measures, because of their retrospective nature, risk being incomplete or athletes may be prone to biased recall when completing self-reports. To achieve this aim regarding measurement correspondence, we first attempted to relate questionnaire-based self-talk subcategories with their coded counterparts. Second, we sought to establish evidence for a content-based, rather than method based underlying factor structure when both self-reported and coded self-talk subcategories were taken into account simultaneously. Finally, the current study explored the relationships between a multi-informant assessment procedure of self-talk, and fear of failure and perceived pressure, as a presumed personal antecedent and an affective consequence of self-talk, respectively.

CORRESPONDENCE BETWEEN SELF-TALK ASSESSMENT METHODS

With regard to the correspondence between parallel self-talk subcategories, results showed that relationships between different measurements of the same self-talk category can be considered as medium (Cohen, 1988) or even large (Hemphill, 2003). This finding indicates that self-

reported indicators of self-talk can retrospectively capture what tennis players truly tell to themselves during a particular event.

The only exception for this finding was that no correspondence was found for psyching up. One possible explanation is that for this category, an actor-observer bias might be at play, suggesting that athletes and coders perceive the same situation differently (Jones & Nisbett, 1971). This is because observers have access only to a limited portion of information available to actors, thereby for example not being able to assess intentions. Indeed, previous research indicated that self-talk ratings made by participants were similar but distinct from those made by researchers reading self-talk transcripts or listening to audio recordings (Van Raalte, Cornelius, Copesky, & Brewer, 2014), with correspondence being especially low for motivational self-talk. Although self-talk content and function should not be equated, psych-up clearly has a motivational component. An avenue for future research is to ask participants to code their own audiotaped self-talk as to examine whether self-reported psych-up self-talk and participant-coded psych-up self-talk does correspond to a greater extent, indicating that an actor-observer bias was at play in the current study.

Besides having indicated that different measures of the same self-talk subcategory moderately relate to one another, the current study further supported the correspondence of different self-talk measures by a PCA involving a combination of self-reported and coded self-talk categories. Rather than different categories clustering together as a function of the assessment method, they fell apart in terms of valence, with both self-reported and coded positive self-talk categories loading on a first factor and self-reported and coded negative self-talk categories loading on a second factor.

A MULTI-INFORMANT MEASURE TO CAPTURE SELF-TALK

Knowing that different self-talk assessment procedures show good correspondence and result in a content-based factor structure when combined, a multi-informant measure of positive and negative self-talk was created and

interrelationships with external variables were examined. This multi-informant measure of self-talk can be considered as a more valid representation of the self-talk athletes engage in, because it reflects the shared variance between two complementary assessment methods (Lodge, Tripp, & Hart, 2000). In general, hypotheses regarding the convergent validity were supported. The more fear of failure tennis players reported before performing the tennis exercises, the more negative self-talk they used during play and the more tension they reported afterwards. Hereby, negative self-talk functioned as a mechanism through which fear of failure impacted on tennis players' experienced tension. Although fear of failure did also increase participants positive self-talk, positive self-talk was unrelated to perceived tension. At first sight, the positive relation between fear of failure and positive self-talk might be somewhat surprising, as positive self-talk is usually positively related to beneficial variables (e.g., Zourbanos et al., 2015, Zourbanos, Hatzigeorgiadis, & Theodorakis, 2007). However, previous studies also suggested that positive self-talk can serve as a way of coping (Delrue et al., 2016), a reasoning that is further supported by the analyses on positive self-talk subcategories. These indicated that anxiety control is the only subcomponent of positive self-talk that relates to fear of failure.

By relying on the ASTQS for examining the underlying factor structure and interrelationships of different self-talk measurement methods, the current study also provided additional evidence for this questionnaire. Middle to large interrelationships between the self-reported and coded self-talk add to the concurrent validity of the instrument, whereas the correlations of self-reported, coded, and multi-informant self-talk measures with fear of failure and perceived pressure underscore the convergent validity of the original instrument.

PRACTICAL IMPLICATIONS AND LIMITATIONS

The findings of the current study carry multiple practical considerations for researchers and practitioners alike regarding choice of

assessment procedure. For researchers, findings advocate the use of a multi-informant measure whenever possible, because it only takes the shared variance between different assessment methods into account, and, as such, probably is the cleanest representation of athletes' self-talk. Additionally, the measure allows the strengths of the one assessment method to compensate for the limitations of the other and vice versa. Specifically, the live-recordings are not prone to memory bias, whereas the questionnaire-based procedure allows participants to report self-talk that was not verbalized, as thinking aloud is sometimes considered hard to do (Kendall & Chansky, 1991). A multi-informant measure is therefore considered to be a more valid measure of self-talk, as procedure-specific biases are filtered out of the self-talk indicator. A multi-informant measure is also beneficial when interested in the possible mediating role of self-talk because, in doing so, self-talk is (at least partly) measured in between measurements of independent and dependent variables (see for example De Muynck et al., 2017).

However, it is not always possible to acquire a multi-informant measure of self-talk. For example, if researchers are interested in investigating competitive athletes' self-talk during competition, where thinking aloud procedures are undesirable and attaching voice recorders sometimes even unfeasible, the creation of a multi-informant indicator of self-talk is impossible. Likewise, in case of great sample sizes or limited resources, the coding process might be to time- or budget consuming. In such a case, findings of the current study also show that researchers can confidently rely on self-report measures of self-talk, as they show substantial convergence with athletes' verbally expressed thoughts during a sport performance. Finally, some specific research questions also call for the use of live recordings. For example, when researchers are interested in self-talk fluctuations, using live-recordings might be most appropriate as participants do not have to complete the same questionnaire over and over again in this case, risking reporting self-talk of a previous time-interval in a subsequent measure.

Findings of the current study also have practical value for practitioners. Sport psychology consultants do not necessarily have to attend practices or being able to hear athletes during competition in order to determine the self-talk they used during that event. Asking athletes to fill in a state-based questionnaire of the ASTQS suffices and is much less time-consuming compared to the transcribing and coding of objectively-recorded self-talk. Furthermore, the questionnaire can serve as a valuable tool to verify coaches' suspicion about a specific athlete using excessive negative self-talk. Due to its more time consuming nature and the need for statistical transformation, the multi-informant measure is much less useful for practitioners.

As for the limitations, the generalizability of the current findings is limited because only Flemish competitive tennis players were sampled. It remains unclear if a similar factor structure of both state-like questionnaire-based self-talk and observed self-talk can be found in other sports. Similarly, future research also need to address if the results holds true in different cultures. Previous research already indicated that negative self-talk had more beneficial effects for East Asian, compared to European participants (Peters & Williams, 2006). As such, antecedents and consequences of self-talk might differ regarding the cultural background of participants.

Second, PCA's were used to examine the factorial structure of the different self-talk measurement procedures. Although confirmatory factor analyses (CFA) might be considered more robust to this end (Floyd & Wildaman, 1995), the sample size of the current study was insufficient. In our defense, we believe that gathering a sufficiently large sample size for this aim is infeasible because transcribing and coding the objectively-recorded self-talk is a time-consuming endeavor.

CONCLUSION

The current study showed that different self-talk assessment methods produce a content-based, rather than method-based factor structure, and indicated that tennis players' questionnaire-based self-talk corresponds with what they actually tell themselves during play. A multi-informant measure, representing the shared variance between both assessment procedures, related to external variables (i.e., fear of failure and perceived tension) in theoretically sound ways. As such, these findings allow researchers and practitioners to tailor self-talk measures to the particular purpose of their study or intervention, thereby taking particular strengths and pitfalls of the different methods into account.

REFERENCES

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, *64*(6, Pt.1), 359–372. https://doi.org/10.1037/h0043445

Blackwell, R. T., Galassi, J. P., Galassi, M. D., & Watson, T. E. (1985). Are cognitive assessment methods equal: A comparison of think aloud and thought listing. *Cognitive Therapy and Research*, *9*(4), 399–413. https://doi.org/10.1007/BF01173089

Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment: The thought-listing technique. In X. V. Merluzzi, C. R. Glass, & M. Genest (Eds.), *Cognitive assessment* (pp. 309–342). New York, NY, US: Guilford Press.

Cacioppo, J. T., von Hippel, W., & Ernst, J. M. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology*, *65*(6), 928–940.

Christoff, K., Gordon, A., & Smith, R. (2011). The role of spontaneous thought in human cognition. In *Neuroscience of decision making* (pp. 259–284). New York, NY, US: Psychology Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, N.J: Routledge.

Conroy, D. E., & Metzler, J. N. (2004). Patterns of self-talk associated with different forms of competitive anxiety. *Journal of Sport & Exercise Psychology*, *26*(1), 69–89. https://doi.org/10.1123/jsep.26.1.69

Conroy, David E., & Coatsworth, J. D. (2007). Coaching behaviors associated with changes in fear of failure: Changes in self-talk and need satisfaction as potential mechanisms. *Journal of Personality*, *75*(2), 383–419. https://doi.org/10.1111/j.1467-6494.2006.00443.x

De Guerrero, M. C. M. (2005). Methodology of research on inner speech. In *Inner Speech — L2: Thinking words in a second language* (pp. 89–

118). Springer, Boston, MA. https://doi.org/10.1007/0-387-24578-2_4

De Muynck, G.-J., Vansteenkiste, M., Delrue, J., Aelterman, N., Haerens, L., & Soenens, B. (2017). The effects of feedback valence and style on need satisfaction, self-talk, and perseverance among tennis players: An experimental study. *Journal of Sport & Exercise Psychology*, *39*(1), 67–80. https://doi.org/10.1123/jsep.2015-0326

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, *125*(6), 627–668. https://doi.org/10.1037//0033-2909.125.6.627

Delrue, J., Mouratidis, A., Haerens, L., De Muynck, G.-J., Aelterman, N., & Vansteenkiste, M. (2016). Intrapersonal achievement goals and underlying reasons among long distance runners: Their relation with race experience, self-talk, and running time. *Psychologica Belgica*, *56*(3), 288–310. https://doi.org/10.5334/pb.280

Dobson, K.S., & Dozois, D.J.A. (2003). Historical and philosophical bases of the cognitive-behavioral therapies. In K.S. Dobson (Ed.), *Handbook of cognitive-behavioral therapies* (2nd ed., pp. 4–39). New York: The Guilford Press.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, *7*(3), 286–299. https://doi.org/10.1037/1040-3590.7.3.286

Genest, M., & Turk, D. C. (1981). Think-aloud approaches to cognitive assessment. In X. V. Merluzzi, C. R. Glass, & M. Genest (Eds.), *Cognitive assessment* (pp. 233–269). New York, NY, US: Guilford Press.

Gustafsson, H., Sagar, S. S., & Stenling, A. (2017). Fear of failure, psychological stress, and burnout among adolescent athletes competing in high level sport. *Scandinavian Journal of Medicine &*

Science in Sports, *27*(12), 2091–2102. https://doi.org/10.1111/sms.12797

Hardy, J. (2006). Speaking clearly: A critical review of the self-talk literature. *Psychology of Sport and Exercise*, *7*(1), 81–97. https://doi.org/10.1016/j.psychsport.2005.04.002

Hardy, J., Gammage, K., & Hall, C. (2001). A descriptive study of athlete self-talk. *Sport Psychologist*, *15*(3), 306–318. https://doi.org/10.1123/tsp.15.3.306

Hardy, J., Hall, C. R., & Alexander, M. R. (2001). Exploring self-talk and affective states in sport. *Journal of Sports Sciences*, *19*(7), 469–475. https://doi.org/10.1080/026404101750238926

Hardy, J., Oliver, E., & Tod, D. (2009). A framework for the study and application of self-talk within sport. In S. D. Mellalieu & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 37–74). London, UK: Routledge.

Hardy, James, & Zourbanos, N. (2016). Self-talk: Where are we now? In R. J. Schinke, K. R. McGannon, & Smith (Eds.), *Routledge international handbook of sport psychology* (pp. 449–459). Oxfordshire, UK: Routledge.

Hardy, L. (1992). Psychological stress, performance, and injury in sport. *British Medical Bulletin*, *48*(3), 615–629. https://doi.org/10.1093/oxfordjournals.bmb.a072567

Hardy, Lew, Roberts, R., Thomas, P. R., & Murphy, S. M. (2010). Test of performance strategies (TOPS): Instrument refinement using confirmatory factor analysis. *Psychology of Sport and Exercise*, *11*(1), 27–35. https://doi.org/10.1016/j.psychsport.2009.04.007

Hatzigeorgiadis, A., & Biddle, S. J. H. (2000). Assessing cognitive interference in sport: Development of the thought occurrence questionnaire for sport. *Anxiety Stress and Coping*, *13*(1), 65–86. https://doi.org/10.1080/10615800008248334

Hatzigeorgiadis, A., & Biddle, S. J. H. (2001). Athletes' perceptions of how cognitive interference during competition influences concentration and effort. *Anxiety Stress and Coping*, *14*(4), 411–429. https://doi.org/10.1080/10615800108248364

Hatzigeorgiadis, Antonis, Galanis, E., Zourbanos, N., & Theodorakis, Y. (2014). Self-talk and competitive sport performance. *Journal of Applied Sport Psychology*, *26*(1), 82–95. https://doi.org/10.1080/10413200.2013.790095

Hatzigeorgiadis, Antonis, Zourbanos, N., Galanis, E., & Theodorakis, Y. (2011). Self-talk and sports performance: A meta-analysis. *Perspectives on Psychological Science*, *6*(4), 348–356. https://doi.org/10.1177/1745691611413136

Hatzigeorgiadis, Antonis, Zourbanos, N., Latinjak, A., & Theodorakis, Y. (2014). Self-talk. In A. Papaioannou & D. Hackfort (Eds.), *Routledge companion to sport and exercise psychology: Global perspectives and fundamental concepts* (pp. 372–385). London, UK: Taylor & Francis.

Hatzigeorgiadis, Antonis, Zourbanos, N., & Theodorakis, Y. (2007). The moderating effects of self-talk content on self-talk functions. *Journal of Applied Sport Psychology*, *19*(2), 240–251. https://doi.org/10.1080/10413200701230621

Hemphill, J. F. (2003). Interpreting the magnitudes of correlation coefficients. *American Psychologist*, *58*(1), 78–79. https://doi.org/10.1037/0003-066X.58.1.78

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

Jones, E. E., & Nisbett, R. E. (1971). *The actor and the observer: Divergent perceptions of the causes of behavior*. Morristown, NJ, US: General Learning Press.

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist*, *58*(9), 697–720. https://doi.org/10.1037/0003-066X.58.9.697

Kakkos, V., & Zervas, Y. (1997). Validation of the affect state inventory (ASI): A preliminary study in competitive situations. In R. Lidor & M. Bar-Eli (Eds.), *Innovations in sport psychology: Linking theory and practice. Proceedings of IX world congress of sport psychology, Part I* (pp. 339–341). Netanya, Israel.

Kendall, P. C., & Chansky, T. E. (1991). Considering cognition in anxiety-disordered children. *Journal of Anxiety Disorders*, *5*, 167–185. https://doi.org/10.1016/0887-6185(91)90027-Q

Kenny, D. A., & Kashy, D. A. (1992). Analysis of multitrait-multimethod matrix by confirmatory factor analysis. *Psychological Bulletin*, *112*, 165–172.

Kerr, D. C. R., Lunkenheimer, E. S., & Olson, S. L. (2007). Assessment of child problem behaviors by multiple informants: a longitudinal study from preschool to school entry. *Journal of Child Psychology and Psychiatry*, *48*(10), 967–975. https://doi.org/10.1111/j.1469-7610.2007.01776.x

Kline, R. B. (2005). *Principles and practice of structural equation modeling, 2nd ed*. New York, NY, US: Guilford Press.

Kolovelonis, A., Goudas, M., & Dermitzaki, I. (2011). The effects of instructional and motivational self-talk on students' motor task performance in physical education. *Psychology of Sport and Exercise*, *12*(2), 153–158. https://doi.org/10.1016/j.psychsport.2010.09.002

Lang, J. W. B., & Fries, S. (2006). A revised 10-item version of the achievement motives scale: Psychometric properties in German-speaking samples. *European Journal of Psychological Assessment*, *22*(3), 216–224. https://doi.org/10.1027/1015-5759.22.3.216

Latinjak, A. T., Zourbanos, N., Lopez-Ros, V., & Hatzigeorgiadis, A. (2014). Goal-directed and undirected self-talk: Exploring a new perspective for the study of athletes' self-talk. *Psychology of Sport and Exercise*, *15*(5), 548–558. https://doi.org/10.1016/j.psychsport.2014.05.007

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, *9*(2), 151–173. https://doi.org/10.1207/S15328007SEM0902_1

Lodge, J., Tripp, G., & Harte, D. K. (2000). Think-aloud, thought-listing, and video-mediated recall procedures in the assessment of children's self-talk. *Cognitive Therapy and Research*, *24*(4), 399–418. https://doi.org/10.1023/A:1005575618941

Mahoney, M. J., Gabriel, T. J., & Perkins, T. S. (1987). Psychological skills and exceptional athletic performance. *The Sport Psychologist*, *1*(3), 181–199. https://doi.org/10.1123/tsp.1.3.181

Meichenbaum, D. (1977). *Cognitive-behavior modification: An integrative approach*. Springer US.

Moran, P. A. (1996). *The psychology of concentration in sports performance*. East Sussex, UK: Psychology Press Publishers.

Muthén, L., & Muthén, B. (2010). *Mplus User's Guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

Peters, H. J., & Williams, J. M. (2006). Moving cultural background to the foreground: An investigation of self-talk, performance, and persistence following feedback. *Journal of Applied Sport Psychology*, *18*(3), 240–253. https://doi.org/10.1080/10413200600830315

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, *43*(3), 450–461. https://doi.org/10.1037//0022-3514.43.3.450

Simons, R. I., Whitbeck, L. B., Conger, R. D., & Wu, C. I. (1991). Intergenerational transmission of harsh parenting. *Developmental Psychology*, *27*(1), 159–171. https://doi.org/10.1037/0012-1649.27.1.159

Smith, R. E., Smoll, F. L., & Schutz, R. W. (1990). Measurement and correlates of sport-specific cognitive and somatic trait anxiety: The sport anxiety scale. *Anxiety Research*, *2*(4), 263–280. https://doi.org/10.1080/08917779008248733

Stanovich, K. E., & West, R. F. (2000). Advancing the rationality debate. *Behavioral and Brain Sciences*, *23*(5), 701–726. https://doi.org/10.1017/S0140525X00623439

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

Theodorakis, Y., Hatzigeorgiadis, A., & Zourbanos, N. (2012). Cognitions: Self-talk and performance. In S. Murphy (Ed.), *Oxford handbook of sport and performance psychology. Part 2: Individual psychological processes in performance* (pp. 191–212). New York, NY, US: Oxford University Press.

Thomas, P. R., Murphy, S. M., & Hardy, L. (1999). Test of performance strategies: Development and preliminary validation of a comprehensive measure of athletes' psychological skills. *Journal of Sports Sciences*, *17*(9), 697–711. https://doi.org/10.1080/026404199365560

Van Raalte, J. L., Brewer, B. W., Rivera, P. M., & Petitpas, A. J. (1994). The relationship between observable self-talk and competitive junior tennis players' match performances. *Journal of Sport and Exercise Psychology*, *16*(4), 400–415. https://doi.org/10.1123/jsep.16.4.400

Van Raalte, J. L., Cornelius, A. E., Copeskey, M. K., & Brewer, B. W. (2014). Say what? An analysis of spontaneous self-talk categorization. *Sport Psychologist*, *28*(4), 390–393. https://doi.org/10.1123/tsp.2014-0017

Van Raalte, J. L., Vincent, A., & Brewer, B. W. (2016). Self-talk: Review and sport-specific model. *Psychology of Sport and Exercise*, *22*, 139–148. https://doi.org/10.1016/j.psychsport.2015.08.004

Zourbanos, N., Hatzigeorgiadis, A., Bardas, D., & Theodorakis, Y. (2013). The effects of self-talk on dominant and nondominant arm performance on a handball task in primary physical education students. *Sport Psychologist*, *27*(2), 171–176. https://doi.org/10.1123/tsp.27.2.171

Zourbanos, N., Hatzigeorgiadis, A., Chroni, S., Theodorakis, Y., & Papaiciannou, A. (2009). Automatic self-talk questionnaire for sports (ASTQS): Development and preliminary validation of a measure identifying the structure of athletes' self-talk. *Sport Psychologist*, *23*(2), 233–251. https://doi.org/10.1123/tsp.23.2.233

Zourbanos, N., Hatzigeorgiadis, A., Goudas, M., Papaioannou, A., Chroni, S., & Theodorakis, Y. (2011). The social side of self-talk: Relationships between perceptions of support received from the coach and athletes' self-talk. *Psychology of Sport and Exercise*, *12*(4), 407–414. https://doi.org/10.1016/j.psychsport.2011.03.001

Zourbanos, N., Hatzigeorgiadis, A., & Theodorakis, Y. (2007). A preliminary investigation of the relationship between athletes' self-talk and coaches' behaviour and statements. *International Journal of Sports Science & Coaching*, *2*, 57–66. https://doi.org/10.1260/174795407780367195

Zourbanos, N., Hatzigeorgiadis, A., Tsiakaras, N., Chroni, S., & Theodorakis, Y. (2010). A multimethod examination of the relationship between coaching behavior and athletes' inherent self-talk. *Journal of Sport & Exercise Psychology*, *32*(6), 764–785. https://doi.org/10.1123/jsep.32.6.764

Zourbanos, N., Haznadar, A., Papaioannou, A., Tzioumakis, Y., Krommidas, C., & Hatzigeorgiadis, A. (2016). The relationships between athletes' perceptions of coach-created motivational climate, self-

talk, and self-efficacy in youth soccer. *Journal of Applied Sport Psychology*, *28*(1), 97–112. https://doi.org/10.1080/10413200.2015.1074630

APPENDIX

APPENDIX A: SUPPLEMENTARY TABLES

Supplementary Table 1. Means and Standard Deviations for Questionnaire-Based and Objectively-Recorded Self-Talk Procedures

	Questionnaire-based		Objectively-recorded	
	M	*SD*	*M*	*SD*
Psych up	2.28	.72	8.13	8.13
Anxiety control	1.49	.96	.83	1.35
Instructions	2.73	.78	7.43	7.47
Confidence	1.94	.85	5.92	6.94
Worries	1.25	.92	5.97	4.86
Disengagement	.44	.75	.23	.68
Somatic fatigue	1.44	.87	1.63	2.13

Supplementary Table 2. Correlations Patterns between Differential Measurements of Positive and Negative Self-Talk Components and Outcome Variables

	Fear of failure	Tension
Positive self-talk		
Questionnaire	.19*	.21*
Coded	-.03	-.02
Multi-informant	.13	.14
Psych up		
Questionnaire	.17	.26**
Coded	-.03	.02
Multi-informant	.09	.19*
Anxiety control		
Questionnaire	.21*	.34**
Coded	.14	.12
Multi-informant	.21*	.28**
Instructions		
Questionnaire	.16	.19*
Coded	-.04	-.03
Multi-informant	.07	.10
Confidence		
Questionnaire	.07	-.12
Coded	-.02	-.08
Multi-informant	.03	-.12
Negative self-talk		
Questionnaire	.29**	.58**
Coded	.06	.22*
Multi-informant	.19*	.44**
Worries		
Questionnaire	.33**	.62**
Coded	.09	.29**
Multi-informant	.26**	.55**
Disengagement		
Questionnaire	.21*	.46**
Coded	.04	.09
	.15	.33**
Somatic fatigue		
Questionnaire	.13	.35**
Coded	-.06	-.09
Multi-informant	-.01	.09

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

CHAPTER 4

The Effects of Feedback Valence and Style on Need Satisfaction, Self-Talk, and Perseverance among Tennis Players: An Experimental Study[1]

[1] De Muynck, G.-J., Vansteenkiste, M., Delrue, J., Aelterman, N., Haerens, L., & Soenens, B. (2017). The effects of feedback valence and style on need satisfaction, self-talk, and perseverance among tennis players: An experimental study. Journal of Sport & Exercise Psychology, 39(1), 67–80. https://doi.org/10.1123/jsep.2015-0326

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Grounded in Self-Determination Theory, this experimental study examined whether the valence (i.e., positive vs. negative) and style (i.e., autonomy-supportive vs. controlling) of normative feedback impact the self-talk, motivational experiences (i.e., psychological need satisfaction and enjoyment) and behavioral functioning (i.e., perseverance, performance) of tennis players (N = 120; Mage = 24.50 ± 9.86 years). Positive feedback and an autonomy-supportive style positively influenced players' enjoyment and perseverance, with psychological need satisfaction and self-talk playing an intervening role. While positive feedback yielded its beneficial effect via greater competence satisfaction and decreased negative self-talk, the beneficial impact of an autonomy-supportive communication style was explained via greater autonomy satisfaction.

INTRODUCTION

A key objective of coaches is to motivate their athletes and to help them to improve their skills. One powerful way to achieve this objective is through the delivery of feedback (Wright & O'Halloran, 2013), which can be defined as the provision of competence-related information about athletes' performance on a particular task (Kluger & DeNisi, 1996). Whether athletes find coach feedback truly helpful and motivating likely depends on the type of feedback provided and on the style used to communicate the feedback. Specifically, according to Self-Determination Theory (SDT; Deci & Ryan, 2000; Vansteenkiste, Niemiec, & Soenens, 2010), feedback will yield a motivating effect if it supports athletes' basic psychological needs for competence (i.e., feeling effective) and autonomy (i.e., experiencing a sense of volition), as the satisfaction of these needs nurtures intrinsic motivation (Deci, Koestner, & Ryan, 1999).

To better understand the mechanisms behind effects of feedback on athletes' enjoyment and behavioral functioning (i.e., perseverance and performance), this experimental study examined the role of psychological need satisfaction and self-talk. Specifically, the intervening role of these variables was examined in effects of experimentally manipulated feedback valence (i.e., positive and negative) and style (i.e., autonomy-supportive and controlling).

FEEDBACK VALENCE

Feedback valence refers to whether the feedback is positive or negative (Whitehead & Corbin, 1991). Positive feedback may highlight athletes' capacity to master the task at hand (i.e., task-based feedback; e.g., Tzetzis, Votsis, & Kourtessis, 2008), to improve their technique or performance relative to the past (i.e., intrapersonal feedback; e.g., Tenenbaum et al., 2001), or to excel in relation to other athletes or a particular norm table (i.e., normative feedback; e.g., Mouratidis, Vansteenkiste, Lens, & Sideridis,

2008). Similarly, the coach can be critical of athletes' failure to master the task, their lack of sufficient progress, or their nonattainment of a specific norm.

Within SDT, it is maintained that the provision of positive (relative to negative) feedback supports athletes' intrinsic motivation as indicated by their task enjoyment and perseverance at the activity (Deci et al., 1999). It has indeed been shown that the more athletes felt their coaches provided positive feedback, the higher their intrinsic motivation (Amorose & Horn, 2000; Mouratidis et al., 2008). Likewise, experimentally induced positive feedback was found to increase pleasure and perseverance during an agility run (Whitehead & Corbin, 1991) and intrinsic motivation for a stabilometer task (Vallerand & Reid, 1984).

Relative to effects of feedback on intrinsic motivation, effects of feedback on performance are more equivocal. Meta-analytic findings indicate that the effect of feedback on performance is smaller in sports compared with other activities (Kluger & DeNisi, 1996). This is possibly because sport performance has many determinants, which can be affected differentially by feedback. For example, negative feedback may both increase tension (Whitehead & Corbin, 1991) and effort (Weinberg, Gould, & Jackson, 1979), whereby the benefits associated with increased effort cancel out the detrimental effect of tension on performance.

Further, the impact of positive, relative to negative, feedback may depend on the reference standard used to deliver feedback. Although normative feedback may yield fewer benefits compared with intrapersonal or task-based feedback (cf. Ames, 1992), competitive players often receive normative feedback (either implicitly or explicitly) because competition is almost an inherent feature of many sports. Because the delivery of normative feedback is inevitable in some sports contexts, it is important to examine how this type of feedback can be given in a motivating and performance-enhancing way. One key issue in this regard is the communication style used to provide feedback (e.g., Deci et al., 1999), an issue we address next.

FEEDBACK STYLE

According to SDT, the style used by coaches when providing feedback can be more controlling or more autonomy supportive in nature. When being controlling, coaches pressure athletes to act, think, or feel in prescribed ways (Bartholomew, Ntoumanis, Ryan, Bosch & Thogersen-Ntoumani, 2011). In contrast, when being autonomy-supportive, coaches identify, nurture, and build athletes' inner motivational resources so as to promote a sense of volition (Reeve, 2009). One feature determining coaches' style of feedback is the type of language they use. This language can either be inviting and informational (e.g., "I propose"; "I ask", and "you can") or coercive and threatening (e.g., "you must", "you should", "if you …not, then…"; Vansteenkiste, Simons, Soenens, & Lens, 2004).

In the sport domain, correlational studies have shown that when athletes perceive their coach as relying on autonomy-supportive language when providing corrective feedback, they report greater feelings of positive affect and stronger intentions to persevere (Mouratidis, Lens, & Vansteenkiste, 2010). Further, experimental work has shed light on the causal impact of the type of language used. This language has been experimentally varied in the way tasks were introduced (Savard, Joussemet, Pelletier, & Mageau, 2013), in the way individuals were monitored (Enzle & Anderson, 1993), and in the way feedback was delivered (Ryan, 1982). In each of these contexts, it has been shown that autonomy-supportive (relative to controlling) language promotes positive outcomes, such as task enjoyment, self-efficacy, positive affect, performance, and perseverance (Hooyman, Wulf, & Lewthwaite, 2014; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Specifically, in the the context of feedback, it has been shown that participants who were given positive feedback in a controlling rather than autonomy-supportive way were more likely to lose their interest in the activity at hand (Ryan, 1982; Ryan, Koestner, & Deci, 1991).

IN SEARCH OF INTERVENING MECHANISMS: THE ROLE OF PSYCHOLOGICAL NEED SATISFACTION AND SELF-TALK

The research discussed so far points out that both valence and style of normative feedback affect athletes' enjoyment, persistence, and performance. An important gap in extant research, however, is the limited empirical attention devoted to intervening processes accounting for these effects. From an SDT perspective, it is argued that athletes' basic psychological need satisfaction plays a key role in accounting for the effects of feedback (Deci & Ryan, 2000). Specifically, it can be reasoned that competence and autonomy need satisfaction would explain the effects of feedback valence and feedback style, respectively. Although a handful of sport-based studies indeed showed that competence need satisfaction accounts for the beneficial effects of positive (relative to negative) feedback (Vallerand & Reid, 1984; Whitehead & Corbin, 1991), to the best of our knowledge, evidence for the intervening role of autonomy need satisfaction with respect to feedback style is absent. Moreover, no feedback-related studies have simultaneously examined both psychological needs simultaneously as intervening variables.

Besides psychological need satisfaction, few other intervening processes have been taken into account within the SDT literature. Yet self-talk may also constitute a viable candidate in the sport context (Tod, Hardy, & Oliver, 2011). Fairly often, athletes engage in self-talk during small breaks during a game. Especially in more technical and individual sports, like table tennis, bowling, or darts, athletes may talk to themselves (Van Raalte, Cornelius, Brewer, & Hatten, 2000). Self-talk is defined as everything individuals say to themselves to either regulate their arousal, direct their attention, evaluate their performance, or to be self-reinforcing or self-punishing (Hatzigeorgiadis, Zourbanos, Latinjak, & Theodorakis, 2014). Different types of self-talk can be distinguished on the basis of their valence (Zourbanos, Hatzigeorgiadis, Chroni, Theodorakis, Papaioannou, 2009). Whereas positive self-talk encompasses self-directed statements to generate energy, to give oneself instructions, or to build confidence, negative self-talk

involves messages expressing self-criticism, worries, somatic complaints, and thoughts about disengagement.

Situational factors, such as coach feedback, are likely to activate self-talk (Hardy, Oliver, & Tod, 2009). In this regard, negative, relative to positive, feedback was found to decrease tennis players' positive self-talk and to elicit more negative self-talk (Zourbanos, Hatzigeorgiadis, Tsiakaras, Chroni, & Theodorakis, 2010; Study 3). As for communication style, correlational evidence confirms that athletes use more positive self-talk when their coach is perceived to rely on an inviting communicating style and to express confidence in them (Zourbanos et al., 2010). In contrast, both cross-sectional (Zourbanos et al., 2010; Study 2) and longitudinal research (Conroy & Coatsworth, 2007) indicate that athletes report using more negative self-talk when they perceive their coaches as controlling.

In turn, self-talk has been found to predict important outcomes. For instance, instructional self-talk, which is one component of positive self-talk, appears to contribute positively to performance (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011). Further, a few studies also found positive self-talk to relate to individuals' positive affect and pleasure (Hardy, Hall, & Alexander, 2001) as well as their effort expenditure (Hatzigeorgiadis, Zourbanos, & Theodorakis, 2007). Negative self-talk on the other hand, was found to be unrelated (Tod, et al., 2011) or even negatively related to performance (Van Raalte, Brewer, Rivera, & Petitpas, 1994). Given the evidence that feedback affects self-talk and that self-talk, in turn, predicts athlete outcomes, it seems plausible to assume an intervening role for self-talk in associations between feedback and athlete outcomes. This assumption has not been put to the test, however.

In addition, little research has addressed the relationship between self-talk and psychological need satisfaction, which according to SDT also represents an intervening process in effects of feedback on athlete outcomes. Because athletes indicate using self-talk for motivational ends (Hardy et al., 2001), Tod and colleagues (2011) proposed that self-talk has a motivational

impact. From an SDT-perspective, self-talk can be conceived as motivating to the extent it supports the satisfaction of athletes psychological needs (Vansteenkiste et al. 2010). Indeed, self-talk could serve as a precursor to athletes' need satisfaction, and subsequent enjoyment, perseverance, and performance. For instance, instructional or confidence-boosting self-talk (as indicators of positive self-talk) may foster a sense of competence (Hardy, 2006), whereas self-critical self-talk and worrying (as indicators of negative self-talk) may evoke a sense of pressure (Oliver, Markland, & Hardy, 2010) and exacerbate individuals' sense of failure (Delrue et al., 2016).

THE PRESENT STUDY

The central purpose of the present study was to examine the mechanisms underlying effects of feedback valence and communication style on competitive tennis players' enjoyment, perseverance, and performance. Specifically, the study aims at examining the intervening role of both satisfaction of the psychological needs for competence and autonomy, and self-talk.

In addition to this central purpose, this study aimed to contribute to the literature in a number of other ways. Although the (de)motivating role of feedback has been extensively examined (e.g., Carpentier & Mageau, 2013, 2016), the present study extended past work (a) by examining feedback in an ecologically valid setting (i.e., players' tennis clubs), (b) by examining the independent and interactive effects of valence (i.e., positive vs. negative) and style of feedback (i.e., autonomy supportive vs. controlling), and (c) by relying not only on questionnaires but also on the coding of audiotaped self-talk and on players' objectively recorded perseverance and performance at the tennis court. The experimental study had a 2x2 design crossing a manipulation of valence of feedback with a manipulation of style of feedback.

The following specific hypotheses were formulated. First, we hypothesized that positive, relative to negative, normative feedback (Hypothesis 1a) and autonomy-supportive, relative to controlling, normative

feedback (Hypothesis 1b) would increase players' task enjoyment, perseverance and performance. We also predicted an interaction effect between feedback valence and style, such that the combination of positive feedback with an autonomy-supportive style would yield an additional positive effect (Hypothesis 1c; cf. Curran, Hill, & Niemiec, 2013). Second, we hypothesized that competence need satisfaction would primarily account for the effects of feedback valence (Hypothesis 2a) and that autonomy need satisfaction would primarily account for the effects of communication style (Hypothesis 2b). We further hypothesized that the manipulated feedback may feed into players' experience of need satisfaction not only directly, but also indirectly, that is, via the activated self-talk (Hypothesis 2c). For instance, the negative self-talk elicited by the feedback may relate negatively to competence and autonomy need satisfaction over and above the direct effects of the manipulation on need satisfaction.

METHOD

PARTICIPANTS

One-hundred and twenty Belgian tennis players aged between 13 and 50 years participated in this study (67.5% male; M = 24.5; SD = 9.86). Of the participants 109 players were right-handed (90.8%) and 11 were left-handed. Participants trained on average 3 hours a week (SD = 3.09), with substantial variance: some participants did not participate in regular weekly training, whereas others trained for 16 hours a week. Belgian tennis rankings varied between 'nonranked' and 'A international'. Belgian rankings are also indicated by the points assigned to each ranking. Beginning tennis players, who do not have a ranking yet, are assigned 5 points, whereas world tour players (A international) are assigned 115 points. Most participants had a low ranking (5-35 pts.; n = 70; 58.3%) or a moderate ranking (40 – 70 pts.; n = 28; 23.3%) and a smaller number of players were highly ranked in Belgium (75-110 pts.; n = 22; 18.4%).

PROCEDURE

Participants were recruited from tennis clubs in Flanders, the Dutch-speaking part of Belgium. Four head coaches were contacted and given information about the study. All of them approved that the tennis players they coached could participate in the study by signing an informed consent statement. Subsequently, players were given information about the aim of the study and were invited to participate. Upon agreement, they also signed an informed consent statement. For participants younger than 18 years, passive consent was obtained from their parents by informing them about the study and asking to return a form by the date on which the experimental phase was scheduled in case they did not want their child to participate in the study. No parents denied their child's participation. Permission to conduct the study was obtained via the institution's research ethics committee.

The study consisted of a premeasurement phase, a tennis exercise and a postmeasurement phase. The first measurement, involving the assessment of background characteristics and feelings of competence with respect to tennis, took place directly following the completion of the informed consent statement. The actual experiment took place at least 1 day after completion of the premeasure. Participants individually performed tennis drills based on Purcell's (1981) forehand-backhand drive skill test to measure ball control and stroke velocity. Participants were asked to hit balls coming from a tennis ball machine (Pro Match – Pro model) back into the other side of the court, which was divided into different zones. Each zone had its own value, with the most points given to strokes close to the center of the baseline. The experimental phase consisted of an exercise trial and two experimental trials. To standardize the difficulty level of the exercises, the difficulty level of the tennis drills was adjusted as a function of participants' ranking (i.e., low, middle, and high). While performing these trials, participants were asked to verbalize their thoughts, which were recorded by a voice recorder attached to their nondominant arm. The exercise trial consisted of 10 strokes and was used for warming up and familiarizing to the drills. The two experimental trials

comprised 6 rallies of 10 strokes each, divided by rest periods of approximately 20 seconds in between the rallies. Participants received manipulated feedback from the experimenter between the two experimental trials and were allowed to take some additional rest for approximately 2 minutes. The difficulty level was raised for the second experimental trial to further challenge the participants and to avoid participants deriving feedback from themselves by comparing their performance on both trials. Upon completion of the second experimental trial, participants received a second-time manipulated feedback. Next, a postexperimental behavioral measure was obtained to measure players' perseverance (described subsequently). Finally, participants completed a questionnaire tapping into their motivational experiences and self-talk during the second experimental trial.

Participants were debriefed individually after completion of the postexperimental measure as to inform them that they had been deceived by bogus feedback. Furthermore, participants were asked if they suspected, or heard from others, that the feedback was false. If so, their data was excluded from the study. In total, three participants were excluded.

MANIPULATED FEEDBACK

Manipulated feedback was provided at the end of both experimental trials. Matched for skill level and gender, participants were randomly assigned to one out of four experimental conditions, which were created by crossing feedback valence (i.e., positive or negative) and style (i.e., autonomy supportive or controlling). To operationalize an autonomy-supportive and controlling communication style, expressions such as "I invite you to…" or "I suggest that…" were used in the autonomy-supportive condition, while statements such as "I expect you to …" and "It is now time to prove yourself" were used in the controlling condition. Additionally, whereas the experiment was presented as an "exercise" in the autonomy-supportive condition, it was introduced as a "test" in the controlling condition. To operationalize the valence of feedback, participants in the positive and negative normative

feedback condition were informed after both experimental trials that they had, respectively, done better or worse than most of the players of their age with the same ranking. A complete overview of the feedback manipulations can be found in Appendix.

INSTRUMENTS

Pre-experimental measures.

Trait-competence need satisfaction. The Perceived Competence Scale was used to determine how competent participants generally feel as a tennis player (Williams & Deci, 1996). This scale used a Likert scale varying from 1 (*not at* all) to 7 (*very* much), and consists of four statements, which were adapted to the tennis context (e.g., "I feel confident in my abilities as a tennis player"; α = .78)

Measures during the experimental phase.

Performance. Participants were asked to hit balls to a court divided in different zones, each with its own value (Purcell, 1981). Strokes close to the center of the baseline were awarded the most points. To prevent tennis players from playing too safely and to make sure that players were unable to infer their own scores, they were informed that stroke velocity would be taken into account, which was actually not the case. The experimenter calculated the score for each rally, which led to a sum score for a trial. Internal consistency for the accuracy scores on both experimental trials was .75 and .72.

Coded self-talk. Self-talk was assessed via the thinking-aloud protocol, which involved asking participants to verbalize their thoughts during the tennis exercises. The thinking-aloud procedure has a number of benefits. It captures a large amount of self-talk (Blackwell, Galassi, Galassi, & Watson, 1985) and it promotes recall of self-talk later on (Lodge, Tripp, & Harte, 2000). Further, the memory bias is minimized due to the very short time interval between experiencing and reporting self-talk (Blackwell et al., 1985). The verbalized thoughts during the experimental trials were recorded by a voice recorder. Subsequently, they were transcribed verbatim and categorized

in positive and negative self-talk using the categories of the Automatic Self-Talk Questionnaire for Sports (Zourbanos et al., 2009). Transcripts of 42 participants were coded by two coders familiar with the self-talk literature, using a coding manual that was developed specifically for the present study. The intter-rater reliability after coding a third of the participants was high (κ = .83). After disagreements were resolved and the coding manual was completed, one coder continued the coding of the remaining transcripts.

Postexperimental measures. The postexperimental questionnaire asked tennis players to reflect on their experiences during the second experimental trial.

Self-reported self-talk. The questionnaire used to measure positive and negative self-talk was a slightly adapted version of the Automatic Self-Talk Questionnaire for Sports (Zourbanos et al., 2009). Adaptations involved making the questionnaire relevant for the context of tennis. For each statement, participants indicated its frequency during the second tennis exercise on a 5-point Likert scale ranging between 0 (*seldom*) and 4 (*often*). A composite score was created for both positive and negative self-talk (α = .78 for both; Zourbanos et al., 2009). Both composite scores correlated significantly with the coded self-talk (r = .43, p < .01 and r = .33, p < .01 for positive and negative self-talk, respectively[2]).

Given these findings, a composite measure for positive and negative self-talk was created by averaging the standardized scores obtained via the thinking-aloud procedure and the questionnaire. Such a combined measure is to be preferred because some people are more reserved and verbalize only a small percentage of their thoughts. As a result, the additional assessment of

[2] More validity information regarding the relationship between self-reported and recorded self-talk is provided in chapter 2. In order to further validate the self-talk measure used in the current study, additional variables were measured during the data collection. Because these variables were not useful to the scope of the current study, they were not mentioned in the method section and omitted from the analyses. Specifically, need for achievement, fear of failure, perceived pressure, dominant achievement goal pursuit and reasons underlying the dominant achievement goal pursuit were also measured, besides the constructs listed in the manuscript.

self-talk via self-reports allows for a more complete and, hence, more valid assessment of self-talk. Furthermore, past research has indicated that some self-talk measures are better suited to measure particular self-talk types, whereas other measures are beneficial to capture other types of self-talk (Lodge et al., 2000). For example, instructions are more easily captured with talking aloud, whereas worries are more easily captured by a questionnaire measure.

Manipulation check. To ensure that our manipulation had the intended effect on participants, two items were created, one considering the manipulation of feedback valence ("the experimenter gave positive feedback") and the other tapping into the manipulation of feedback communication style ("the experimenter pressured me to perform well"). Items were scored on a 5-point Likert scale ranging from 1 (*Totally disagree*) to 5 (*Totally agree*).

Motivational experiences. To measure tennis players' motivational experiences, we used the Intrinsic Motivation Questionnaire (Ryan, 1982), which was adapted to a tennis context. This 20-item scale taps into players' task enjoyment (7 items; e.g., "The second tennis exercise was very amusing to do"; α = .79), autonomy need satisfaction (7 items; e.g., "I had the perception that I had to perform the second tennis exercise"; reversed scored; α = .84), and competence need satisfaction (6 items; e.g., "While performing the second tennis exercise, I felt I was doing well"; α = .92). Participants responded on a 5-point Likert scale ranging between 1 (*not at all*) and 5 (*very much*). To distinguish this competence need satisfaction measure from the more general trait-like competence measure used as a pre-experimental measure, we refer to this variable as state-competence need satisfaction.

Perseverance. A behavioral measure based on the free choice paradigm (Deci et al., 1999) was used to measure players' perseverance. Tennis players were offered the opportunity to take part in a third trial, consisting of three rallies of 10 balls each. Participation in this free-choice trial was said to be voluntary, so that players could stop playing tennis at this point

(perseverance scored as 0). Players who chose to perform this additional trial could choose its difficulty level. They could either choose for the difficulty level of the first experimental trial (perseverance scored as 1), the more difficult level of the second experimental trial (perseverance scored as 2), or an even more challenging tennis drill (perseverance scored as 3). Choosing a more difficult exercise at the end of the second experimental trial can be interpreted as an indication of higher perseverance. Participants were not aware that their choice at that moment was actually a measure of perseverance.

RESULTS

PRELIMINARY ANALYSES

Descriptive statistics and bivariate correlations among the study variables can be found in Table 1. Independent samples t test revealed that female players trained less, had lower trait-competence satisfaction levels, were less accurate in the first exercise, and showed lower perseverance compared with their male counterparts. An analysis of variance (ANOVA) indicated that trait-competence satisfaction levels, $F(2,117) = 3.97$, $p = .022$, and performance on the first tennis exercises, $F(2,117) = 10.45$, $p < .001$, differed according to skill level. Tennis players with a high ranking felt more competent ($M = 5.48$; $SD = .96$) compared with tennis players with a low ranking ($M = 4.86$; $SD = .89$). Furthermore, the former players performed better than players with a low or a moderate ranking on the first exercise ($M_{high} = 56.75$, $SD_{high} = 6.85$; $M_{moderate} = 51.83$, $SD_{moderate} = 7.57$; $M_{low} = 48{,}81$, $SD_{low} = 7.15$).

Bivariate correlations showed that older tennis players reported greater enjoyment. The amount of training hours correlated positively with players' trait-competence need satisfaction and with their performance on the first tennis exercise. Based on these results, we systematically controlled for sex, age, training frequency, and skill level in the main analyses. Because positive self-talk was unrelated to both the outcomes and need satisfaction, we

decided not to include this variable in the main analyses. All analyses were conducted with and without background characteristics to reduce the probability of false positives. No differences were found between the results of the two sets of analyses.

Manipulation check. An ANOVA indicated that participants receiving positive feedback reported that the experimenter was more positive while giving feedback (M = 4.45) than participants receiving negative feedback (M = 2.81; $F(1, 94) = 90{,}04$, $p < .001$). Participants receiving feedback with an autonomy-supportive style reported feeling less pressured by the experimenter (M = 1.70) than participants receiving the controlling feedback (M = 2.39; $F(1, 94) = 9.86$, $p = .002$). These findings show that the manipulations were successful.

Table 1. Descriptive Statistics, Gender Differences, and Bivariate Correlations Between the Measured Variables

Variables	Male	Female	t	1	2	3	4	5	6	7	8	9	10
Pre-experimental measures													
1. Age	25.90	23.79	1.20	-									
2. Training hours/week	3.47	2.14	2.72**	-.27**	-								
3. Trait-competence	5.30	4.50	4.07**	-.16	.32**	-							
4. Accuracy first exercise	47.06	52.85	4.09**	.14	.23*	.25**	-						
Experimental measures													
Self-Talk													
5. Positive [a]	-.06	.13	-1.17	.07	-.09	.17	-.10						-
6. Negative [a]	-.02	.05	-.44	-.09	-.08	-.36**	-.21*	.08					
Motivational experiences													
7. Autonomy satisfaction	3.95	3.90	.27	.14	.12	.08	.13	-.14	-.28**				
8. State-competence satisfaction	3.13	3.11	.13	.16	.01	.30**	.18*	.02	-.61**	.29**			
9. Enjoyment	3.75	3.74	.12	.26**	-.10	.29**	.12	.08	-.54**	-.45**	.59**		
Behavioral measures													
10. Performance change	-.28	.58	-.80	.05	-.11	.08	.00	-.07	-.18*	.05	.27**	.12	
11. Perseverance	2.41	2.05	1.99*	.13	.11	.19*	.15	.03	-.33**	.23**	.45**	.39**	.18*

Note. [a] This value represents the composite score of self-talk, which was computed by averaging the standardized scores of the self-report and coding procedure.

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

PRIMARY ANALYSES

Hypothesis 1 Effects of feedback valence and communication style. A multivariate analysis of covariance showed a significant main effect for feedback valence (Wilks' $\lambda = .73$, $F(5,83) = 6.00$, $p < .001$) and for communication style (Wilks' $\lambda = .88$, $F(5,83) = 2.36$, $p = .047$). The interaction effect was not significant (Wilks' $\lambda = .94$, $F(5,83) = 1,09$, $p = .38$). Table 2 presents the means and standard deviations of the outcome variables according to the different feedback conditions.

Follow-up univariate ANOVAs concerning feedback valence indicated that participants receiving positive, relative to negative, feedback used negative self-talk less frequently and showed higher levels of state-competence need satisfaction, enjoyment, and perseverance (see Table 2). With regard to communication style, follow-up univariate ANOVAs showed that tennis players in the autonomy-supportive, relative to controlling, communication condition reported higher autonomy need satisfaction and enjoyment, and scored higher on perseverance[3].

[3] Additional contrast analyses comparing the experimental conditions with a stand-alone neutral comparison group (receiving no feedback) showed that tennis players in the controlling negative feedback condition reported less enjoyment, $t(115) = -4.37$, $p < .001$, less state-competence need satisfaction, $t(115) = -5.36$, $p < .001$, and persevered less during the free choice period, $t(41.27) = -3.33$, $p = .002$. Additionally, two other conditions also differed in some way from the neutral condition. First, tennis players receiving autonomy-supportive, negative feedback experienced less state-competence need satisfaction, $t(115) = -3.27$, $p = .001$, while tennis players receiving controlling positive feedback condition reported more state-competence need satisfaction, $t(115) = 2.33$, $p = .02$, compared to those in the neutral condition.

Table 2. Means and Standard Deviations for the Four Experimental Conditions (Positive vs. Negative Feedback Crossed with an Autonomy-Supportive vs. Controlling Communication Style) and ANOVA Results for Feedback Valence Effects and Feedback Communication Style Effects

		Positive feedback	Negative feedback	Effects of feedback valence		
		M(SD)	M(SD)	*F*(1,90)	*p*	η^2
Autonomy-supportive style	Negative self-talk	-.23 (.64)	.13 (.90)	11.24	.001	.11
	Autonomy satisfaction	4.13 (.67)	4.10 (.61)	3.42	.07	.04
	State-competence satisfaction	3.50 (.64)	2.67 (.72)	68.83	<.001	.43
	Enjoyment	4.01 (.44)	3.73 (.61)	19.50	<.001	.18
	Performance change	.33 (6.08)	1.44 (5.48)	.06	.80	.00
	Perseverance	2.54 (.72)	2.34 (.88)	13.47	<.001	.13
		Positive feedback	**Negative feedback**	**Effects of feedback style**		
		M(SD)	**M(SD)**	***F*(1,90)**	***p***	**η^2**
Controlling style	Negative self-talk	-.37 (.73)	.46 (1.00)	.50	48	.01
	autonomy satisfaction	4.03 (.67)	3.48 (1.06)	5.13	.026	.05
	State-competence satisfaction	3.79 (.64)	2.26 (.77)	.29	59	.00
	Enjoyment	4.00 (.54)	3.14 (.70)	7.22	.009	.07
	Performance change	.21 (5.94)	-.31 (5.27)	.65	.42	.01

Note. ANOVA = analysis of variance

Hypothesis 2: Intervening effects of self-talk and need satisfaction. Structural Equation Modeling (SEM) analyses using MPlus 7 (Muthén & Muthén, 2010) were used to test for the intervening role of negative self-talk and psychological need satisfaction. The solutions were generated on the basis of maximum likelihood estimation. Five latent variables were constructed. The number of parcels created depended on the total number of items used to assess constructs and each parcel was created by a set of randomly selected items. Trait-competence need satisfaction was modeled by creating two parcels, whereas three parcels were used for autonomy and state-competence need satisfaction and perceived enjoyment. Little, Cunningham, Shahar, and Widaman (2002) recommend random parceling when items stem from a common pool, which was the case in our study. An important advantage of random parceling is that parcels contain roughly equal amounts of common factor variance, resulting in balanced factor loadings (Little et al., 2002). Finally, negative self-talk was indicated by the standardized scores of the thinking aloud procedure (i.e., coded self-talk) and the thought listing procedure (i.e., self-reported self-talk). Goodness of fit was evaluated using the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the comparative fit index (CFI). Combined cut-off values of .06 for RMSEA, .08 for SRMR, and .95 for CFI were used as criteria for good fit (Hu & Bentler, 1999).

First, a confirmatory factor analysis modeled the five study variables (trait-competence need satisfaction, negative self-talk, state-competence need satisfaction, autonomy need satisfaction and interest/pleasure) using 13 indicators. To overcome a problem with local under-identification, the residual variance of one parcel regarding trait-competence need satisfaction was fixed to zero. This solution was preferred above using all four items as individual indicators of the latent variable as to ensure sufficient power for the analyses. Results showed a good fit (χ^2 (56) = 69.11; RMSEA = .04; SRMR =

.05; CFI =.98) with all indicators loading moderately to strongly on the latent factors, ranging from .49 to .94 (mean λ= .79; all $p < .001$).

Next, we modeled psychological need satisfaction and negative self-talk as intervening variables in associations between the manipulations and the outcomes. Specifically, we modeled contrast-coded feedback valence (negative feedback coded 0; positive feedback coded 1) as a predictor of both negative self-talk and state-competence need satisfaction, with negative self-talk also being modeled as a predictor of state-competence need satisfaction. State-competence need satisfaction, in turn, was modeled as a predictor of players' enjoyment, performance change, and perseverance (see Figure 1). Performance change was operationalized with a residual score indicating change in performance from the first to the second tennis exercise to take differences in performance on the first tennis exercise into account. This residual score was computed by regressing performance in the second exercise on performance in the first exercise and by saving the unstandardized residual score from this analysis. Next, both contrast-coded communication style (controlling communication style coded as 0; autonomy-supportive communication style coded as 1) and negative feedback were modeled as a predictor of autonomy need satisfaction, which, in turn was modeled as a predictor of perseverance and enjoyment.

Results showed acceptable model fit with all pathways being significant and in the predicted direction (χ^2 (135) = 191.87; RMSEA = .07; SRMR = .09; CFI = .93).

Next, we evaluated the intervening role of self-talk and state-competence and autonomy need satisfaction by means of tests for indirect effects (MacKinnon, Lockwood, & Williams, 2004). The indirect effects are computed on the basis of the product of the association between an independent variable and the intervening variable (the α association) and the association between the independent variable and the dependent variable (the β association) divided by the standard error of this product. Because traditional methods to estimate indirect effects (such as the Sobel test) have

low power and a high probability of Type I errors, MacKinnon et al. (2004) proposed a bias-corrected bootstrap method. This method is based on a resampling approach and involves the calculation of confidence intervals to determine the significance of an indirect effect. When significant, such an effect indicates that an independent variable is related indirectly to a dependent variable through an intervening variable.

The indirect effects of feedback valence, through negative self-talk and, subsequently, state-competence need satisfaction to enjoyment (β = .12, p = .005), perseverance (β = .08, p = .003) and performance change (β = .06, p = .02) were all significant. These effects are consistent with the prediction that negative self-talk and state competence need satisfaction represent intervening mechanisms through which feedback valence is related to enjoyment, perseverance, and performance change. The indirect effect of feedback style through autonomy to enjoyment (β = .09, p = .044) reached significance, which was not the case for perseverance (β = .06, p = .14), indicating that autonomy represents a significant intervening variable in the association feedback style with enjoyment but not with perseverance.

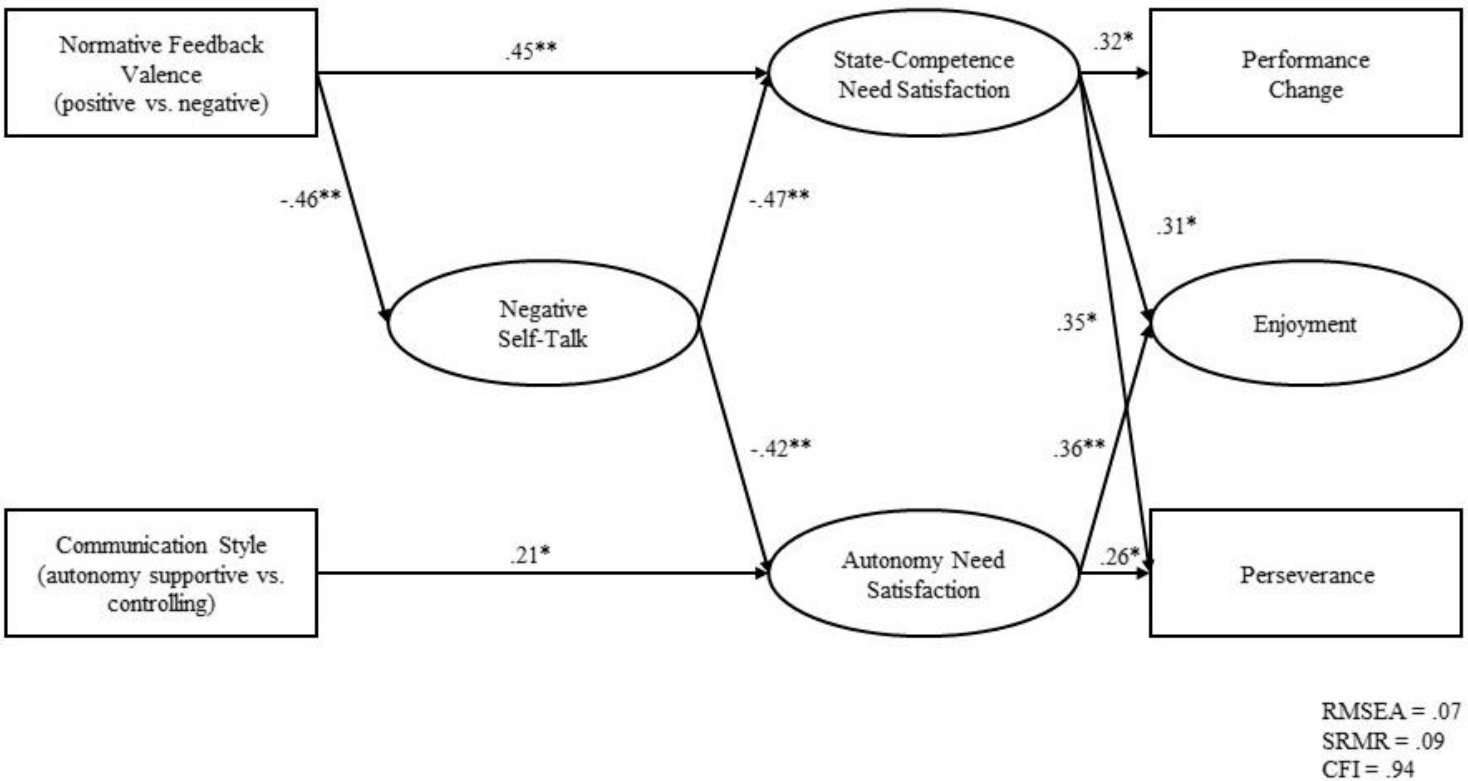

Figure 1. Structural model tested in SEM analysis. * $p < .05$, ** $p < .01$

ANCILLARY ANALYSIS

Because negative self-talk may not only predict but also stem from low need satisfaction, we tested a second model. Specifically, we modeled contrast-coded feedback valence as a predictor of state-competence need satisfaction, while contrast-coded communication style was modeled as a predictor of autonomy need satisfaction. In turn, both need satisfaction variables were modeled as predictors of negative self-talk, which in turn served as a predictor for the outcome variables. Results indicated a good fit of the model (χ^2 (130) = 178.58; RMSEA = .06; CFI = .94; SRMR = .09). However, within the model using state-competence and autonomy need satisfaction as predictors for negative self-talk, negative self-talk was no longer related to the outcomes. This might indicate that the two psychological needs are more proximal indicators for the outcomes compared with negative self-talk.

DISCUSSION

Coach feedback is presumed to play a pivotal role in the maintenance and even enhancement of players' motivational functioning, perseverance, and performance (Mouratidis et al., 2008). Grounded in SDT, the present experimental study was designed to examine the mechanisms behind effects of two critical features of feedback, that is, its valence and the way in which the feedback is communicated.

VALENCE AND STYLE OF FEEDBACK

With regard to feedback valence, positive (relative to negative) normative feedback caused tennis players to experience their play as more enjoyable and led them to persevere more during a free-choice period afterwards. These findings are consistent with research in the laboratory (Deci et al., 1999) and extend this work to a more ecologically valid setting. Moreover, competence need satisfaction played an explanatory role in these

associations, with positive feedback enhancing tennis players' competence need satisfaction, which, in turn, was associated with greater intrinsic motivation, both self-reported and behaviorally (Vallerand & Reid, 1984).

Feedback valence did not directly affect performance, but there was an indirect effect via competence need satisfaction, which was associated with better performance. Possibly, the lack of a direct effect is due to the fact that performance was based on the precision of players' strokes when engaging in the second exercise, immediately after they received feedback (Wulf, Chiviacowsky, & Lewthwaite, 2010). Players' performance in this context may still depend heavily on well-established interindividual differences, such as talent or technique (Kluger & DeNisi, 1996). Yet, positive feedback may yield an effect in the longer run as it enhances intrinsic motivation and perseverance, thereby leading athletes to train more effectively (Whitehead & Corbin, 1991). Another explanation is that the type of feedback in this study was normative in nature and, hence, not task-specific or individualized. Although knowing that one outperforms others on a tennis task may boost athletes' competence need satisfaction and intrinsic motivation, for their performance to improve they may need more specific task-oriented feedback (Tzetzis, et al., 2008), an issue that needs to be tested in future research.

Apart from the valence of feedback, the style through which the feedback was communicated was found to be critical. To the extent players were given feedback in an autonomy-supportive and informational rather than in a controlling and evaluative way, they experienced the task as more enjoyable and were more likely to persevere during a free-choice period. The manipulation of communication style involved both the framing of the activity (e.g., as an exercise rather than a test) as the use of controlling language (e.g., should, have to, must,…). Therefore, it is unclear in the present study whether the obtained differences between both conditions can be attributed to (a) the way the activity is framed, (b) the use of controlling language, or (c) both. Future studies may want to disentangle these different ways to increase pressure and study them separately.

The effects of feedback valence and style were independent of one another, indicating that both matter in predicting players' motivational functioning (see also Sheldon & Filak, 2008). Somewhat unexpectedly, we did not obtain evidence for interactive effects between valence of feedback and style of feedback. This lack of interactions is inconsistent with findings from a number of correlational studies (e.g., Curran et al., 2013). Because only a few studies to date addressed this possibility of an interaction between the valence of feedback and the style of communication and because these studies are quite different in terms of design and selection of outcome variables, more research addressing this possibility is needed.

The results for feedback style are in accordance with Ryan (1982), indicating that inviting and informational, relative to controlling and evaluative, feedback made participants persevere more in a hidden figure puzzle task. Although correlational studies found similar evidence for the critical role of autonomy-supportive feedback style in the realm of sports (e.g., Mouratidis et al., 2010), to the best of our knowledge, this is the first experimental study to address this issue in the context of sports. Interestingly, in line with SDT, autonomy need satisfaction accounted for the effect of feedback style on players' motivational and behavioral functioning. These findings indicate that feedback given in an autonomy-supportive way supports tennis players' basic psychological need for autonomy, which, in turn, relates to higher perseverance and greater enjoyment.

THE ROLE OF SELF-TALK

Another unique feature of the present study was the consideration of players' self-talk as an additional explanatory mechanism in the relation between manipulated feedback and players' motivational and behavioral functioning. Tennis players are known to engage in self-talk fairly often (Van Raalte et al., 1994). Rather than relying on self-reports only, tennis players were asked to verbalize their thoughts and feelings during the experiment, which were audio recorded and coded by external coders. To increase the

validity of the assessment of self-talk, we created a combined score of self-reported and coded self-talk (Lodge et al., 2000). Interestingly, negative self-talk was activated by the induction of negative (relative to positive) normative feedback. Presumably, negative feedback served as a model, thereby awakening the critical voice of the players themselves (Zourbanos et al., 2007). In turn, negative self-talk was related to diminished competence and autonomy need satisfaction above and beyond the effect of manipulated feedback valence and style, thus potentially aggravating the already present detrimental effects of controlling and negative normative feedback. Presumably, negative self-talk functions as a self-fulfilling prophecy such that the engagement in critical and anxiety-enhancing self-talk eventually relates negatively to competence and autonomy need satisfaction.

A number of additional findings and issues regarding self-talk require discussion. First, whereas negative self-talk was impacted by the manipulation, this was not case for positive self-talk. Thus, neither positive normative feedback nor an autonomy-supportive style caused tennis players to be more positive toward themselves. Possibly, negative self-talk is more susceptible to social influences than positive self-talk (Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012). In addition, positive self-talk was unrelated to competence and autonomy need satisfaction. Possibly, what needs to be taken into consideration is the tone of the verbalized self-talk. One and the same positive self-statement could be verbalized in an informational fashion or in a more evaluative and pressuring fashion, with resulting consequences for participants' autonomy and competence need satisfaction (Oliver et al., 2010). Thus, it is possible that some tennis players engaged in rather evaluative positive self-talk, which would suppress the beneficial effects of more informational positive self-talk.

Second, although self-talk was modeled as a predictor of the needs, it is also possible that self-talk arises as a function of low need satisfaction. That is, when athletes feel more pressured and inadequate because they notice that they are doing poorly, they may engage in self-talk to cope with this

experience (Delrue et al., 2016). In our data, this alternative possibility received less support because a model in which competence and autonomy need satisfaction were predictors of negative self-talk revealed that negative self-talk was no longer related to the outcomes. As such, psychological need satisfaction appears to be a more proximal predictor of the outcomes than negative self-talk, indicating that negative self-talk precedes competence and autonomy need satisfaction rather than the other way around. Still, because in this study both self-talk and psychological need satisfaction were measured with regard to the same tennis exercise, it is impossible to conclude with certainty that self-talk undermined need satisfaction or the other way around. Most likely, associations between these variables are reciprocal in nature, a possibility that can be explored in future studies relying on multiple assessment points.

LIMITATIONS AND FUTURE DIRECTIONS

First, this study did not take into account relatedness need satisfaction (i.e., the desire to experience warm and caring relationships). We considered this need as less appropriate for the current study as tennis players performed individually under the supervision of an experimenter they barely knew. Manipulating relatedness support may require an established relationship between experimenter/coach and tennis player, which was not the case in the current study. Also, the study focused on need satisfaction only and primarily included desirable outcomes. Future experimental research could also include measures of need frustration and more negative outcomes (Bartholomew et al., 2011).

A second limitation has to do with the generalizability of our findings, as only Flemish competitive tennis players participated and as only normative feedback was examined. Additional research needs to examine whether these results hold for other types of feedback (e.g., task-based and intrapersonal feedback), in other individual sports, in team sports, or in different cultures. For example, Peters and Williams (2006) found that negative, relative to

positive, normative feedback causes less perseverance in a darts throwing task for European-Americans, but did not impact perseverance for East-Asian participants. Furthermore, using negative, compared to positive, self-talk more frequently was detrimental to European-American participants' performance, while being beneficial for East-Asian participants. Thus, reactions on negative feedback and negative self-talk may depend to some extent on cultural background.

Third, SEM-analyses tested a complex model within a rather small sample, resulting in less than optimal power. A lack of sufficient power may not only preclude one to obtain true effects but may also lead one to detect statistically significant effect that does not reflect a true effect. As a result, we deem it important that future research replicates the current findings with a more extended sample (Button et al., 2013).

CONCLUSION

This study showed that positive (relative to negative) normative feedback, led to more enjoyment and more behavioral perseverance in a tennis task because it nurtured tennis players' competence need satisfaction. Likewise, an autonomy-supportive (compared with a controlling) communication style to give feedback supported players' autonomy need satisfaction, which, in turn, enhanced game enjoyment and perseverance. Negative self-talk played an intervening role in the effects of feedback on psychological need satisfaction. Tennis players seem to adopt the negative tone inherent in negative feedback and to become self-critical, thereby forestalling their own autonomy and competence need satisfaction and, in turn, undermining their feelings of enjoyment and behavioral perseverance. Overall, on the basis of these findings, it can be advised to coaches to avoid using negative normative feedback and to be as autonomy-supportive as possible when providing feedback.

REFERENCES

Ames, C. (1992). Achievement goals and adaptive motivation patterns: The role of the environment. In G. C. Roberts (Ed.), Motivation in sport and exercise (pp. 161–176). Champaign, IL: Human Kinetics.

Amorose, A. J., & Horn, T. S. (2000). Intrinsic motivation: Relationships with collegiate athletes' gender, scholarship status, and perceptions of their coaches' behavior. Journal of Sport and Exercise Psychology, 22(1), 63–84. https://doi.org/10.1123/jsep.22.1.63

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thogersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. Personality and Social Psychology Bulletin, 37(11), 1459–1473. https://doi.org/10.1177/0146167211413125

Blackwell, R. T., Galassi, J. P., Galassi, M. D., & Watson, T. E. (1985). Are cognitive assessment methods equal: A comparison of think aloud and thought listing. Cognitive Therapy and Research, 9(4), 399–413. https://doi.org/10.1007/BF01173089

Button, K. S., Ioannidis, J. P. A., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S. J., & Munafo, M. R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. Nature Reviews Neuroscience, 14(5), 365–376. https://doi.org/10.1038/nrn3475

Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. Psychology of Sport and Exercise, 14(3), 423–435. https://doi.org/10.1016/j.psychsport.2013.01.003

Conroy, D. E., & Coatsworth, J. D. (2007). Coaching behaviors associated with changes in fear of failure: Changes in self-talk and need satisfaction as potential mechanisms. Journal of Personality, 75(2), 383–419. https://doi.org/10.1111/j.1467-6494.2006.00443.x

Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of children's behavioral engagement and behavioral disaffection in sport based on self-determination theory. Journal of Sport & Exercise Psychology, 35(1), 30–43. https://doi.org/10.1123/jsep.35.1.30

De Muynck, G.-J., Delrue, J., Zourbanos, C., Hatzigeorgiadis, A., & Vansteenkiste, M. (2017). Combining self-reports and thinking-aloud strategies to measure tennis players' self-talk: Additional validation of the Automatic Self-Talk Questionnaire for Sports (ASTQS), Manuscript in preparation.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. Psychological Bulletin, 125(6), 627–668; discussion 692-700.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Delrue, J., Mouratidis, A., Haerens, L., De Muynck, G.-J., Aelterman, N., & Vansteenkiste, M. (2016). Intrapersonal achievement goals and underlying reasons among long distance runners: Their relation with race experience, self-talk, and running time. Psychologica Belgica, 56(3), 288–310. https://doi.org/10.5334/pb.280

Enzle, M. E., & Anderson, S. C. (1993). Surveillant intentions and intrinsic motivation. Journal of Personality and Social Psychology, 64(2), 257–266. https://doi.org/10.1037/0022-3514.64.2.257

Hardy, J. (2006). Speaking clearly: A critical review of the self-talk literature. Psychology of Sport and Exercise, 7(1), 81–97. https://doi.org/10.1016/j.psychsport.2005.04.002

Hardy, J., Hall, C. R., & Alexander, M. R. (2001). Exploring self-talk and affective states in sport. Journal of Sports Sciences, 19(7), 469–475. https://doi.org/10.1080/026404101750238926

Hardy, J., Oliver, E., & Tod, D. (2009). A framework for the study and application of self-talk within sport. In S. D. Mellalieu & S. Hanton (Eds.), Advances in applied sport psychology: A review (pp. 37–74). London, UK: Routledge.

Hatzigeorgiadis, A., Zourbanos, N., Galanis, E., & Theodorakis, Y. (2011). Self-talk and sports performance: A meta-analysis. Perspectives on Psychological Science, 6(4), 348–356. https://doi.org/10.1177/1745691611413136

Hatzigeorgiadis, A., Zourbanos, N., Latinjak, A., & Theodorakis, Y. (2014). Self-talk. In A. Papaioannou & D. Hackfort (Eds.), Routledge companion to sport and exercise psychology: Global perspectives and fundamental concepts (pp. 372–385). London, UK: Taylor & Francis.

Hooyman, A., Wulf, G., & Lewthwaite, R. (2014). Impacts of autonomy-supportive versus controlling instructional language on motor learning. Human Movement Science, 36, 190–198. https://doi.org/10.1016/j.humov.2014.04.005

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling-a Multidisciplinary Journal, 6(1), 1–55. https://doi.org/10.1080/10705519909540118

Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. Psychological Bulletin, 119(2), 254–284. https://doi.org/10.1037/0033-2909.119.2.254

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits.

Structural Equation Modeling, 9(2), 151–173. https://doi.org/10.1207/S15328007SEM0902_1

Lodge, J., Tripp, G., & Harte, D. K. (2000). Think-aloud, thought-listing, and video-mediated recall procedures in the assessment of children's self-talk. Cognitive Therapy and Research, 24(4), 399–418. https://doi.org/10.1023/A:1005575618941

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. Multivariate Behavioral Research, 39(1), 99–128. https://doi.org/10.1207/s15327906mbr3901_4

Mouratidis, A., Lens, W., & Vansteenkiste, M. (2010). How you provide corrective feedback makes a difference: The motivating role of communicating in an autonomy-supporting way. Journal of Sport & Exercise Psychology, 32(5), 619–637. https://doi.org/10.1123/jsep.32.5.619

Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education: Evidence for a motivational model. Journal of Sport & Exercise Psychology, 30(2), 240–268. https://doi.org/10.1123/jsep.30.2.240

Muthén, L., & Muthén, B. (2010). Mplus User's Guide (6th ed.). Los Angeles, CA: Muthén & Muthén.

Oliver, E. J., Markland, D., & Hardy, J. (2010). Interpretation of self-talk and post-lecture affective states of higher education students: A self-determination theory perspective. British Journal of Educational Psychology, 80(2), 307–323. https://doi.org/10.1348/000709909X477215

Peters, H. J., & Williams, J. M. (2006). Moving cultural background to the foreground: An investigation of self-talk, performance, and persistence following feedback. Journal of Applied Sport Psychology, 18(3), 240–253. https://doi.org/10.1080/10413200600830315

Purcell, K. (1981). A tennis forehand-backhand drive skill test which measures ball control and stroke firmness. Research Quarterly for Exercise and Sport, 52(2), 238–245. https://doi.org/10.1080/02701367.1981.10607862

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. Educational Psychologist, 44(3), 159–175. https://doi.org/10.1080/00461520903028990

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. Journal of Personality and Social Psychology, 43(3), 450–461. https://doi.org/10.1037//0022-3514.43.3.450

Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. Motivation and Emotion, 15(3), 185–205. https://doi.org/10.1007/BF00995170

Savard, A., Joussemet, M., Pelletier, J. E., & Mageau, G. A. (2013). The benefits of autonomy support for adolescents with severe emotional and behavioral problems. Motivation and Emotion, 37(4), 688–700. https://doi.org/10.1007/s11031-013-9351-8

Sheldon, K. M., & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. British Journal of Social Psychology, 47, 267–283. https://doi.org/10.1348/014466607X238797

Tenenbaum, G., Hall, H. K., Calcagnini, N., Lange, R., Freeman, G., & Lloyd, M. (2001). Coping with physical exertion and negative feedback under competitive and self-standard conditions. Journal of Applied Social Psychology, 31(8), 1582–1626. https://doi.org/10.1111/j.1559-1816.2001.tb02743.x

Theodorakis, Y., Hatzigeorgiadis, A., & Zourbanos, N. (2012). Cognitions: Self-talk and performance. In S. Murphy (Ed.), Oxford handbook of

sport and performance psychology. Part 2: Individual psychological processes in performance (pp. 191–212). New York, NY, US: Oxford University Press.

Tod, D., Hardy, J., & Oliver, E. (2011). Effects of self-talk: A systematic review. Journal of Sport & Exercise Psychology, 33(5), 666–687. https://doi.org/10.1123/jsep.33.5.666

Tzetzis, G., Votsis, E., & Kourtessis, T. (2008). The effect of different corrective feedback methods on the outcome and self confidence of young athletes. Journal of Sports Science and Medicine, 7(3), 371–378.

Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. Journal of Sport Psychology, 6(1), 94–102. https://doi.org/10.1123/jsp.6.1.94

Van Raalte, J. L., Cornelius, A. E., Brewer, B. W., & Hatten, S. J. (2000). The antecedents and consequences of self-talk in competitive tennis. Journal of Sport & Exercise Psychology, 22(4), 345–356. https://doi.org/10.1123/jsep.22.4.345

Vanraalte, J., Brewer, B., Rivera, P., & Petitpas, A. (1994). The relationship between observable self-talk and competitive junior tennis players match performance. Journal of Sport & Exercise Psychology, 16(4), 400–415. https://doi.org/10.1123/jsep.16.4.400

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. A., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. Journal of Personality and Social Psychology, 87(2), 246–260. https://doi.org/10.1037/0022-3514.87.2.246

Vansteenkiste, M., Simons, J., Soenens, B., & Lens, W. (2004). How to become a persevering exerciser? Providing a clear, future intrinsic goal in an autonomy-supportive way. Journal of Sport & Exercise Psychology, 26(2), 232–249. https://doi.org/10.1123/jsep.26.2.232

Vansteenkiste, Maarten, Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick, The decade ahead: Theoretical perspectives on motivation and achievement (Vol. 16A, pp. 105–165). Bingley, UK: Emerald.

Weinberg, R., Gould, D., & Jackson, A. (1979). Expectations and performance: An empirical test of Bandura's self-efficacy theory. Journal of Sport Psychology, 1(4), 320–331. https://doi.org/10.1123/jsp.1.4.320

Whitehead, J. R., & Corbin, C. B. (1991). Youth fitness testing: The effect of percentile-based evaluative feedback on intrinsic motivation. Research Quarterly for Exercise and Sport, 62(2), 225–231. https://doi.org/10.1080/02701367.1991.10608714

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. Journal of Personality and Social Psychology, 70(4), 767–779. https://doi.org/10.1037/0022-3514.70.4.767

Wright, B. J., & O'Halloran, P. D. (2013). Perceived success, auditory feedback, and mental imagery: What best predicts improved efficacy and motor performance? Research Quarterly for Exercise and Sport, 84(2), 139–146. https://doi.org/10.1080/02701367.2013.784842

Wulf, G., Chiviacowsky, S., & Lewthwaite, R. (2010). Normative feedback effects on learning a timing task. Research Quarterly for Exercise and Sport, 81(4), 425–431. https://doi.org/10.1080/02701367.2010.10599703

Zourbanos, N., Hatzigeorgiadis, A., Chroni, S., Theodorakis, Y., & Papaiciannou, A. (2009). Automatic self-talk questionnaire for sports (ASTQS): Development and preliminary validation of a

measure identifying the structure of athletes' self-talk. Sport Psychologist, 23(2), 233–251. https://doi.org/10.1123/tsp.23.2.233

Zourbanos, N., Hatzigeorgiadis, A., & Theodorakis, Y. (2007). A preliminary investigation of the relationship between athletes' self-talk and coaches' behaviour and statements. International Journal of Sports Science & Coaching, 2(1), 57–66. https://doi.org/10.1260/174795407780367195

Zourbanos, N., Hatzigeorgiadis, A., Tsiakaras, N., Chroni, S., & Theodorakis, Y. (2010). A multimethod examination of the relationship between coaching behavior and athletes' inherent self-talk. Journal of Sport & Exercise Psychology, 32(6), 764–785. https://doi.org/10.1123/jsep.32.6.764

APPENDIX

APPENDIX A: FEEDBACK MANIPULATIONS

Positive feedback following the first experimental trial

Autonomy-supportive communication style	Controlling communication style
Let us see if I can give you some feedback regarding the first series of exercises. There are norms for this exercise, based on the rankings of tennis players, which allow for comparison. I can tell you that you did well on the first part of this exercise, compared to other players your ranking. This is positive, as it shows that you are capable to focus well and be consistent in your strokes. I propose we proceed to the second set of exercises. I would like to challenge you further by increasing the difficulty level. This is done by increasing the dispersion of the tennis balls. I want to ask you to try showing a similar level of focus and consistency, despite the more difficult shots. I wish you all the best!	Let us see how you scored on this test, which is an important indication of your worth as a tennis player. There are norms for this test, based on the rankings of tennis players. You score well on the first part of this test, as could be expected from someone your ranking. You manage to hold your focus and be persistent for a relative long time period. However, attaining a particular proficiency level is only the beginning, consolidating is much more difficult. It's now time for the second part of this test. This is more difficult because we will increase the dispersion of the tennis balls. We expect from players your skill level that they perform equally well in this part. It's time to prove yourself.

Negative feedback following the first experimental trial

Autonomy-supportive communication style	Controlling communication style
Let us see if I can give you some feedback regarding the first series of exercises. There are norms for this exercise, based on the rankings of tennis players, which allow for comparison. I can tell you that you did not do so well on the first part of this exercise, compared to other players your ranking. This exercise requires a lot of focus and consistency in your strokes. The lower performance indicates that you could not manage very well to focus and be persistent. I propose we proceed to the second set of exercises. I would like to challenge you further by increasing the difficulty level. This is done by increasing the dispersion of the tennis balls. I want to ask you to try showing a similar level of focus and consistency, despite the more difficult shots. I wish you all the best!	Let us see how you scored on this test, which is an important indication of your worth as a tennis player. There are norms for this test, based on the rankings of tennis players. Your score on the first test shows that you won't set the world on fire. With regard to focus and consistency, more can be expected from a player your ranking. It's now time for the second part of this test. This is more difficult because we will increase the dispersion of the tennis balls. We expect from players your skill level that they perform better than you did so far. It's time to prove yourself.

Positive feedback following the second experimental trial

Autonomy-supportive communication style	Controlling communication style
Let's take a look at how you did on the second exercise trial, compared to other players your ranking. Again, I can see that you did very well. You adapted smoothly to the more difficult strokes and you kept focused throughout the entire exercise. Producing consistent strokes seems to be a quality of yours.	Let's evaluate how you scored on the second part of this test, compared to other players your ranking. Again, you performed very well, as I expected from someone your ranking. You proved being able to manage these more difficult strokes. Your consistency in strokes is appropriate.

Negative feedback following the second experimental trial

Autonomy-supportive communication style	Controlling communication style
Let's take a look at how you did on the second exercise trial, compared to other players your ranking. Again, I need to inform you that you did less well. Ensuring consistent strokes and focusing throughout the entire exercise is not an easy thing to do. Nonetheless, I would like to invite you to keep training your consistency.	Let's evaluate how you scored on the second part of this test, compared to other players your ranking. Again, your performance was not what we expect from a player your ranking. You did not sufficiently take your chance to prove yourself on these more difficult strokes. You really have to enhance your consistency in order to be able to perform at a higher level.

CHAPTER 5

The Interplay between Normative Feedback and Self-Critical Perfectionism in Competitive Tennis Players' Competence, Affect, and Cheating Behavior: An Experimental Study[1]

[1] De Muynck, G-J., Vansteenkiste, M., Vandenkerckhove, B., Vande Broek, G., & Soenens, B. (2018). The interplay between normative feedback valence and self-critical perfectionism in competitive tennis players' competence, affect, and cheating behavior: An experimental study. *Manuscript submitted for publication.*

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Feelings of competence play a key role in youth athletes' sport experiences and behaviors. Although competence is likely affected by both contextual and personal characteristics, most studies have focused on the role of either context or athletes' personality in competence. In order to study competence from a person x context perspective, the current experimental field study examined the unique and interactive role of outcome-based feedback and self-critical perfectionism in youth competitive tennis players' (N = 90; M_{age} = 15.56; SD = 1.59) competence need satisfaction and subsequent affect and cheating behavior. Participants first filled out a measure of self-critical perfectionism and then performed a series of tennis exercises, presented as a competition in which their results were compared to interpersonal standards. Results showed that positive, compared to negative, normative feedback enhanced competence need satisfaction, while self-critical perfectionism yielded a negative relation. Both predictors interacted such that self-critical perfectionism exacerbated the impact of negative normative feedback on competence. In turn, competence was found to play an intervening role in the association between normative feedback and players' experienced enjoyment and in the association between self-critical perfectionism and players' experienced tension. No relationships were found for cheating behavior. Overall, the results testify to the importance of studying competence from a person x context perspective.

INTRODUCTION

In competitive sports, feeling competent is a key factor underlying athletes' optimal functioning, motivation, and performance (Grove & Heard, 1997; Mageau & Vallerand, 2003; Moritz, Feltz, Fahrbach, & Maxk, 2000). Indeed, according to Self-Determination Theory (SDT, Ryan & Deci, 2017), which is often used as a guiding motivational theory in sport-related research (Hagger & Chatzisarantis, 2007; Vansteenkiste, Niemiec, & Soenens, 2010), competence represents a fundamental psychological need along with two other needs, that is, the needs for autonomy and relatedness. In SDT, competence need satisfaction is denoted by the experience of effectiveness and confidence in carrying out activities (White, 1959). The more youth athletes report feeling competent, the more they enjoy their sports (Ryan, 1982) and, as a consequence, the longer they stay active in competitive sports (Pelletier, Fortier, Vallerand, & Briere, 2001). Furthermore, competence need satisfaction relates to better decision making, less tension, better coping with setbacks, and greater perseverance (De Muynck et al., 2017; Hepler & Feltz, 2006; Whitehead & Corbin, 1991).

Given the crucial role of competence in sports, it is important to examine its sources, thereby paying attention to both contextual and personal factors. An important contextual source is the feedback athletes receive. If athletes are informed that they performed well (i.e., positive feedback), their competence need satisfaction typically increases (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008), whereas their competence typically stagnates or even gets undermined when athletes receive negative and demeaning feedback (Gernigon & Delloye, 2003). Next to contextual factors, personal factors, including personality traits, also play a key role in shaping competence-based experiences (Allen, Greenlees, & Jones, 2013). One personality dimension receiving much attention in research on athletes' competence, motivation, and performance is perfectionism (Flett & Hewitt, 2005). Self-critical perfectionism in particular is considered a risk factor for poor motivation and

performance in sports (Stoeber, 2011). Athletes high on self-critical perfectionism set excessively high standards for themselves and at the same time hinge their self-worth on the attainment of these standards, thereby engaging in harsh self-scrutiny when failing to meet standards (Blatt, 1995; Shafran, Cooper, & Fairburn, 2002). Therefore, they might benefit less in terms of competence satisfaction from positive feedback and performance success, while being hurt more severely by negative feedback or performance failure.

While research has addressed either the role of feedback valence (e.g., Vallerand & Reid, 1984) or the role of self-critical perfectionism (e.g., Koivula, Hassmen, & Fallby, 2002) in athletes' competence satisfaction during competition, few studies to date addressed the simultaneous effect of both sources of influence. Adopting a person x situation perspective (Mischel & Shoda, 1995) on competence feelings among competitive youth athletes, the present experimental study examined the unique and interactive role of contextual feedback and athletes' self-critical perfectionism in the prediction of their competence, affect, and cheating behavior.

FEEDBACK AS A SOURCE OF COMPETENCE-RELATED INFORMATION

During a competitive game, athletes receive a great amount of feedback, which is defined as the provision of competence-related information about athletes' performance on a particular task (Kluger & DeNisi, 1996). Feedback can be directly communicated to players, for instance, when coaches provide concrete hints for improvement (Carpentier & Mageau, 2013), but it can also be communicated to them indirectly. That is, in many cases, athletes can infer themselves how effective they are at performing an activity. To illustrate, athletes can rely on the outcome of the game to infer how well they performed. While winning a game has been found to foster competence, the loss of a game often comes with feelings of incompetence or even failure (Standage, Duda, & Pensgaard, 2005; Vansteenkiste & Deci, 2003).

The motivating impact of directly communicated feedback has been examined extensively. Especially the valence of feedback, which involves the degree to which the feedback conveys a positive or negative evaluation, was found to affect competence need satisfaction (De Muynck et al., 2017). Positive feedback comes with a host of benefits, including greater effort-expenditure, enjoyment, and better performance (Standage, et al., 2005; Vallerand & Reid, 1984), presumably because athletes of coaches who provide more positive feedback report greater feelings of competence (Mouratidis et al., 2008). The type of positive feedback delivered by coaches can differ and co-varies with their standards used to evaluate athletes' performance (Elliot, 2005). That is, coaches can focus on athletes' mastery of the task at hand, their progress made or their level of performance in relation to others players. Consistent with these different standards, past research found athletes to benefit in terms of competence when their coaches stressed good skill execution (i.e., task-based feedback; Tzetsis, Votsis, & Kourtessis, 2008), personal progress (i.e., intrapersonal feedback; Tenenbaum et al., 2001) or successful outperformance of others (i.e., normative feedback; Lewthwaite & Wulf, 2010) in their feedback. To illustrate the latter type of feedback, junior high school students who were informed that they were performing among the best twenty percent on an agility run found the exercise more enjoyable, perceived less tension and reported more effort, compared to students being informed they were performing among the worst twenty percent of students their age (Whitehead & Corbin, 1991).

Research has documented the presumed explanatory role of competence need satisfaction in accounting for the benefits of positive feedback. Both tennis players participating individually in a series of tennis exercises (De Muynck et al., 2017) and basketball players engaging in an interactive dribble and shooting task (Fransen et al., 2018) reported greater competence satisfaction when receiving positive feedback, with this improved competence satisfaction accounting for the observed benefits of positive

feedback on task enjoyment (see also Mouratidis et al., 2008; Vallerand & Reid, 1984).

When athletes receive negative feedback, they face the risk of experiencing lowered competence need satisfaction (Gernigon & Delloye, 2003), preventing them from experiencing the merits that come along with it (Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009). Reduced competence need satisfaction involves multiple costs, including a motivational deficit, as indexed by lowered effort-expenditure and reduced enjoyment, and an affective cost, as indexed by greater tension and more burnout (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011). When facing competence need frustration, athletes might engage in compensatory behaviors aimed towards the restoration of the frustrated need (Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013). Yet, these restorative attempts can vary greatly, with some individuals adopting a task-focused approach to regain mastery over the activity (Standage et al., 2005) and with others seeking a quick fix to restore their sense of competence, especially if the stakes of displaying incompetence are high. For example, need frustration has been found to predict cheating behavior among high school and college students (Kanat-Maymon, Benjamin, Stavsky, Shoshani, & Roth, 2015). Further, in punitive environments, which are highly evaluative and which involve the thwarting of both competence and autonomy, children have been found to lie more often (Talwar & Lee, 2011). Competence need frustration in particular was found to relate to more aggressive thoughts, feelings and actions (Przybylski, Deci, Rigby, & Scott, 2014). These studies provide indirect evidence for the possibility that competence frustration relates to morally questionable actions, such as cheating, a possibility investigated further herein.

Three more observations deserve being mentioned regarding the issue of feedback. First, although positive feedback generally yields greater benefits compared to negative feedback, some forms of positive feedback (i.e., person-oriented feedback) attenuate its motivating impact, while the demotivating

impact of negative feedback can be ameliorated when delivered in a specific (i.e., autonomy-supportive) way. With respect to the former argument, praising athletes for fixed traits (e.g., talents), compared to changeable behaviors (e.g., effort) has been found to backfire in terms of motivation and performance when athletes subsequently experience failure (Mueller & Dweck, 1998). Similarly, when negative feedback is formulated in an inviting way and when a meaningful rationale is given, its demotivating effects get somewhat buffered, presumably because the negative feedback is perceived as more legitimate (Mouratidis, Lens, & Vansteenkiste, 2010) and less competence-thwarting (Mabbe, Soenens, De Muynck, & Vansteenkiste, 2018).

Second, although sport coaches are discouraged to provide normative feedback because of its highly evaluative character, (Ames, 1992), such normative comparisons are inevitable in the realm of competitive sports where results, rankings and competition tables are omnipresent and often more easily available for athletes, compared to information about skill execution and personal progress. For example, competitive regional tennis players in Europe mostly compete at tournaments in the absence of their coaches. After the game, they can easily determine if they have won or lost (i.e., the outcome), but it is much harder to determine for themselves how they performed the technique of a particular stroke (i.e., the skill execution).

Third, although the topic of feedback has been well studied in the sport literature, a number of caveats can be detected. That is, the vast majority of these studies are correlational in nature, which prevents researchers from drawing any causal conclusions (e.g., Mouratidis et al., 2010). If an experimental design is used, non-athlete participants were sampled, which hampers the ecological validity of the obtained findings. Herein, we aimed to move the literature on feedback in sports one step further by conducting an experimental field study among athletes.

SELF-CRITICAL PERFECTIONISM AND COMPETITIVE SPORT EXPERIENCES

Self-critical perfectionism is characterized by the setting of unrealistically high standards, in combination with pervasive doubts about actions and concerns about mistakes (Dunkley & Blankstein, 2000; Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014). Given that individuals high on self-critical perfectionism hinge their self-worth on the attainment of standards for performance and engage in harsh self-scrutiny when encountering failure, they are at risk for lowered competence and self-worth (Blatt, 1995; Shafran et al., 2002). The impeding role of self-critical perfectionism in feelings of competence has been studied both in the sports domain and in other domains such as education and work (e.g., DiBartolo, Frost, Chang, LaSota, & Grills, 2004). Research clearly showed that self-critical perfectionism is related to competence frustration in adolescents (Boone et al., 2014) and to poorer appraisals of task performance (Frost & Marten, 1990). Such relationships have been documented specifically in the context of sports, with self-critical perfectionism relating to less self-confidence in athletes from various sports and skill levels (Frost & Henderson, 1991; Koivula et al., 2002) and to enhanced psychological need frustration among junior athletes (Mallinson & Hill, 2011).

Apart from its relationship with competence need satisfaction, self-critical perfectionism is also related to other maladaptive affective and behavioral outcomes in sports. In terms of affective functioning, relationships with stress and enjoyment are of particular importance for the current study. In a sample of intercollegiate athletes engaging in a variety of team and individual sports, self-critical perfectionism was found to contribute to athletes' appraisal of a competition as a threat, negative affect, and avoidance coping (Crocker, Gaudreau, Mosewich, & Kljajic, 2014). Self-critical perfectionism is also related to lower enjoyment among youth athletes from various team sports (Gucciardi, Mahoney, Jalleh, Donovan, & Parkes, 2012; Mallinson, Hill, Hall, & Gotwals, 2014). Given the relationships with

enhanced stress and reduced enjoyment, it should come as no surprise that self-critical perfectionism forecasts longitudinal increases in athlete burn-out (Madigan, Stoeber, & Passfield, 2016).

As for the behavioral correlates, relationships with cheating behavior are of relevance to the current study. Findings in the general population showed that self-critical perfectionism relates positively to an accepting attitude towards cheating (Bong, Hwang, Noh, & Kim, 2014) but not necessarily to actual cheating behavior (Nathanson, Paulhus, & Williams, 2006; Vansteenkiste, Smeets et al., 2010). To the best of our knowledge, the relationship between self-critical perfectionism and cheating behavior has not yet been documented in the context of sport.

THE INTERPLAY BETWEEN FEEDBACK AND PERFECTIONISM

Research on personality in general (Mischel & Shoda, 1995; Fleeson, 2007) and on perfectionism in particular (Sagar & Stoeber, 2009; Van der Kaap-Deeder, et al., 2016) increasingly considers the role of personality traits in interaction with contextual and situational influences. In this line of inquiry, it is assumed that personality affects the appraisal of situational events, thereby modifying the effect of the situation on individuals' outcomes. Conversely, contexts and situations may awaken or suppress behaviors and vulnerabilities associated with personality traits, thereby strengthening, respectively dampening, effects of personality on outcomes. With regard to self-critical perfectionism in particular, it can be assumed that individuals scoring high on this trait will have more critical and dysfunctional appraisals of negative feedback, resulting in a more pronounced experienced threat to their need for competence. Similarly, it can be reasoned that negative feedback awakens the tendency to engage in negative self-evaluation characteristic of athletes' high on self-critical perfectionism. In light of this reasoning, it can be expected that the combination of negative feedback and high levels of self-critical perfectionism has a surplus undermining effect on competence need satisfaction.

Consistent with the assumption that self-critical perfectionism affects athletes' reactions to feedback, athletes high on self-critical perfectionism have been found to experience more negative reactions to mistakes during competition (e.g., more images of mistakes, more worry about audience reactions), as reported by the athlete himself as well as by the coach (Frost & Henderson, 1991). Further evidence suggested that the motor performance of highly self-critical athletes deteriorated more quickly after receiving negative feedback, compared to their less perfectionistic counterparts (Anshel & Mansouri, 2005). More recently, individuals high in self-critical perfectionism were found to ruminate more about the received critical feedback and to accept it less, suggesting that they display poorer coping in reaction to competence frustrating experiences (Van der Kaap-Deeder et al., 2016). Given that the number of studies addressing the interactive interplay between feedback and self-critical perfectionism in general and in sport in particular is still limited, more research is clearly needed.

THE PRESENT STUDY

The general aim of the current article is to study athletes' competence development from a person x context perspective by examining the unique and combined effects of feedback valence and self-critical perfectionism. Regarding the unique effects, it is hypothesized that positive, compared to negative feedback enhances tennis players' competence need satisfaction, enjoyment and reduces experienced tension (hypothesis 1a). Self-critical perfectionism is assumed to relate negatively to competence need satisfaction and enjoyment, while relating positively to experienced tension (hypothesis 1b). In terms of their combined effect, we hypothesized that the detrimental effect of negative feedback would be more pronounced for athletes high on self-critical perfectionism (hypothesis 1c).

Further, competence need satisfaction was hypothesized to play an intervening role in the relationships between feedback valence and self-critical perfectionism on the one hand, and enjoyment and experienced tension on the

other hand (hypothesis 2). To examine this issue as rigorously as possible, competence need satisfaction was measured in between the manipulations and the measurement of the competitive experiences.

Finally, the effects of feedback valence and self-critical perfectionism on cheating behavior were inspected in a more explorative manner (Research Question 1), as these effects have not yet been investigated in the context of competitive sports and because the evidence in other contexts is inconclusive. We expected that effects of negative feedback and self-critical perfectionism on cheating behavior, if any, would be positive and that competence need frustration would play an intervening role in these potential effects. Much like with the other outcomes, we also examined the interactive contribution of feedback valence and self-critical perfectionism in the prediction of cheating.

METHOD

PARTICIPANTS

Ninety competitive tennis players (67.8% boys) aged between 13 and 19 years (M_{age} = 15.56; *SD* = 1.59) participated in the current study. Seventy-four had the Belgian nationality (82.2%), whereas 16 participants had the Dutch nationality. With 68 tennis players (75.6%), the majority of participants was lowly ranked; 22 tennis players had a high national ranking. Tennis players trained on average approximately 3.5 hours a week ($M_{training}$ = 3.42; *SD* = 3.28), with weekly training hours ranging from 1 to 15.

PROCEDURE

To facilitate the recruitment of participants, the head coaches of fifteen tennis clubs were informed about the global aim of the study and asked for permission to recruit youth tennis players they coached as participants. All of the head coaches agreed and signed an informed consent form. Subsequently, youth tennis players were informed about the study following their regular training and were invited to participate. Those who were willing

to participate signed an informed consent form and, for participants younger than eighteen years, active parental consent was also obtained. Directly following the provision of informed consent, tennis players filled in a pre-experimental questionnaire (see further for more details regarding the content of the questionnaires). Finally, the experimental phase was planned for each player.

The experimental phase individually took place at the tennis players' club at least one day after filling in the pre-experimental measures. Upon arrival at their club, the experimenter explained the exercise to the participants. They had to return balls coming from a tennis ball machine (Pro Match-Pro model) into one of two zones of choice, which were marked by two posts. To score a point, the ball had to bounce inside the court and go through a designated zone. The whole experiment was framed as a competitive event, with the main price being a duo-ticket for Wimbledon 2017. Each participant went through the same sequence of strokes, which was a random alternation of forehands and backhands. Participants were told that they were going to perform three series of exercises, preceded by a probation trial. The probation trial encompassed ten strokes and was used as means of familiarization and warming up. Subsequently, two exercises of forty strokes each were offered with increasing difficulty in order to prevent tennis players inferring feedback for themselves by comparing their performance on different trials. Both of these two trials were divided in four rallies of ten strokes each, with twenty seconds rest in between subsequent rallies. In addition to score tracking by the experimenter, participants were asked to count for themselves how many strokes they scored within each rally and to write down their achievement in the small pause following each rally on a paper that was positioned at the corner of their playing half. At the end of each of these trials (of forty strokes), participants were given manipulated feedback and, subsequently, completed a measure tapping into their competence need satisfaction. Specifically, participants, matched for gender and skill level, received randomly provided positive or negative feedback following both the

first and the second tennis exercise. In the negative and positive feedback group, tennis players were told that they performed, respectively, worse and better than 73 and 76 percent of tennis players their ranking and age. In addition, participants in the neutral feedback valence condition were told that they performed at percentiles 53 and 56 during the first and second exercise trial, respectively.

Following the second exercise, participants were informed how many additional points they needed to score in the last exercise to make a fair chance to win the competition and, thus, the Wimbledon tickets. For each participant, this number was based on the participants' average performance on the two previous trials by adding forty percent to that performance. The last exercise of forty strokes differed from the previous two because it was not divided in four rallies of ten strokes each, so participants had no little breaks in between. Furthermore, the experimenter made up a story in order to leave the training field so that participants were deceived to be fully responsible for tracking their own score. This story involved being called away during the third exercise with the first participant taking the test and willing to offer every participant the same conditions in the simulated competition.

In reality, two video cameras were located at the back of the court, opposite to the participants' half in order to track participants' scores and to identify whether or not they cheated while tracking and reporting their own score. Due to the obtrusive placement of the cameras, which was in extension of the zones to which participants had to aim, participants were given a bogus explanation regarding the true aim of the cameras. Specifically, participants were told in the introduction of the experimental phase that these cameras were used to film their technique in order to analyze the effects of competition on technical execution in detail.

After participants had finished the last exercise, the experimenter re-entered the training facility, briefly asked how the exercise went and how many points they had scored. Subsequently, participants were asked to fill in a post-experimental questionnaire. Upon handing in this questionnaire,

participants were debriefed individually and asked not to discuss the true nature of the experiment with other tennis players, so that they could participate in the study as well. During the debriefing, the experimenter probed if the participants suspected the through nature of the study with regard to the manipulated feedback and the true aim of the cameras before disclosing that no Wimbledon tickets would be allocated, but each participant would be thanked for participation by means of a can of tennis balls. In total, one participant found the provided feedback to be incredible and three other participants noted having figured out the true objective of the cameras. The former participant was excluded from all analyses, while the latter three participants were excluded from the analyses regarding cheating behavior. The ethical committee of Ghent University approved the study.

INSTRUMENTS

Pre-experimental measures. Upon signing an informed consent form, participating tennis players filled in a questionnaire tapping into background characteristics, trait-competence need satisfaction and self-critical perfectionistic traits.

Trait-competence need satisfaction. To measure trait-competence need satisfaction, the Perceived Competence Scale (Williams & Deci, 1996) was adapted to fit within the context of competitive tennis. This scale used a Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*) and encompassed four items (e.g., "I believe in my abilities as a tennis player"; α = .78).

Self-critical perfectionistic traits. The doubt about actions and concern over mistakes subscales from the Frost Multidimensional Perfectionism Scale was used to tap into participants' self-critical perfectionism traits (Frost, Frost, Marten, Lahart, & Rosenblate, 1990). Participants responded on a five point Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). Four items were used to tap into participants' doubts about actions (e.g., "Even when I do something very carefully, I often

feel that I do not do it completely correct"), while nine items tapped into concern over mistakes (e.g., "Other people will not respect me if I do not perform well all of the time"). Taken together, the self-critical perfectionism measure shows good internal reliability (α = .81).

Measures during the experimental phase. In between subsequent tennis exercises, tennis players were asked to report about their current competence feelings, as a measure of state-competence need satisfaction. Regarding the last tennis exercise, they were also asked to track their performance in order to become a measure of cheating.

State-competence need satisfaction. In order to measure participants' momentary competence need satisfaction, the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015) was adapted to the younger age of several participants and to the specific context of the current experiment. This questionnaire was administered after both the first and the second tennis exercise, more or less one minute after feedback provision. A Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*) was used to measure need satisfaction (2 items; e.g., "after receiving feedback regarding the first/second tennis exercise, I feel capable") and need frustration (2 items; e.g., "after receiving feedback regarding the first/second exercise, I am unsure about my tennis abilities"). Because competence need satisfaction and frustration were moderately correlated (r = -.55; p < .001), a composite measure was created over the two questionnaires by averaging the need satisfaction items with the reversed scored need frustration, as done in previous research using this scale (Van der Kaap-Deeder et al., 2015). Internal consistency of this 8-item scale was good (α = .86).

Cheating. In the third exercise, participants were asked to count for themselves how many points they scored. This exercise was performed in absence of the experimenter and participants were asked to write down their score on a sheet of paper immediately after the end of the exercise. On a later moment, the video recordings were used to determine the true score of the

participants. The difference between the participant-generated score and the real score was used as a continuous measure of cheating.[2]

Post-experimental measures. Directly following the third tennis exercise, tennis players gathered the balls and were asked to fill in a last questionnaire, tapping into their task perceptions.

Perceived enjoyment. The intrinsic experience subscale from the Flow State Scale (Jackson & Marsh, 1996) was used to measure tennis players' enjoyment during the three tennis exercises. Using a Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*), four items tapped into tennis players' enjoyment (e.g., "during participation in this competition, I really enjoyed playing tennis"; α = 84.).

Perceived tension. Four self-created items were used to measure perceived tension during the third tennis exercises. Two items tapped into feelings of tension (e.g., "During participation in this competition, I felt tensed"), whereas the other two tapped into perceived relaxation (e.g., "During participation in this competition, I felt relaxed"). The latter items were reverse scored and averaged with the former items in order to create a composite score of perceived tension, which was internally reliable (α = 79). This procedure was also justified by the moderate negative correlation between those two constructs (r = -.53; p <.001).

[2] Next to the continuous variable of cheating, we also replicated analyses using a dichotomous cheating variable. Because participants might mistakenly perceive a stroke going through the designated zone or make a mistake while keeping track of their scores, we used an error margin of 2 strokes to define cheating behavior. Thus, in the dichotomous measure of cheating, participants were considered to cheat when their reported score exceeded their real score by three or more.

RESULTS

PRELIMINARY ANALYSES

To examine the associations between gender and variables of interest, independent-samples t tests were performed. These tests showed that men and women did not differ in terms of outcome variables. Independent-samples t tests regarding tennis players' ranking revealed that highly ranked tennis players perceived more state-competence need satisfaction, compared to their lowly ranked counterparts (M_{high} = 3.67; SD_{high} = .62; M_{low} = 3.24; SD_{low}= .72; $t(86)$ = -2.45; p = .02) and cheated more often (M_{high} = 3.56; SD_{high} = .4.55; M_{low} = 1.26; SD_{low}= 2.83; $t(77)$ = -2.60; p = .01). Main analyses were controlled for significant relationships between background variables and variables of interest.

Bivariate correlations are reported in Table 1 and showed that tennis players who trained more frequently reported greater competence and enjoyment during the tennis exercises. In addition, the more tennis players trained, the more they cheated on the third tennis exercise. Further, trait competence differences related positively to competence and enjoyment during the tennis exercises and negatively to tension.[3]

[3] When using the dichotomous variable of cheating, no relations between background characteristics and cheating behavior were found.

Table 1. Bivariate Correlations among Pre-Experimental, Experimental, and Post-Experimental Measures

	1	2	3	4	5	6
Pre-experimental measures						
1. Age						
2. Training frequency	-.12					
3. Trait competence	-.09	.40**				
Experimental measures						
4. State-Competence	-.15	.28**	.47**			
Post-experimental measures						
5. Enjoyment	-.02	.25*	.39**	.63**		
6. Tension	.04	-.14	-.31**	-.49**	-.41**	
7. Cheating behavior	.02	.33**	.05	.12	.05	.16

MAIN ANALYSES

Effects of feedback Valence. A MANCOVA with feedback valence (0 = negative; 1 =positive) as a predictor, training frequency, trait-competence need satisfaction, gender and ranking as covariates, and state-competence need satisfaction, perceived enjoyment, perceived tension and cheating behavior as dependent variables was found significant (Wilks λ = .72, F(4,45) = 4.29, p = .005). As presented in Table 2, follow-up univariate ANOVA analyses showed that positive, compared to negative, normative feedback enhanced state competence need satisfaction and perceived enjoyment during play, whereas it did not impact perceived tension and cheating behavior. [4]

Table 2. Means and Standard Deviations for Positive and Negative Feedback Conditions, and ANOVA Results for Feedback Valence

	Negative Feedback		Positive Feedback		*F(df)*	*p*	η^2
	M	*SD*	*M*	*SD*			
Competence	3.00	.71	3.66	.55	14.69 (1,53)	<.001	.22
Enjoyment	3.81	1.06	4.71	.94	10.80 (1,55)	.002	.16
Tension	2.26	.80	1.93	.58	1.95 (1,55)	.17	.03
Cheating	1.58	2.59	2.31	4.28	.47 (1,48)	.50	.01

Note. ANOVA = Analysis of variance.

[4] To examine potential differences of positive and negative feedback with the comparison group, which was neutral in valence, two additional MANOVA analyses were conducted. The MANOVA with the difference between negative and neutral feedback valence (0 = negative; 1 = neutral) as predictor, training frequency, trait competence need-satisfaction and ranking as covariates, and state-competence need satisfaction, perceived enjoyment, perceived tension and cheating behavior as dependent variables was found to be non-significant (Wilks λ = .86, F(4,47) = 1.89, p = .13). The MANOVA with the difference between positive and neutral feedback valence (0 = neutral; 1 = positive) as predictor, training frequency, trait competence need-satisfaction and ranking as covariates, and state-competence need satisfaction, perceived enjoyment, perceived tension and cheating behavior as dependent variables was found to be non-significant (Wilks λ = .91, F(4,46) = 1.19, p = .33). These results suggest that the neutral feedback comparison group falls in between negative and positive feedback conditions, not differing from any of the two other conditions.

Associations with self-critical perfectionism. Linear regression analyses were used to examine the associations of self-critical perfectionism and the interactive role between self-critical perfectionism and feedback (see Table 3). For each outcome variable, significant background characteristics, feedback valence and self-critical perfectionism were entered simultaneously as independent variables in Step 1, while the interaction between self-critical perfectionism and feedback was entered in Step 2. The interaction term was created by multiplying the standardized variables of feedback and self-critical perfectionism. Results indicated that self-critical perfectionism related negatively to state competence need satisfaction, while being positively related to perceived tension. No relationships were found for perceived enjoyment and cheating behavior[5]. The findings for feedback mirrored those reported in the MANOVA-analysis.

As for the interaction between feedback valence and self-critical perfectionism, one out of four possible interactions reached significance. Specifically, the interaction between feedback valence and self-critical perfectionism was significantly related to state competence need satisfaction. The interaction showed that tennis players who are more self-critical perfectionistic, suffer more from negative feedback (See Figure 1), with regions of significance analyses indicating that the interaction becomes significant for participants who score 1.86 or higher on self-critical perfectionism on a scale ranging from 1 to 5. This effect corresponds with the interaction being significant for 77.9% of the total sample. Among the remaining 22.1% of the participants, competence need satisfaction was not affected by positive, compared to negative feedback.

[5] When using the dichotomous variable of cheating, no relations were found for outcome-based feedback valence (χ^2 (1) = .11, p = .74; *odds ratio* = 1.22), self-critical perfectionistic traits (χ^2 (1) = .004, p = 95, *odds ratio* = .97) and their interaction (χ^2 (1) = .50, p = .48; *odds ratio* = 1.28).

Table 3. Standardized Regression Coefficients for Feedback Valence, Self-Critical Perfectionism and their Interaction in the Prediction of Outcomes

	Competence		**Enjoyment**		**Tension**		**Cheating**	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Training frequency	-.07	-.06	.25+	.25+	/	/	.28	.27
Ranking	.25+	.20	/	/	/	/	.15	.16
Trait competence	.25*	.29*	.09	.10	-.26*	-.28*	/	/
Valence	.40**	.39**	.37**	.37**	-.16	-.15	.09	.10
Self-critical perfectionism	-.31**	-.37**	-.15	-.17	.31*	.35**	.05	.07
Valence x perfectionism		.23*		.05		-.17		-.05

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

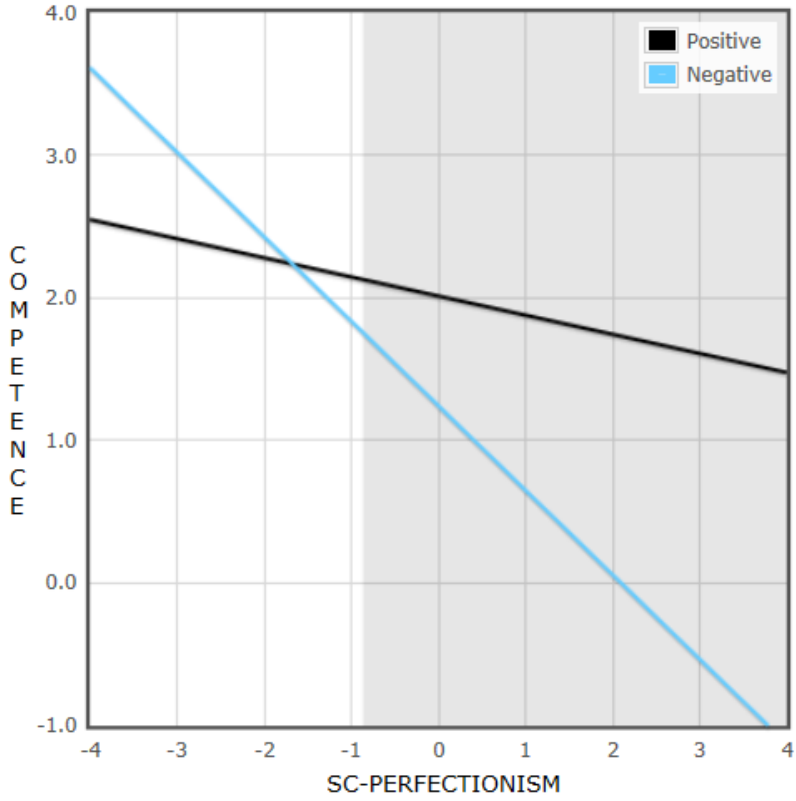

Figure 1. Regions of significance regarding the interaction of feedback valence and self-critical perfectionism with state-competence need satisfaction

Intervening effect. To test whether state competence need satisfaction fulfills an intervening role between feedback valence, self-critical perfectionism and their interaction on the one hand, and enjoyment, tension and cheating behavior on the other hand, Structural Equation Modeling (SEM) analyses were performed using MPLUS 7 (Muthén & Muthén, 2010). Solutions were generated on the basis of maximum likelihood estimation and model fit was evaluated on the basis of the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the comparative fit index (CFI). Combined cut-off values of .06 for RMSEA, .08 for SRMR, and .95 for CFI were used as criteria for good fit (Hu & Bentler, 1999).

To ensure sufficient power with the relatively low sample size, a manifest variables model with ten variables was estimated. In this model, state competence need satisfaction was modeled as an intervening variable. To do so, contrast coded feedback valence (negative feedback coded as 0; positive feedback coded as 1), self-critical perfectionism, their interaction and significant background variables were modeled as predictors of state competence need satisfaction. In turn, state competence need satisfaction was modeled as a predictor of perceived enjoyment, perceived tension and cheating behavior. Results showed only one non-significant pathway; the path between state competence need satisfaction and cheating behavior. Despite this non-significant pathway, model fit was good (χ^2 (18) = 20.34; RMSEA = .05; SRMR = .06; CFI = .98).

The indirect effects from feedback valence through state competence need satisfaction to perceived enjoyment (β = .26, p <.001) and tension (β = -.24, p <.001) were both significant, which was not the case for cheating behavior (β = .04, p = .30). The same holds true for self-critical perfectionism (β = -.24, p = .001; β = .23, p = .002; β = -.04, p = .34 resp.) and the interaction between feedback valence and self-critical perfectionism (β = .14, p = .047; β = -.13, p = .048; β = .02, p = .38 resp.). Model fit did not improve significantly when direct pathways from the independent variables and their interaction were added to the prediction of each of the dependent variables (χ^2 (9) = 6.17, p = .72), with none of the nine direct pathways being significant. Therefore, the more parsimonious model did not include these direct paths. A graphical representation of the final model can be found in Figure 2.

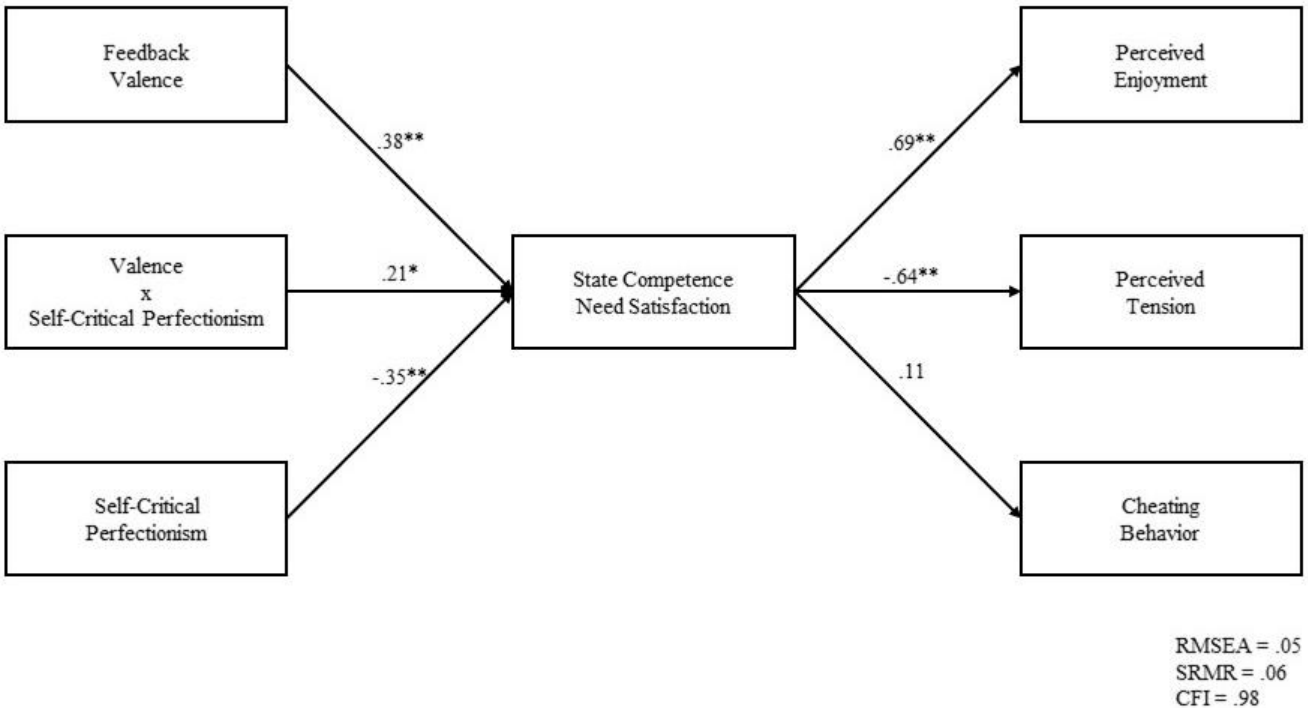

Figure 2. Structural model tested with SEM analyses. *$p < .05$, **$p < .01$

DISCUSSION

Feelings of competence play a crucial role in youth-athletes' sporting experiences, as competence relates to enhanced vitality and intrinsic motivation, while also being associated with less physical symptoms (Reinboth, Duda, & Ntoumanis, 2004). Therefore, the current study aimed at identifying factors in the competitive sports environment potentially impacting on competence need satisfaction and, subsequently, on youth athletes' motivational, affective and behavioral functioning. To do so, the current study relied on a person x context perspective, looking into self-critical perfectionism, normative feedback, and their interplay.

HOW DEMOTIVATING IS NEGATIVE NORMATIVE FEEDBACK?

Given the omnipresence of competition in youth sports, tennis players were placed into a competitive situation in which they had to perform multiple tennis exercises. By manipulating the valence of normative feedback they received, the impact of competitive outcomes was examined. In line with expectations, positive, compared to negative, normative feedback increased tennis players' competence need satisfaction and enjoyment. This finding is in line with previous correlational (Mouratidis et al., 2008; Study 2), longitudinal (Gillet, Berjot, & Gobancé, 2009), and experimental (Fransen et al., 2018; Reid & Vallerand, 1984) work. The current finding builds on the existing evidence base by sampling competitive tennis players for a tennis-specific drill, performed on tennis courts, rather than using university students to participate in a competition-like activity in a laboratory context. As such, the ecological validity of correlational studies was combined with the methodological rigor of experimental research. In line with reasoning from SDT, competence need satisfaction was found to function as an intervening variable between normative feedback valence and perceived enjoyment (Whitehead & Corbin, 1991). In contrast with the effects on competence need satisfaction and enjoyment, no direct effects on perceived tension were found,

although normative feedback valence had an indirect effect on tension, through competence need satisfaction. This finding indicated that positive, in contrast with negative feedback, enhanced competence need satisfaction, which, in turn, related to less perceived tension. The link between basic psychological need satisfaction and tension is consistent with previous research (e.g., Quested et al., 2011).

The lack of a direct effect of normative feedback on tension is at odds with previous research, indicating that winning produced stress reduction in elite rugby players, while losing did not (Wilson & Kerr, 1999). One possible explanation for this unexpected finding is that the perceived importance of the exercises was too low for negative feedback to have an impact on tension. Another explanation might be the lack of a human opponent, as tennis players played against a tennis ball machine. Although competing against a human opponent is inconvenient for standardization, it would further enhance ecological validity and might be conducive to increasing levels of tension. A final explanation is that the manipulation of negative feedback in the current study might be insufficiently undermining in order to enhance a detrimental outcome. Indeed, previous research clearly demonstrated differential and unique pathways for supportive and undermining climates (Bartholomew et al., 2011; Haerens, Aelterman, Vansteenkiste, Soenens & Van Petegem, 2015), such that the mere lack of supportive elements does not equal a truly undermining climate (Vansteenkiste & Ryan, 2013). To examine whether participants perceived the negative feedback as truly undermining, the mean score on competence need frustration was subtracted from the mean score on competence need satisfaction, with a negative outcome being indicative of a truly undermining effect. Results showed, in line with our reasoning, that negative feedback in the current study was found to produce greater competence frustration, compared with competence need satisfaction, in only 37.9% of the participants assigned to the negative feedback condition. Additional support for the reasoning that the negative feedback provided in the current study was rather mild was obtained by additional analyses showing

that the negative feedback condition did not differ significantly from the neutral condition on any of the variables of interest. Finally, it is well possible that the negative feedback may not be demotivating for all individuals, an explanation which received some evidence in the present study.

SELF-CRITICAL PERFECTIONISM AS A VULNERABILITY FACTOR

Indeed, the present study indicates, congruent with a person x context perspective, that personal factors might affect youth athletes' perceptions of negative feedback. We specifically examined the role of self-critical perfectionism, both because this personal factor is heavily implied in participants' skill development (Hall, 2006) and because it is highly prevalent in athletes (Szymanski & Chrisler, 1991). Regarding the unique relationships of self-critical perfectionism, results indicated that the more self-critical perfectionism tennis players reported beforehand, the less competence need satisfaction and the more tension they reported during the tennis exercises. The negative relationship between self-critical perfectionism and competence need satisfaction confirms and further refines research in sports showing that self-critical perfectionism relates to less need satisfaction in junior athletes from a variety of sports (Jowett, Hill, Hall, & Curran, 2016). Findings with regard to tension are also in accordance with previous studies, underlining the vulnerabilities associated with self-critical perfectionism with regard to affective experiences in sport (Mallinson & Hill, 2011). In line with the current findings, other studies also showed a positive relation between self-critical perfectionism and anxiety in student-athletes (Stoeber, Otto, Pescheck, Becker, & Stoll, 2007) and indicated that self-critical, compared to non-perfectionistic competitive athletes showed elevated levels of cognitive and somatic anxiety (Martinent & Ferrand, 2006). Additionally, the current study showed that competence need satisfaction functioned as an intervening variable between self-critical perfectionism and perceptions of tension.

At odds with the formulated hypotheses and some previous studies (Mallinson et al., 2014), self-critical perfectionism was not related to reduced

enjoyment in the tennis exercises. Possibly, direct relationships with unfavorable outcomes are more probable, given the negative nature of self-critical perfectionism. This line of reasoning is supported by earlier studies, showing no relationship with autonomous motivation, but pointing towards a positive relationship with controlled motivation (Mouratidis & Michou, 2011; Vansteenkiste et al., 2010). Despite the lack of a direct relationship between self-critical perfectionism and enjoyment, an indirect relationship via competence need satisfaction was found. This finding corresponds with evidence linking self-critical perfectionism to diminished basic psychological need satisfaction on the one hand (Boone et al., 2014), and evidence linking competence need satisfaction to enjoyment on the other hand (Whitehead & Corbin, 1991).

Apart from the direct effect of personal factors on task perceptions and behavior, personal factors might also impact on how individuals react to a contextual event. Indeed, results regarding the interplay between feedback and self-critical perfectionism showed that tennis players scoring higher on self-critical perfectionism suffered more from negative outcome-related feedback in terms of competence need satisfaction. Although other correlational studies already showed similar findings (e.g., Lizmore, Dunn, & Dunn, 2016), this is the first study to our knowledge to examine the role of self-critical perfectionism in reaction to experimentally induced success or failure in the context of sports. One potential explanation for this finding is that people higher on self-critical perfectionism ruminate more and display less acceptance in response to failure (Van der Kaap-Deeder et al., 2016). If this reasoning holds true, the exacerbating effect that self-critical perfectionistic traits may hold in response to failure should become more pronounced if the time between experiencing the failure and the measurement of competence is prolonged. This might be a fruitful avenue for future research. Another possible explanation is that self-critical perfectionism urges athletes to use less favorable attributions in response to failure, indicated by a greater tendency to attribute success externally and a reduced tendency to

attribute success internally or failure externally (Stoeber & Becker, 2008). By doing so, they take less credits for their successful performances while holding themselves more responsible for failures, possibly explaining why negative outcome-based feedback does more harm for people with more self-critical perfectionistic traits. This line of reasoning might also explain why people scoring extremely low on self-critical perfectionism were not differentially affected by positive or negative feedback. These participants probably attribute failure almost completely to external factors, which enables them not to ruminate about it at all. Examining this claim might be a fruitful avenue for future research.

Despite the person x context interaction for competence need satisfaction, no direct interaction effect was found on enjoyment or perceived tension. This non-significant effect might be attributable to competence being a more proximal outcome, compared to enjoyment or tension. Indeed, the interaction between normative feedback and self-critical perfectionism was found to be indirectly relevant for enjoyment and tension through its effect on competence. Specifically, the interaction impacted on tennis players' competence, which, in turn, impacted on their enjoyment and tension. The lack of a direct effect might also be attributable to the limited sample size, as only sixty participants were included in this analysis. Future research might want to examine this interaction with a more extensive sample.

A final note on the findings regarding to self-critical perfectionism has to do with how this concept was operationalized within the current study. Tennis players' self-critical perfectionism was measured in a global, trait-like fashion (e.g., "Performing worse than others means that I am an inferior as person"). In other words, the items lacked context-specificity, such that it is unclear which particular situation participants had in mind when completing the self-critical perfectionism questionnaire. Although trait-like and domain-specific perfectionism have been shown to be strongly interrelated (Boone, Soenens, Vansteenkiste, & Braet, 2012; Rice, & Aldea, 2006), they do not overlap perfectly. Possibly, a more sport-specific measure of self-critical

perfectionism results in stronger associations with athletes' affective (i.e., competence, enjoyment, tension) and moral functioning (i.e., cheating) and more easily interacts with feedback valence in contributing to these outcomes. Future research might address this reasoning.

ANTECEDENTS OF CHEATING BEHAVIOR

Regarding cheating behavior, the present study found no relationship with either manipulated feedback or self-reported self-critical perfectionism. To the best of our knowledge, no previous studies examined the relationship between self-critical perfectionism and cheating behavior in sport. Although some studies approximated this issue by looking into the relationship between self-critical perfectionism and attitudes towards doping. These studies, however, obtained inconsistent results, with some showing weak positive relationships in elite athletes (Bae, Yoon, Kang, & Kim, 2017) and others showing no or weak negative relationships among lower level athletes (Sas-Nowosielski & Budzisz, 2017). Furthermore, attitudes do not equal behavior (in regard with doping attitudes and behavior, see Petroczi, 2007), such that it is possible that athletes are tempted to cheat, without actually doing it. Future research might take such attitudes into account up and above cheating behavior.

It is remarkable to find that none of the variables of interest related to tennis players' cheating behavior, as this was thought to function as a compensatory behavior in handling competence need frustration, as previous studies outside the sport domain linked psychological need frustration to cheating behavior (Kanyat-Maymon et al., 2015; Talwar & Lee, 2011). Furthermore, within the context of sports, athletes with more self-critical perfectionistic traits are also found to react with more anger following mistakes (Vallance, Dunn, Causgrove, & Dunn, 2006), which may make them vulnerable to act out their frustration, whether or not by cheating. However, no links were found between reduced competence need satisfaction and cheating behavior, which might be because the negative feedback used in the

current study failed to be truly competence need frustrating, as already mentioned.

Several explanations can be put forward to explain the lack of relationships between cheating behaviors and both manipulated normative feedback and self-critical perfectionism. First, mean values of cheating are very low across the study, which might indicate that the procedure and task used in this study was not meaningful enough for participants to cheat. Secondly, the presence of video-cameras on the court might also make tennis players more reluctant to lie about their actual performance. Third, a small difference in reported and actual score might also be due to a counting or perception mistake (e.g., thinking a stroke landed just inside the court or zone, while actually just being out), possibly clouding the results. However, when only taking those participants into account who reported scoring three strokes or more than they actually did, as to exclude mistakes in counting, still no differences in cheating were found according to normative feedback valence. The same holds true for self-critical perfectionism, when cases with possible counting mistakes are excluded, there still was no relationship between self-critical perfectionism and cheating behavior. Fourth, the lack of relationships with cheating, even when excluding possible counting mistakes, can also be attributed to the fact that every participant, irrespective of the experimental condition they were randomly assigned to, was told that they could win a price if they did well. As such, a goal with a normative standard was communicated, which has been linked with increased cheating behavior (Van Yperen, Hamstra, & Van der Klauw, 2011). Furthermore, the normative feedback given between exercises, might strengthen the interpersonal competition and thus, further stimulate cheating behavior in both experimental groups. However, the reason to cheat might differ for tennis players receiving negative, compared to those receiving positive outcome-related feedback. Tennis players in the negative feedback condition were told twice that they performed more poorly than others their age and skill level. Therefore, their competence need satisfaction might be undermined, tempting them to cheat as

a shortcut to illustrate competence or to save face. Tennis players in the positive feedback condition, on the other hand, were told that they performed above the average player of their age and skill level. As such, they were close to winning the expected Wimbledon tickets. Having those tickets within reach might also have tempted these players to lie about their actual performance. Future studies might disentangle more clearly these different possible precursors of cheating behavior.

LIMITATIONS

As all research, the current study also has its limitations. First, the generalization of the current study's findings is limited in two ways. (a) As only tennis players were sampled for the current study, it is unclear if the findings also hold for other individual and team sport athletes. (b) Because outcome-based feedback was used in the current study, the question raises if feedback valence has similar effects in case performance of athletes is compared to task standards (Tzetzis et al., 2008) or previous personal accomplishments (Tenenbaum et al., 2001). Previous research already indicated some pitfalls of feedback comparing athletes' performance with performances of others or a norm table (Ames, 1992). However, outcome-based feedback is relevant in competitive sports because rankings and competition tables are omnipresent in this context. Furthermore, outcome-based feedback is most useful to ensure a good balance between credibility and standardization in experimental research. A second limitation of the current study concerns the small sample size, which precluded using a latent variable SEM-model. As data collection was time-consuming, collecting a larger sample was unrealistic. A final limitation has to do with only looking into self-critical perfectionism, thereby ignoring the personal standards perfectionism (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000), which shows a more ambivalent outcome pattern in sport, exercise and dance (Jowett, Mallinson, & Hill, 2016). Future research might explore the role of

this perfectionism subtype in reaction to feedback, as well as its relationships with affective and behavioral functioning in sport.

CONCLUSION

This study showed how contextual and personal factors both uniquely and in conjunction with one another impact on tennis players' competence need satisfaction, and subsequently, their affective and behavioral functioning. Regarding the unique contributions, both negative, compared to positive, outcome-based feedback and self-critical perfectionism was found to be detrimental for tennis players' competence need satisfaction. Regarding their interplay, results showed that tennis players' self-critical perfectionism further aggravated the competence undermining effect of negative feedback. In turn, competence need satisfaction was found to serve as an intervening variable between both outcome-based feedback and self-critical perfectionism on the one hand, and perceived tension and enjoyment on the other hand, whereas no relationships were evident for cheating behavior.

REFERENCES

Allen, M. S., Greenlees, I., & Jones, M. (2013). Personality in sport: A comprehensive review. *International Review of Sport and Exercise Psychology*, *6*(1), 184–208. https://doi.org/10.1080/1750984X.2013.769614

Ames, C. (1992). Achievement goals and adaptive motivation patterns: The role of the environment. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161–176). Champaign, IL: Human Kinetics.

Anshel, M., & Mansouri, H. (2005). Influences of perfectionism on motor performance, affect, and causal attributions in response to critical information feedback. *Journal of Sport Behavior*, *28*, 99–124.

Bae, M., Yoon, J., Kang, H., & Kim, T. (2017). Influences of perfectionism and motivational climate on attitudes towards doping among Korean national athletes: A cross sectional study. *Substance Abuse Treatment Prevention and Policy*, *12*, 52. https://doi.org/10.1186/s13011-017-0138-x

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thogersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459–1473. https://doi.org/10.1177/0146167211413125

Blanchard, C. M., Amiot, C. E., Perreault, S., Vallerand, R. J., & Provencher, P. (2009). Cohesiveness, coach's interpersonal style and psychological needs: Their effects on self-determination and athletes' subjective well-being. *Psychology of Sport and Exercise*, *10*(5), 545–551. https://doi.org/10.1016/j.psychsport.2009.02.005

Blatt, S. J. (1995). The destructiveness of perfectionism: Implications for the treatment of depression. *American Psychologist*, *50*(12), 1003–1020. https://doi.org/10.1037//0003-066X.50.12.1003

Bong, M., Hwang, A., Noh, A., & Kim, S. (2014). Perfectionism and motivation of adolescents in academic contexts. *Journal of Educational Psychology*, *106*(3), 711–729. https://doi.org/10.1037/a0035836

Boone, L., Soenens, B., Vansteenkiste, M., & Braet, C. (2012). Is there a perfectionist in each of us? An experimental study on perfectionism and eating disorder symptoms. *Appetite*, *59*(2), 531–540. https://doi.org/10.1016/j.appet.2012.06.015

Boone, L., Vansteenkiste, M., Soenens, B., Van der Kaap-Deeder, J., & Verstuyf, J. (2014). Self-critical perfectionism and binge eating symptoms: A longitudinal test of the intervening role of psychological need frustration. *Journal of Counseling Psychology*, *61*(3), 363–373. https://doi.org/10.1037/a0036418

Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise*, *14*(3), 423–435. https://doi.org/10.1016/j.psychsport.2013.01.003

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., … Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Crocker, P. R. E., Gaudreau, P., Mosewich, A. D., & Kljajic, K. (2014). Perfectionism and the stress process in intercollegiate athletes: Examining the 2 x 2 model of perfectionism in sport competition. *International Journal of Sport Psychology*, *45*(4), 325–348. https://doi.org/10.7352/IJSP.2014.45.325

De Muynck, G.-J., Vansteenkiste, M., Delrue, J., Aelterman, N., Haerens, L., & Soenens, B. (2017). The effects of feedback valence and style on need satisfaction, self-talk, and perseverance among tennis players:

An experimental study. *Journal of Sport & Exercise Psychology*, *39*(1), 67–80. https://doi.org/10.1123/jsep.2015-0326

DiBartolo, P. M., Frost, R. O., Chang, P., LaSota, M., & Grills, A. E. (2004). Shedding light on the relationship between personal standards and psychopathology: The case for contingent self-worth. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *22*(4), 237–250. https://doi.org/10.1023/B:JORE.0000047310.94044.ac

Dunkley, D. M., & Blankstein, K. R. (2000). Self-critical perfectionism, coping, hassles, and current distress: A structural equation modeling approach. *Cognitive Therapy and Research*, *24*(6), 713–730. https://doi.org/10.1023/A:1005543529245

Dunkley, D. M., Blankstein, K. R., Halsall, J., Williams, M., & Winkworth, G. (2000). The relation between perfectionism and distress: Hassles, coping, and perceived social support as mediators and moderators. *Journal of Counseling Psychology*, *47*(4), 437–453. https://doi.org/10.1037//0022-0167.47.4.437

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck, *Handbook of competence and motivation* (pp. 52–72). New York, NY, US: Guilford Publications.

Fleeson, W. (2007). Situation-based contingencies underlying trait-content manifestation in behavior. *Journal of Personality*, *75*(4), 825–861. https://doi.org/10.1111/j.1467-6494.2007.00458.x

Flett, G. L., & Hewitt, P. L. (2005). The perils of perfectionism in sports and exercise. *Current Directions in Psychological Science*, *14*(1), 14–18. https://doi.org/10.1111/j.0963-7214.2005.00326.x

Fransen, K., Boen, F., Vansteenkiste, M., Mertens, N., & Vande Broek, G. (2018). The power of competence support: The impact of coaches and athlete leaders on intrinsic motivation and performance. *Scandinavian Journal of Medicine & Science in Sports*, *28*(2), 725–745. https://doi.org/10.1111/sms.12950

Frost, R. O., & Henderson, K. J. (1991). Perfectionism and reactions to athletic competition. *Journal of Sport & Exercise Psychology*, *13*(4), 323–335. https://doi.org/10.1123/jsep.13.4.323

Frost, R. O., & Marten, P. A. (1990). Perfectionism and evaluative threat. *Cognitive Therapy and Research*, *14*(6), 559–572. https://doi.org/10.1007/BF01173364

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research*, *14*(5), 449–468. https://doi.org/10.1007/BF01172967

Gernigon, C., & Delloye, J. B. (2003). Self-efficacy, causal attribution, and track athletic performance following unexpected success or failure among elite sprinters. *Sport Psychologist*, *17*(1), 55–76. https://doi.org/10.1123/tsp.17.1.55

Gillet, N., Berjot, S., & Gobance, L. (2009). A motivational model of performance in the sport domain. *European Journal of Sport Science*, *9*(3), 151–158. https://doi.org/10.1080/17461390902736793

Grove, J. R., & Heard, N. P. (1997). Optimism and sport confidence as correlates of slump-related coping among athletes. *Sport Psychologist*, *11*(4), 400–410. https://doi.org/10.1123/tsp.11.4.400

Gucciardi, D. F., Mahoney, J., Jalleh, G., Donovan, R. J., & Parkes, J. (2012). Perfectionistic profiles among elite athletes and differences in their motivational orientations. *Journal of Sport & Exercise Psychology*, *34*(2), 159–183. https://doi.org/10.1123/jsep.34.2.159

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, *16*, 26–36. https://doi.org/10.1016/j.psychsport.2014.08.013

Hagger, M. S., & Chatzisarantis, N. L. (2007). *Intrinsic motivation and self-determination in exercise and sport*. Champaigne, IL: Human Kinetics.

Hall, H. K. (2006). Perfectionism: A hallmark-quality of world-class performers, or a psychological impediment to athletic development? In D. Hackfort & G. Tenenbaum (Eds.), *Perspectives in sport and exercise psychology: Essential processes for attaining peak performance* (pp. 178–221). Oxford, UK: Meyer & Meyer Publishers.

Hepler, T. J., & Feltz, D. L. (2006). Self-efficacy and decision-making performance in baseball. *Journal of Sport & Exercise Psychology, 28*, S82–S83.

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

Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The Flow State Scale. *Journal of Sport & Exercise Psychology*, *18*(1), 17–35. https://doi.org/10.1123/jsep.18.1.17

Jowett, G. E., Hill, A. P., Hall, H. K., & Curran, T. (2016). Perfectionism, burnout and engagement in youth sport: The mediating role of basic psychological needs. *Psychology of Sport and Exercise*, *24*, 18–26. https://doi.org/10.1016/j.psychsport.2016.01.001

Jowett, G. E., Mallinson, S. H., & Hill, A. P. (2016). An independent effects approach to perfectionism in sport, dance, and exercise. In A. P. Hill (Ed.), *The psychology of perfectionism in sport, dance, and exercise* (pp. 85–149). New York, NY, US: Routledge.

Kanat-Maymon, Y., Benjamin, M., Stavsky, A., Shoshani, A., & Roth, G. (2015). The role of basic need fulfillment in academic dishonesty: A self-determination theory perspective. *Contemporary*

Educational Psychology, *43*, 1–9. https://doi.org/10.1016/j.cedpsych.2015.08.002

Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin*, *119*(2), 254–284. https://doi.org/10.1037/0033-2909.119.2.254

Koivula, N., Hassmen, P., & Fallby, J. (2002). Self-esteem and perfectionism in elite athletes: Effects on competitive anxiety and self-confidence. *Personality and Individual Differences*, *32*(5), 865–875. https://doi.org/10.1016/S0191-8869(01)00092-7

Lewthwaite, R., & Wulf, G. (2010). Social-comparative feedback affects motor skill learning. *Quarterly Journal of Experimental Psychology*, *63*(4), 738–749. https://doi.org/10.1080/17470210903111839

Lizmore, M. R., Dunn, J. G. H., & Dunn, J. C. (2016). Reactions to mistakes as a function of perfectionism and situation criticality in curling. *International Journal of Sport Psychology*, *47*(1), 81–101. https://doi.org/10.7352/IJSP2016.47.081

Mabbe, E., Soenens, B., De Muynck, G.-J., & Vansteenkiste, M. (2018). The impact of feedback valence and communication style on intrinsic motivation in middle childhood: Experimental evidence and generalization across individual differences. *Journal of Experimental Child Psychology*, *170*, 134–160. https://doi.org/10.1016/j.jecp.2018.01.008

Madigan, D. J., Stoeber, J., & Passfield, L. (2016). Motivation mediates the perfectionism burnout relationship: A three-wave longitudinal study with junior athletes. *Journal of Sport & Exercise Psychology*, *38*(4), 341–354. https://doi.org/10.1123/jsep.2015-0238

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, *21*(11), 883–904. https://doi.org/10.1080/0264041031000140374

Mallinson, S. H., & Hill, A. P. (2011). The relationship between multidimensional perfectionism and psychological need thwarting in junior sports participants. *Psychology of Sport and Exercise, 12*(6), 676–684. https://doi.org/10.1016/j.psychsport.2011.05.009

Mallinson, S. H., Hill, A. P., Hall, H. K., & Gotwals, J. K. (2014). The 2 x 2 model of perfectionism and school- and community- based sport participation. *Psychology in the Schools, 51*(9), 972–985. https://doi.org/10.1002/pits.21796

Martinent, G., & Ferrand, C. (2006). A cluster analysis of perfectionism among competitive athletes. *Psychological Reports, 99*(3), 723–738. https://doi.org/10.2466/PR0.99.3.723-738

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system-theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review, 102*(2), 246–268. https://doi.org/10.1037/0033-295X.102.2.246

Moritz, S. E., Feltz, D. L., Fahrbach, K. R., & Mack, D. E. (2000). The relation of self-efficacy measures to sport performance: A meta-analytic review. *Research Quarterly for Exercise and Sport, 71*(3), 280–294. https://doi.org/10.1080/02701367.2000.10608908

Mouratidis, A., Lens, W., & Vansteenkiste, M. (2010). How you provide corrective feedback makes a difference: The motivating role of communicating in an autonomy-supporting way. *Journal of Sport & Exercise Psychology, 32*(5), 619–637. https://doi.org/10.1123/jsep.32.5.619

Mouratidis, A., & Michou, A. (2011). Perfectionism, self-determined motivation, and coping among adolescent athletes. *Psychology of Sport and Exercise, 12*(4), 355–367. https://doi.org/10.1016/j.psychsport.2011.03.006

Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education:

Evidence for a motivational model. *Journal of Sport & Exercise Psychology*, *30*(2), 240–268. https://doi.org/10.1123/jsep.30.2.240

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, *75*(1), 33–52. https://doi.org/10.1037/0022-3514.75.1.33

Muthén, L., & Muthén, B. (2010). *Mplus User's Guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

Nathanson, C., Paulhus, D. L., & Williams, K. M. (2006). Predictors of a behavioral measure of scholastic cheating: Personality and competence but not demographics. *Contemporary Educational Psychology*, *31*(1), 97–122. https://doi.org/10.1016/j.cedpsych.2005.03.001

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*(4), 279–306. https://doi.org/10.1023/A:1014805132406

Petroczi, A. (2007). Attitudes and doping: A structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behaviour. *Substance Abuse Treatment Prevention and Policy*, *2*, 34. https://doi.org/10.1186/1747-597X-2-34

Przybylski, A. K., Deci, E. L., Rigby, C. S., & Ryan, R. M. (2014). Competence-impeding electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of Personality and Social Psychology*, *106*(3), 441–457. https://doi.org/10.1037/a0034820

Quested, E., Bosch, J. A., Burns, V. E., Cumming, J., Ntoumanis, N., & Duda, J. L. (2011). Basic psychological need satisfaction, stress-related appraisals, and dancers' cortisol and anxiety responses. *Journal of Sport & Exercise Psychology*, *33*(6), 828–846. https://doi.org/10.1123/jsep.33.6.828

Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, *28*(3), 297–313. https://doi.org/10.1023/B:MOEM.0000040156.81924.b8

Rice, K. G., & Aldea, M. A. (2006). State dependence and trait stability of perfectionism: A short-term longitudinal study. *Journal of Counseling Psychology*, *53*(2), 205–213. https://doi.org/10.1037/0022-0167.53.2.205

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, *43*(3), 450–461. https://doi.org/10.1037/0022-3514.43.3.450

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY, US: Guilford Press.

Sagar, S. S., & Stoeber, J. (2009). Perfectionism, fear of failure, and affective responses to success and failure: The central role of fear of experiencing shame and embarrassment. *Journal of Sport & Exercise Psychology*, *31*(5), 602–627. https://doi.org/10.1123/jsep.31.5.602

Sas-Nowosielski, K., & Budzisz, A. (2017). Adaptive and maladaptive perfectionism and athletes' attitudes toward doping and anti-doping policy in sport. *Baltic Journal of Health and Physical Activity*, *9*(2), 82–88.

Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, *40*(7), 773–791. https://doi.org/10.1016/S0005-7967(01)00059-6

Soenens, B., Vansteenkiste, M., & Niemiec, C. P. (2009). Should parental prohibition of adolescents' peer relationships be prohibited? *Personal Relationships*, *16*(4), 507–530. https://doi.org/10.1111/j.1475-6811.2009.01237.x

Standage, M., Duda, J. L., & Pensgaard, A. M. (2005). The effect of competitive outcome and task-involving, ego-involving, and cooperative structures on the psychological well-being of individuals engaged in a co-ordination task: A self-determination approach. *Motivation and Emotion*, *29*(1), 41–68. https://doi.org/10.1007/s11031-005-4415-z

Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology*, *4*(2), 128–145. https://doi.org/10.1080/1750984X.2011.604789

Stoeber, J., & Becker, C. (2008). Perfectionism, achievement motives, and attribution of success and failure in female soccer players. *International Journal of Psychology*, *43*(6), 980–987. https://doi.org/10.1080/00207590701403850

Stoeber, J., Otto, K., Pescheck, E., Becker, C., & Stoll, O. (2007). Perfectionism and competitive anxiety in athletes: Differentiating striving for perfection and negative reactions to imperfection. *Personality and Individual Differences*, *42*(6), 959–969. https://doi.org/10.1016/j.paid.2006.09.006

Szymanski, L. A., & Chrisler, J. C. (1991). Eating disorders, gender-role, and athletic activity. *Psychology*, *28*(1), 20–29.

Talwar, V., & Lee, K. (2011). A punitive environment fosters children's dishonesty: A natural experiment. *Child Development*, *82*(6), 1751–1758. https://doi.org/10.1111/j.1467-8624.2011.01663.x

Tenenbaum, G., Hall, H. K., Calcagnini, N., Lange, R., Freeman, G., & Lloyd, M. (2001). Coping with physical exertion and negative feedback under competitive and self-standard conditions. *Journal of Applied Social Psychology*, *31*(8), 1582–1626. https://doi.org/10.1111/j.1559-1816.2001.tb02743.x

Tzetzis, G., Votsis, E., & Kourtessis, T. (2008). The effect of different corrective feedback methods on the outcome and self confidence of

young athletes. *Journal of Sports Science & Medicine*, *7*(3), 371–378.

Vallance, J. K. H., Dunn, J. G. H., & Causgrove Dunn, J. L. (2006). Perfectionism, anger, and situation criticality in competitive youth ice hockey. *Journal of Sport & Exercise Psychology*, *28*(3), 383–406. https://doi.org/10.1123/jsep.28.3.383

Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology*, *6*(1), 94–102. https://doi.org/10.1123/jsp.6.1.94

van der Kaap-Deeder, J., Soenens, B., Boone, L., Vandenkerckhove, B., Stemgee, E., & Vansteenkiste, M. (2016a). Evaluative concerns perfectionism and coping with failure: Effects on rumination, avoidance, and acceptance. *Personality and Individual Differences*, *101*, 114–119. https://doi.org/10.1016/j.paid.2016.05.063

van der Kaap-Deeder, J., Soenens, B., Boone, L., Vandenkerckhove, B., Stemgee, E., & Vansteenkiste, M. (2016b). Evaluative concerns perfectionism and coping with failure: Effects on rumination, avoidance, and acceptance. *Personality and Individual Differences*, *101*, 114–119. https://doi.org/10.1016/j.paid.2016.05.063

van der Kaap-Deeder, J., Vansteenkiste, M., Soenens, B., Loeys, T., Mabbe, E., & Gargurevich, R. (2015). Autonomy-supportive parenting and autonomy-supportive sibling interactions: The role of mothers' and siblings' psychological need satisfaction. *Personality and Social Psychology Bulletin*, *41*(11), 1590–1604. https://doi.org/10.1177/0146167215602225

Van Yperen, N. W., Hamstra, M. R. W., & van der Klauw, M. (2011). To win, or not to lose, at any cost: The impact of achievement goals on cheating. *British Journal of Management*, *22*, S5–S15. https://doi.org/10.1111/j.1467-8551.2010.00702.x

Vansteenkiste, M., & Deci, E. L. (2003). Competitively contingent rewards and intrinsic motivation: Can losers remain motivated? *Motivation and Emotion*, *27*(4), 273–299. https://doi.org/10.1023/A:1026259005264

Vansteenkiste, Maarten, Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick, *The decade ahead: Theoretical perspectives on motivation and achievement* (Vol. 16A, pp. 105–165). Bingley, UK: Emerald.

Vansteenkiste, Maarten, & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280. https://doi.org/10.1037/a0032359

Vansteenkiste, Maarten, Smeets, S., Soenens, B., Lens, W., Matos, L., & Deci, E. L. (2010). Autonomous and controlled regulation of performance-approach goals: Their relations to perfectionism and educational outcomes. *Motivation and Emotion*, *34*(4), 333–353. https://doi.org/10.1007/s11031-010-9188-3

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, *66*(5), 297–333. https://doi.org/10.1037/h0040934

Whitehead, J. R., & Corbin, C. B. (1991). Youth fitness testing: The effect of percentile-based evaluative feedback on intrinsic motivation. *Research Quarterly for Exercise and Sport*, *62*(2), 225–231. https://doi.org/10.1080/02701367.1991.10608714

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, *70*(4), 767–779. https://doi.org/10.1037/0022-3514.70.4.767

Wilson, G. V., & Kerr, J. H. (1999). Affective responses to success and failure: A study of winning and losing in competitive rugby. *Personality and Individual Differences*, *27*(1), 85–99. https://doi.org/10.1016/S0191-8869(98)00226-8

CHAPTER 6

Towards a More Refined Insight in the Critical Motivating Features of Choice: An Experimental Study among Recreational Rope Skippers[1]

[1] De Muynck, G-J., Soenens, B., Degraeuwe, L., Vande Broek, G., & Vansteenkiste, M. (2018). Towards a more refined insight in the critical motivating features of choice: An experimental study among recreational rope skippers. *Manuscript submitted for publication.*

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The question whether choice is a motivation and engagement-enhancing practice is a much debated subject, both theoretically as well as in practice. The present experimental field study examined whether different types of choice impact on rope skippers' (n = 159; M_{age} = 17.17; SD_{age} = 8.43) engagement and intended perseverance. Offering choice regarding the type of exercises (i.e., *option* choice) resulted in mixed, with this type of choice yielding a clear engagement and perseverance-enhancing effect compared to a no choice control group in cases the offered options differed clearly from one another (i.e., *high contrast option choice*), while no benefits were observed in case choice options leaned closely to one another (i.e., *low contrast option choice*). Athletes' involvement in the order of exercises during a training session (i.e., *action choice*) tended to enhance athletes' engagement, but not their intentional perseverance, compared to a no choice control group. Finally, all experimentally offered choices yielded a positive effect on autonomy need satisfaction, which, in turn related to athlete engagement and perseverance, an effect that was mainly irrespective of rope-skippers' dispositional indecisiveness. The discussion highlights the importance of a nuanced discussion regarding the topic of choice, thereby contrasting the different pros and cons associated with each type of choice.

INTRODUCTION

The advantages and pitfalls associated with the offer of choice are heavily debated (Markus & Schwartz, 2010; Ryan & Deci, 2006; Schwartz, 2000). Paralleling the different viewpoints in academia, anecdotic and empirical evidence suggests that sport coaches and socializing figures in general vary widely in the extent to which they believe in the motivating power of choice (Reeve et al., 2014). Some coaches hold the belief that choice fosters athlete engagement, whereas others are more sceptic about its benefits, arguing that choice is time- and energy consuming and may come with a loss of control by authority figures. Indeed, research shows that coaches report using participative strategies, like the offer of choice, to a far lesser extent compared with other presumed motivating strategies (Delrue et al., 2018). Further, there is wide variety in the type of choices being offered by coaches. Some coaches provide option choice, thereby allowing athletes to decide for themselves which exercises to perform, whereas others provide action choice, which involves offering choice regarding the way how exercises are performed. In the latter case, athletes can decide, for example, the order in which they perform exercises (Mouratidis et al., 2011) or the rate at which they shift from one exercise to another (Reeve, Nix, & Hamm, 2003).

Although these different types of choices have been conceptually discerned (Reeve et al., 2003), there (dis)similar effects on athlete motivation have received little prior attention. Therefore, the broader aim of the present study was to examine in detail when and for whom the motivational effects of choice get maximized or attenuated. Specifically, both the type of choices and type of options being offered as well as the role of interpersonal differences in dispositional indecisiveness (Germeijs & De Boeck, 2003) are considered when predicting rope skippers' experience of autonomy satisfaction, activity engagement, and persistence. These issues were addressed in sport, a life domain where choice-related studies are scarce. Indeed, contemporary studies on choice were predominantly conducted in the domains of (physical) education (Patall, Cooper, & Wynn, 2010), child development (Cote-

Lecaldare et al., 2016) and health care (McKay et al., 2015; Vandereycken & Vansteenkiste, 2009).

CHOICE AS AN AUTONOMY-SUPPORTIVE COACHING STRATEGY

To date the role of choice is particularly well examined in studies on intrinsic motivation and related constructs from a Self-Determination Theory perspective (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017), making this framework very suitable for the purpose of the current study. According to SDT, choice provision is one strategy within the broader dimension of autonomy-supportive coaching. When autonomy-supportive, coaches are curious to relate to athletes' point of view, they promote athletes' self-initiation, they use inviting language, and they offer meaningful rationale for introduced requests and tasks (Mageau & Vallerand, 2003). There is ample research evidence underscoring the benefits of perceived autonomy-supportive coaching in terms of well-being (Adie, Duda, & Ntoumanis, 2008), engagement (Curran, Hill, Ntoumanis, Hall, & Jowett, 2016), and perseverance (Pelletier, Fortier, Vallerand, & Briere, 2001). Yet, because the vast majority of this work has made use of self-reports of autonomy-supportive coaching, which involves creating a composite score of a variety of autonomy-supportive strategies (e.g., Delrue et al., 2018), the effects of specific autonomy-supportive strategies, such as the offer of choice, have been under-examined, at least in the sport domain.

On the other hand, in the educational domain, the topic of choice has received considerable research attention (e.g., Patall, Cooper, & Wynn, 2010). A meta-analysis encompassing more than 40 experimental studies on choice clearly showed that the provision of choice yields multiple benefits, including enhanced intrinsic motivation, effort-expenditure, performance, and preference for challenge (Patall, Cooper, & Robinson, 2008). Importantly, observed effect sizes were small-to-moderate and large heterogeneity was found in the observed effects across studies. In fact, some studies even reported negative effects of choice provision (Overskeid & Svartdal, 1996;

Parker & Lepper, 1992), indicating that not all choices are equally motivating. Since the appearance of this meta-analysis a decade ago, the empirical work on choice has exponentially increased. While many studies continue to demonstrate that choice promotes desirable outcomes, including engagement (Patall et al., 2018) and durable participation (Mitchell, Gray, & Inchley, 2015), others reported null- or even negative effects (e.g., Cosme et al., 2018).

Drawing on SDT, choice provision will only be perceived as motivating insofar choice is conducive to the satisfaction of athletes' psychological need for autonomy (Katz & Assor, 2007). That is, choice represents a *need-enabling* strategy (Aelterman et al., 2018; Vansteenkiste et al., 2018), indicating that choice has the potential to nurture individuals' psychological needs, yet, does not by definition does so. Autonomy refers to athletes' feelings of volition, psychological freedom, and willingness with respect to one's behavior (deCharms, 1968). Although choice may, on average, be autonomy satisfying, athletes' sense of volition can be supported even when they are not making independent decisions. Specifically, even when sticking to instructions or tasks determined by the coach, athletes do not necessarily renounce their sense of volition as far as they can concur with and, hence, fully endorse the instructions or task (Van Petegem, Beyers, Vansteenkiste, & Soenens, 2012; cfr. Ryan & Lynch, 1989). Furthermore, although choice is a key pathway to the experience of autonomy, choice does not guarantee autonomy need satisfaction. That is, there is no one-to-one relation between objectively offered choice and the experience of autonomy because not all objectively offered choices translate into the subjective perception of volition. To illustrate, when the offered options fail to reflect choosers' preferences, choice is unlikely to be beneficial for their motivation and flow (Wilde et al., 2018). In general, the extent to which choice enables choosers to get their need for autonomy met depends upon a variety of choice- and option-related characteristics as well as personal characteristics of the choosers, all of which we turn to next.

CHOICE- AND OPTION CHARACTERISTICS: WHAT TYPE OF CHOICE IS MOST MOTIVATING?

Choice effects are dependent on a number of factors, including (a) the number of sequential choices that are being offered within a given timeframe, (b) the amount of options that are provided within a given choice, (c) the type of choice that is provided, and (d) the type of options that are provided within a choice. Regarding the amount of choice, two to four choices have been found to be optimally motivating (Patall et al., 2008), as choosing more frequently is found to be too energy consuming (Vohs et al., 2008). Regarding the amount of options within a given choice, effects of choice provision are most beneficial for intrinsic motivation and future well-being when three to five alternatives are offered within one choice (Patall et al., 2008). With fewer alternatives, choices may not allow choosers to act according to their preferences, thereby failing to support their sense of volition, whereas an abundance of alternatives may become overwhelming and, as a result, impair effective decision making (Botti & Iyengar, 2006).

To date, research regarding types of choices and types of options is more scarce, precluding firm conclusions about these important choice features. Both characteristics of the offered choice as well as of the involved options may, in conjunction, determine whether the motivating potential of choice gets actualized. As for the specific type of choice involved, option choices have been discriminated from action choices (Reeve et al., 2003). In the case of option choice, individuals are allowed to (repeatedly) pick one or more options from a predetermined list of options (Schraw, Flowerday, & Reisetter, 1998). Allowing athletes to pick one out of three different game-based exercises for closing a training session constitutes an example of option choice. The effects of this type of choice seem to be mixed: whereas giving undergraduate students choice about which of three texts to read failed to promote interest and retention (Schraw et al., 1998), providing 9th to 12th grade students choice about two similar homework assignments increase their intrinsic motivation and test scores (Patall et al, 2010).

While option choice offers choosers the chance to decide what they can do, action choice allows choosers to decide *how* a particular activity is conducted (Reeve et al., 2003). That is, what needs to be done is predetermined, but the way how the activity is executed can be decided upon by the chooser. Different types of action choices can be offered, such as a choice with respect to the difficulty level of a task (Leiker, et al., 2016), the persons with whom to cooperate, the order and pace in which to perform a series of activities (Mouratidis et al., 2011) and the way how a learning topic gets taught (Jang, Reeve, & Halusic, 2016). As for the effects of action choice, quasi-experimental evidence showed that an intervention encompassing action choices (e.g., choosing between hitting down the line or cross court in an attacking drill) in combination with stimulating self-reflection enhanced need satisfaction, motivation and sport commitment among young female volleyball players (Claver, Jiménez, Gil-Arias, Moreno, & Moreno, 2017). Likewise, when students in a physical education class could choose the order in which they complete predetermined exercises as well as the amount of time they allocate to each of the exercises, they reported greater enjoyment and vitality compared to classes during which such action choices were denied (Mouratidis et al., 2011). Similarly, offering students the possibility to choose whether to use ski poles as an assistance device on a ski-simulator resulted in better performance, as reflected by larger amplitudes one day later (Wulf & Toole, 1999). Thus, whereas the effects of option choice are rather mixed, action choice was found to yield more pronounced benefits.

Not only the type of choices can differ, but also the type of options being provided, an issue that applies both to action and option choice. In some cases, choosers may find it hard to discriminate between different offered options because of the minimal differences between them. When low contrast options are offered, they lean that close to one another that choices are more difficult to make. Note that this holds true when choosers need to pick one option from a menu of only attractive options (Luce, 1998) or only unattractive options (Higgins, 1998). Both choosing between desirable

alternatives and between the pest and cholera may appear difficult. In one illustrative study, children were found to report less intrinsic motivation when they were offered two equally appealing activities to choose from compared to when just one of those activities was offered (Higgins, Trope, & Kwon, 1999). In contrast, when offered options differ widely from one another, for instance, when choosers are given an attractive and unattractive option, choosing may be less energy consuming. Also, in the case of high-contrast choice, choosers may be in a better position to enact their preferences, thereby experiencing a greater sense of volition. Herein, we will directly contrast the motivational impact of high- versus low-contrast-choice, an issue that deserved no prior empirical attention.

PERSONAL CHARACTERISTICS OF THE CHOOSERS: THE ROLE OF INDECISIVENESS

Whereas some people like to make their own choices, feeling competent in their decisions, and happily consider different alternatives in order to pick one, others are by nature more insecure when offered choice and therefore more readily experience stress when having to choose. One personal factor affecting the motivational impact of choice is dispositional indecisiveness which is defined as a chronic problem with making decisions over situations and domains (Crites, 1969; Osipow, 1999) and considered to be a trait (Cooper, Fuqua, & Hartman, 1984). Manifestations of indecisiveness include requiring a lot of time to make decisions, perceiving making decisions as difficult, letting others take decisions, and worrying about or even regretting the decision that is made (Cooper et al., 1984; Germeijs & De Boeck, 2002; Frost & Shows, 1993).

Indecisiveness has been found to hamper the decision making process both in experimental studies, as indicated by needing more time to decide (e.g., Rassin, Muris, Booster, & Kolsloot, 2008) and real life situations, as indicated by a reduced information search (Ferrari & Dovidio, 2000), more difficulties in choosing a college major (Germeijs, Verschueren & Soenens,

2006). Because indecisive people are also found to experience more problems during everyday decision making, such as selecting a movie at the cinema or choosing which meal to get at a restaurant (Germeijs & De Boeck, 2002), choice provision might also be less beneficial in terms of task perception and activity engagement as people are more indecisive.

PRESENT STUDY

The global aim of the current study is to provide a more refined insight in the motivational effect of choice. Specifically, we considered the role of different types of choices (i.e., option-choice vs. action-choice), different options (i.e., high- versus low-contrast options) and dispositional indecisiveness, which, as a personal factor, may alter the effect of choice provision. The study was conducted among rope skippers in their authentic training context. Such an experimental field study yields high ecological validity and was also chosen because choice has been found to yield greater benefits when provided in a real-life context (Patall, 2012). During the experimental phase, participants performed three single rope exercises with varying types of choice and types of options being provided to participants depending on condition assignment. Specifically, participants in the control group were informed three repetitive times that the experimenter had selected an exercise for them to perform. Participants in the option-choice conditions could each time pick one out of three different rope exercises, with options being similar (i.e., low-contrast option choice) or dissimilar (i.e., high-contrast option choice) in terms of attractiveness, while participants in the action choice group could choose the order of performing the exercises A no-choice condition served as a comparison group because that practice is most prevalent in the contemporary sport context.

Three main hypotheses were formulated. First, we expected that low-contrast option choice would have no, or only small effects in terms of autonomy need satisfaction, engagement and intended perseverance, compared to a no choice control group (hypothesis 1a). Previous studies

showed that choices are less beneficial if they provide limited possibilities to enact one's personal preferences (Katz & Assor, 2007). Also, the process of choosing may require more self-regulation and effort when options are closely situated to one another, which may hamper the benefits associated with the act of choosing (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Because high-contrast option choices may yield a greater chance to pursue one's preferences and because the process of choosing may be less energy-consuming, we hypothesized that this type of choice would enhance athletes' motivational functioning compared to a no-choice comparison group (Hypothesis 1b). Regarding action choice, we hypothesized in accordance with previous research in the educational domain (Reeve, et al., 2003) that action choice would promote athlete autonomy need satisfaction, engagement, and intended persistence (Hypothesis 1c). The second issue that we addressed is whether autonomy need satisfaction would serve as an intervening variable between the experimentally induced choice versus the no-choice control group and each of the outcome variables (Hypothesis 2). Finally, the current study also examined whether choice would depend on athletes' trait levels of indecisiveness. In this regard, it was hypothesized that individuals high in indecisiveness would benefit less from the opportunity to choose as choosing may appear difficult and require greater effort and self-regulation in their case. Also, athletes high in indecisiveness may more easily experience post-decisional regret, which may hamper their engagement and intended perseverance. (Hypothesis 3).

METHOD

PARTICIPANTS

Recreational Belgian rope skippers (n = 159; M_{age} = 17.17; SD_{age} = 8.43) with, on average, 4.5 years of rope skipping experience (SD = 2.96) were sampled as participants for the current study. The sample was predominantly female (154 females; 96.9%), with all rope skippers being an active member of a rope skipping club during the timeframe of the study. A balanced number of participants below and above fifteen years (M = 12.28; SD = 1.05; M = 22.12; SD = 9.68) was sampled. Both age groups received a set of exercises which were matched with their age in terms of interest and challenge involved. Data collection took place in two waves. During the first wave, the data for the no-choice, action choice and low-contrast option choice condition were collected. In light of the obtained findings for the low-contrast choice condition, we proceeded to run an additional high-contrast option choice condition during a second wave.

In addition to this sample, 30 rope skippers not included in the main sample (M = 22.12; SD = 9.68), were recruited for a pilot test which was set up to examine the attractiveness of a broad range of rope skipping exercises to be used during the main study. In correspondence with the main sample, half of the participants in the pilot study were aged between eleven and fourteen years, where the other half was fifteen years or older.

PROCEDURE

Pilot study. Participants for the pilot study were recruited in two different rope skipping clubs in Flanders. Rope skipping club managers were contacted by phone, informed about the purpose of the study and signed an active informed consent upon agreement to participate. Subsequently, active informed consent was obtained from head coaches before contacting rope skippers themselves. Finally, active informed consent was obtained from rope skippers themselves.

Following informed consent, an experimenter visited a regular training of the participants and took them aside in small groups of three to five persons, Participants viewed instruction videos in which the fifteen exercises were shown one by one through different video fragments. Following each video, participants rated the rope exercise in terms of anticipated (1) enjoyment, (2) challenge and (3) its unattractive character (2 items; i.e., boring and weary; r = .48), while also rating (4) their willingness, and (5) perceived competence to perform the exercise. These questions were answered using a 7-point Likert scale ranging from 1(*Not at all*) to 7 (*very much*). To match exercises to participants' skill level, both age groups were offered a different set of exercises. To avoid order-effects in participants' evaluation of exercises, three files were created, differing in the order in which exercises were presented, and participants were randomly assigned to one of the three files.

Based on the mean scores for each exercise (see Supplementary Tables 1 and 2), nine exercises, six of them being attractive and three of them being unattractive, were retained for the main study. Attractive exercises were rated as fun and challenging, a low unattractive character, and with participants expressing strong intentions to perform those exercise. The unattractive exercises were rated as repetitive and boring, were perceived to be rather low in fun and challenge, and participants' intentions to perform them were low.

Experimental study. Participants were recruited from nine rope skipping clubs in Flanders, the Dutch speaking part of Belgium. After head coaches of these clubs granted informed consent to sample rope skippers of their club, the rope skippers themselves were provided detailed information about the study either before or after a regular training sessions. Those skippers interested in participating signed an informed consent form, with active parental informed consent also being obtained for under-aged participants. Upon retrieval of the before-mentioned informed consents, rope skippers were provided a baseline questionnaire bundle measuring relevant background characteristics and dispositional indecisiveness.

At least one day after completion of the baseline questionnaire, the experimental phase was organized during their regular training. Specifically, rope skippers were taken aside in small groups of three to five persons to perform a series of three single-rope exercises that lasted five minutes each. Those small groups were randomly assigned to one out of four conditions, so that all participants within the same group were allocated to the same experimental or control condition. Immediately following the completion of the three exercises, participants filled in a post-experimental questionnaire that contained a manipulation check and tapped into their autonomy need satisfaction, engagement, and intentions to persevere. Upon handing in the post-experimental questionnaire, rope skippers were debriefed within their small group and asked not to discuss the experiment with other skippers in order to minimize contamination across conditions.

Choice manipulation. Three experimental (i.e., low-contrast option choice, high-contrast option choice, and action choice) and one control condition were run. Using a yoked design, the four conditions differed in terms of the choice that was offered. Although participants were run in small groups, in each choice condition participants were required to make individual decisions. To limit the role of social pressure in the choice process, each individual saw the videotaped exercisers in absence of other participants. Video presentations were embedded within a PowerPoint slide set. In each condition, participants were provided with three series of video demonstrations with the type of choice and options being offered matching with the operationalized type of choice. After each video demonstration and subsequent choice, participants performed a rope skipping exercise for 5 minutes. Hence, in total, three consecutive choice units were offered to participants in the experimental conditions, with each unit involving a video demonstration, a choice, and the performance of the chosen exercise. During each of the exercises, the experimenter gave each participant one standardized instruction regarding the chosen activity, as to ensure they performed the rope skipping exercise during the entire five minutes.

Specifically, in both option choice conditions, each participant was provided with three consecutive choices, each of which encompassed three options (cfr. Patall et al., 2008). The type of options offered differed between both option choice conditions. In the low-contrast condition, the offered options closely resembled one another in terms of attractiveness. That is, during the first, second, and third choice, rope skippers needed to pick one exercises out of, respectively, three attractive, unattractive, and attractive options. In the high-contrast option choice condition, rope skippers picked one exercise out of a series of two unattractive and one attractive exercise, presumably making it easier for participants to pick one option. While participants could choose the type of exercise in both option choice conditions, the order of executing the exercises was predetermined.

In contrast, participants in the action choice condition could choose the order in which exercises were performed but the type of exercises was predetermined. Specifically, those exercises chosen by participants in the low-contrast option choice condition were yoked to those being presented to participants in the action choice condition. That is, as for the first choice, a set of three exercises were presented accompanied by the request to indicate which exercise they want to begin with. Having executed the exercise, the two remaining options were offered, thereby asking participants to select one of both of them. Having executed the second exercise, they proceeded to the third and final exercise.

Finally, participants in the control group were not provided any choice. They were informed that the experimenter had chosen which exercises they needed to execute. They viewed one video demonstration at a time and, having watched the exercises, they performed the requested exercise for five minutes. Subsequently, they repeated the process for the second and third exercise. While the type of exercises in this condition was yoked to the choice being made by participants in the low-contrast choice condition, the order was yoked with the order preferred by participants in the action choice condition.

To realize this yoking procedure the different conditions needed to be run conditions in a fixed order, beginning with low-option choice, moving to action choice and ending with the control group. Because control group participants were matched with those in these two choice conditions, they were not yoked to those in the high-option contrast condition. That is, these participants engaged in a (partially) different set of exercises compared to control group participants and also the order of exercise execution likely deviated from the control group participants, which may possibly explain any observed differences between both groups. Notably, this lack of yoking also resulted from the fact that this condition was run at a later moment in time.

MEASUREMENTS

Questionnaires were administered on two different points in time. Background characteristics and indecisiveness were part of the baseline assessment, whereas the post-experimental measure tapped into perceived choice, autonomy need satisfaction, engagement, and intentions to persevere. Except when indicated otherwise, response scales ranged from 1 (*totally disagree*) to 5 (*totally agree*).

Indecisiveness. The degree to which rope skipping participants were indecisive was measured by a well-validated 22 item questionnaire created by Germeijs and De Boeck (2003) (e.g., "*I often require a lot of time to make a choice"*). An indication of indecisiveness was obtained by averaging responses on all 22 items, which showed a good internal reliability (α = .91).

Perceived choice. The perceived choice subscale from the Intrinsic Motivation Inventory (Ryan, 1982) was used to measure participants' perceived choice, which served as a manipulation check. This scale encompassed seven items and showed good internal reliability (e.g., "*I believe I had the choice about performing the exercises in the past single rope training session*"; α = .82).

Autonomy need satisfaction. The autonomy need satisfaction subscale (4 items; e.g., "*During the past single rope training I felt that the*

exercises were aligned with what I would want myself") of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) measured participants' autonomy need satisfaction. Because the BPNSFS focusses on individuals' need-based experiences in general, the items needed to be slightly adapted to capture state experiences of autonomy need satisfaction (see also Van Petegem et al., 2017). Chronbach alpha showed acceptable internal reliability (α = .69).

Engagement. Three facets of engagement, that is, behavioral, emotional and cognitive engagement, were measured. Behavioral and emotional engagement were measured with four items each, taken from the Engagement vs. Disaffection with Learning Questionnaire (Skinner, Kindermann, & Furrer, 2009). The items were slightly adapted to fit into the context of rope skippers. Both the behavioral and emotional facet yielded good internal reliability (resp. "*During the past single rope training I gave as much effort as possible*" α = .78; *"During the past single rope training, I had fun"* α = .86). Cognitive engagement was measured by means of four items taken from the Metacognitive Strategies Questionnaire (Wolters, 2004; "*During the past single rope training, I tried to connect what I was learning to what I already knew*"; α = .60). All engagement indicators were measured on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Because of their high intercorrelation and congruent with previous research (Cheon, Reeve, Lee & Lee, 2015), the three facets were averaged to form a single engagement composite score (α = .83)

Intended perseverance. Following previous research (e.g., Vansteenkiste, Simons, Soenens, & Lens 2004), three items were used to tap into participants intended perseverance (e.g., "*I would like to join a rope skipping day that is organized like todays single rope training*"). Responses were recorded on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Internal reliability of the scale was good (α = .73)

RESULTS

PRELIMINARY ANALYSES

Background characteristics. Table 1 shows bivariate correlations among the study variables. As can be seen, older participants perceived less choice, reported fewer autonomy need satisfaction and showed lower intentions to persevere. However, because participants fifteen years of age and older performed different rope skipping exercises than younger participants a MANOVA with follow-up ANOVAs were also conducted to account for the exercises performed. Results showed a significant multivariate effect (Wilks's λ = .89, $F(5,146) = 3.78$, p = .003), with follow-up analyses indicating that both age groups differed in terms of their intended perseverance ($F(1,153) = 14.98$, $p < .001$). Rope skippers younger than fifteen year showed greater intentions to persevere compared with rope skippers older than fifteen years (M_{young} = 3.70, SD_{young} = .84; M_{old} = 3.15, SD_{old} = .93). Given that provided exercises differed for participants younger, compared to older than fifteen years of age, and participants' age related to perceptions of choice, perceived autonomy need satisfaction and intentions to persevere, all analyses systematically controlled for the categoral variable of age (contrasting rope skippers younger than 15 with those 15 or older). In addition, we systematically controlled for participants' indecisiveness due to its impact both during and after the decision making process (Rassin, 2007).

Table 1. Bivariate Correlations Among the Study Variables

	1	2	3	4	5
1. Age					
2. Indecisiveness	-.05				
3. Perceived choice	-.22**	.09			
4. Autonomy need satisfaction	-.20*	.10	.62**		
5. Engagement	-.04	.04	.40**	.55**	
6. Intended perseverance	-.40**	.09	.33**	.49**	.36**

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

Manipulation check. A manipulation check was conducted by means of an ANOVA with perceived choice as dependent variable and the contrast between the no-choice comparison group on the one hand and all three choice conditions on the other as a fixed variable. Results showed that participants in the conditions that provided choice (*Mchoice* = 3.79, *SDchoice* = .59) also perceived more choice compared to the no-choice comparison group (*Mcomparison* = 2.93, *SDcomparison* = .80; $F(1,153) = 11.94$, $p < .001$), indicating that the manipulation was successful.

PRIMARY ANALYSES

Hypothesis 1: Effects of different types of choice compared to a no-choice comparison group.

Table 2 shows the means and standard deviations of the study variables for each choice condition. To examine whether choice conditions differed from the no-choice control group, three separate MANOVA and follow-up ANOVA analyses were conducted, each of them contrasting one choice condition with the control group. Table 3 presents the results from each of the ANOVA analyses.

Table 2. Detailed Description of Key Features of Choice Conditions together with Means and Standard Deviations for the Variables of Interest

Label condition	**Control group**		**Action choice**		**Low-contrast option choice**		**High-contrast option choice**	
Description								
Type of choice	Lack thereof		Order		Exercise type		Exercise type	
Type of options	Predetermined		Dissimilar		Similar		Dissimilar	
Number of choices	Zero		Two		Three		Three	
Outcomes	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Perceived choice	2.95	.80	3.60	.52	3.72	.61	3.88	.59
Autonomy need satisfaction	3.22	.75	3.53	.63	3.60	.68	3.77	.66
Engagement	5.18	.72	5.45	.60	5.05	.82	5.57	.69
Intended Perseverance	3.32	1.06	3.20	.75	3.30	.93	4.0	.73

Table 3. ANOVA Results Regarding the Comparison of the Experimental Choice Conditions with the No-Choice Control Group

	Action choice				Low-contrast option choice				High-contrast option choice			
	F-value	df	P-value	η^2	F-value	df	P-value	η^2	F-value	df	P-value	η^2
Perceived choice	25.31	(1,74)	<.001	.26	37.02	(1,75)	<.001	.10	35.06	(1,68)	<.001	.34
Autonomy need satisfaction	4.31	(1,74)	.041	.06	6.67	(1,75)	.012	.08	12.02	(1,68)	.001	.15
Engagement	4.10	(1,73)	.046	.053	.26	(1,73)	.61	.00	6.65	(1,67)	.012	.09
Intended perseverance	.24	(1,73)	.63	.00	.02	(1,73)	.90	.00	12.08	(1,67)	.001	.15

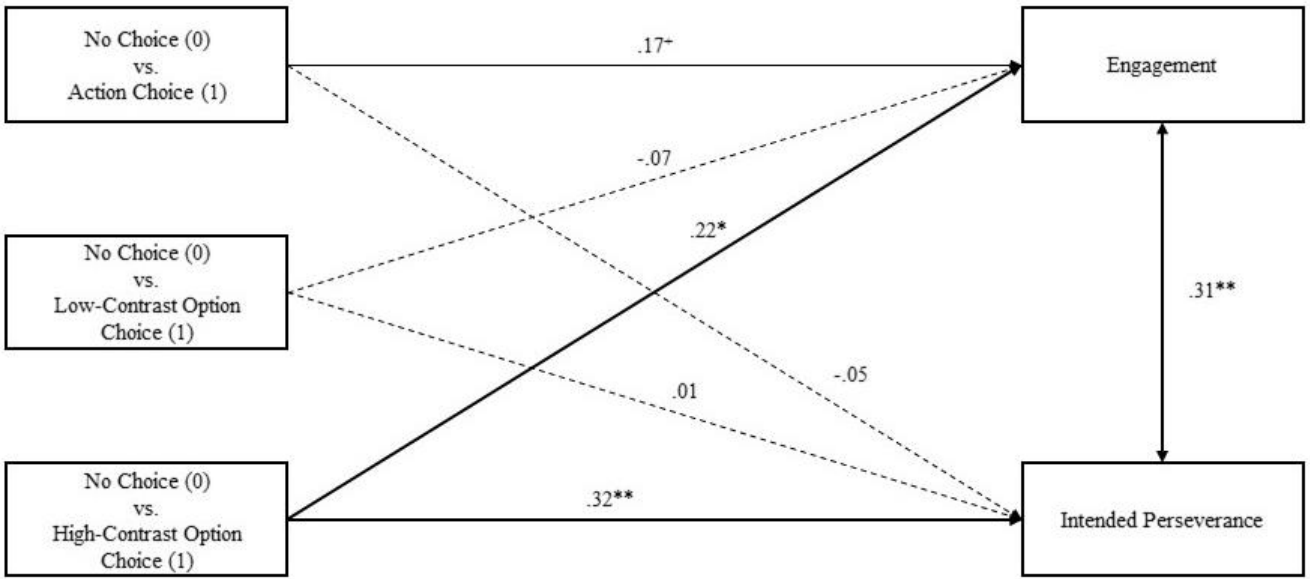
Note: ANOVA = Analysis of variance.

The multivariate effect comparing low-contrast action choice with the no-choice comparison group turned out significant (Wilks's λ = .59, $F(4,70)$ = 12.18, $p < .001$). Follow-up univariate ANOVA's showing higher autonomy satisfaction for rope skippers receiving this type of choice. However, no effects were evident for engagement and intended perseverance. The MANOVA comparing high-contrast option choice to the no-choice control condition also showed a significant multivariate effect (Wilks's λ = .60, $F(4,64)$ = 10.70, $p < .001$), with follow-up ANOVA's indicating that providing high contrast option choice enhances rope skippers' autonomy need satisfaction, engagement, and intentions to persevere. Finally, the multivariate effect comparing action choice with the no-choice comparison group also turned out significant (Wilks's λ = .68, $F(4,70)$ = 8.13, $p < .001$), with ANOVA's showing rope skippers who were provided action choice reporting higher autonomy satisfaction and engagement regarding the rope skipping exercises, with no effects being found for intended perseverance.

Although the above-mentioned MANOVA and follow-up ANOVA analyses provided initial evidence regarding the effect of different type of choice, they treated each of the contrasts in isolation, thereby only relying on parts of the total sample. In order to make use of the total sample simultaneously, we relied on SEM analyses using MPlus 7 software (Muthén & Muthén, 2010) in combination with dummy coding. Herein, the no-choice control condition was used as a main reference point. Three dummies were created, one comparing action choice (1) with no choice (0), one comparing low-contrast option choice (1) with no choice (0), and one comparing high-contrast option choice (1) with no choice (0). To examine the effects of different types of choice, the three dummy variables, along with the categorical age variable and indecisiveness were modelled as predictors of both engagement and intentions to persevere, using a manifest variables model. Fit indices showed a perfect fit as this model is fully saturated ($\chi 2(0)$ = 0.00; RMSEA = .00; SRMR = .000; CFI = 1.00). Results generally show correspondence with the ANOVA analyses, as action choice tended to

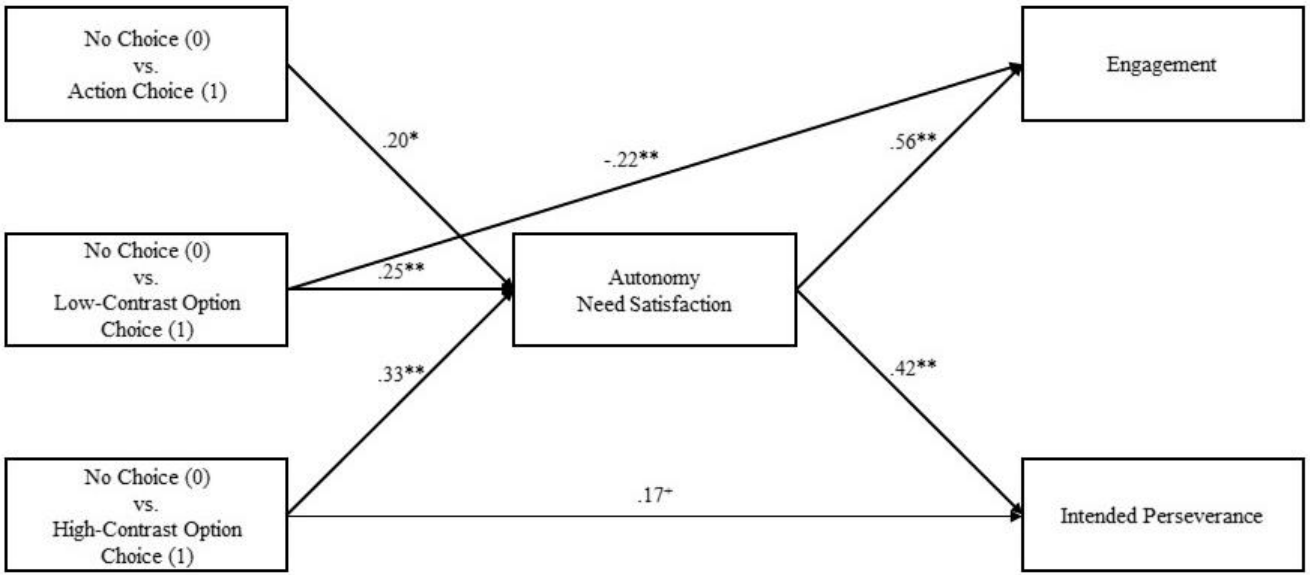
increase rope-skippers' engagement (p = .055), low-contrast option choice was unrelated to both outcomes, while high-contrast option choice was conducive to both (see Figure 1).

Hypothesis 2: Autonomy as intervening variable between choice provision and motivational outcomes. Structural equation modelling analyses using Mplus (Muthén & Muthén, 2010) were also used to test whether autonomy need satisfaction served as an intervening variable in the effect of choice provision on engagement and intended perseverance. To do so, the three dummy variables, indecisiveness and the categorical age variable were modelled as predictors of autonomy need satisfaction. Subsequently, autonomy need satisfaction, indecisiveness and the categorical age variable were modelled as predictors of both engagement and intentions to persevere. Although the three dummy-variables were significantly related to autonomy need satisfaction, which subsequently was significantly related to engagement and intended perseverance, the model fitted the data rather poorly ($\chi^2(6)$ = 28.80; RMSEA = .16; CFI = .83; SRMR = .06). This suggested adding the direct effects of choice manipulations (i.e., the three dummy variables) to engagement and intentions to persevere. This adapted model again was fully saturated and, thus, showed perfect model fit ($\chi2(0)$ = 0.00; RMSEA = .00; SRMR = .000; CFI = 1.00). Results of this model showed that the direct effect of high-contrast option choice remained marginally significant (p = .055), whereas a negative direct relationship between low-contrast option choice and engagement emerged, possibly being indicative of a suppression effect. These results are graphically depicted in Figure 2, where only the significant relationships are reported.



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

Figure 1. Graphical representation of the SEM regarding the direct effects of choice conditions on engagement and intended perseverance



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

Figure 2. Graphical representation of the SEM model regarding the intervening role of autonomy need satisfaction

To test the intervening role of autonomy need satisfaction, we relied on tests for indirect effects (MacKinnon, Lockwood, & Williams, 2004). The indirect effects are computed on the basis of the product of the association between an independent variable and the intervening variable (the α association) and the association between the independent variable and the dependent variable (the β association). Divided by the standard error of this product. Because the traditional methods to estimate indirect effects, such as the Sobel test, have low power and a high probability of Type-I errors, MacKinnon et al. (2004) proposed a bias-corrected bootstrap method. This method is based on resampling approach and involves the calculation of confidence intervals to determine the significance of an indirect effect. When significant, such an effect indicates that an independent variable is related indirectly to a dependent variable through an intervening variable.

Results showed that the indirect effects of action choice provision through autonomy need satisfaction on engagement (β = .11, p = .041) and intended perseverance (β = .08, p = .044) were both significant. Likewise, both indirect effects from low-contrast option choice through autonomy need satisfaction to engagement (β = .14, p = .016) and intended perseverance (β = .11, p = .013) were significant. Finally, both indirect effects of high-contrast option choice through autonomy need satisfaction to engagement (β = .18, p = .001) and intended perseverance (β = .14, p = .002) were also significant.

Hypothesis 3: Moderation by indecisiveness. To examine the moderating role of indecisiveness regarding the motivating impact of choice provision, nine multiple regression analyses were conducted. To do so, z-variables were created for the variables indicating the choice contrasts and for participants' indecisiveness. Both indicators were entered in the first regression step. In a second step, an interaction term was added, computed by multiplying the z-scored condition contrast with the z-scored indicator of indecisiveness. Of the nine interactions tested in this way (i.e., 1 interaction for each of the three choice conditions, and this for three outcome variables), one turned out to be significant (see Supplementary Table 3). Specifically,

indecisiveness interacted with high-contrast option choice in the prediction of rope skippers' autonomy need satisfaction (β = -.22; p =.05). As indicated in Figure 3, this interaction shows that providing high contrast option choice tended to support autonomy need satisfaction to a greater extent for people low, compared to people high, in indecisiveness.

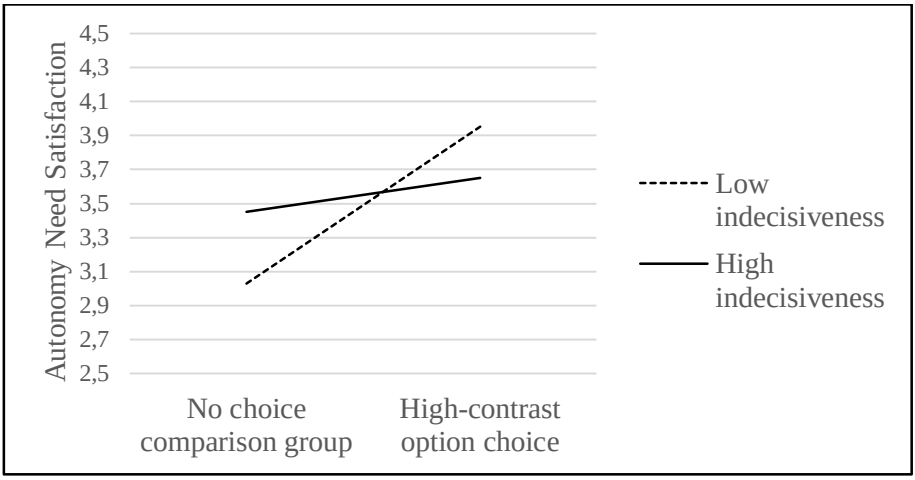


Figure 3. Graphical representation of the interaction between high-contrast option choice and dispositional indecisiveness on autonomy need satisfaction

DISCUSSION

The principal aim of the current study was to examine the motivating effect of different types of choice in the context of sports. To do so, recreational rope skippers participated in an experimental field study which helps enhancing the ecological validity of the findings. Results showed that not all choices are equally beneficial, calling for a differentiated stance towards the motivational practice of choice provision.

IS OPTION CHOICE EFFECTIVE?

Previous research indicated that, compared to the use of other autonomy-supportive strategies (e.g., providing a rationale, empathizing with the athlete), coaches are more reluctant to provide their athletes with choices and participation (Delrue et al., 2018). One of the reasons for the more limited use of choice may involve the belief that choice is not necessary effective. Several reasons can lead them to question the effectiveness, such as the idea that athletes lack the expertise to decide which option is best suited to facilitate their progress or the fact that choice may result in endless discussions without reaching consensus among team members. Overall then, by offering choice, some coaches fear losing grip on their athletes' developmental process. The present findings confirm that not all choices are created equal: the type of options being offered partially determined the effectiveness of choice.

Specifically, in two different option choice conditions, participants were allowed to choose the content of the single rope training they performed. With regard to the low-contrast option choice, coaches remain in charge of the training content by only providing options that slightly differ from one another. However, repetitively being allowed to choose between alternatives that are very similar in content and perceived attractiveness did not elicit extra effort from the side of the rope or to experience the exercises as more enjoyable, thereby failing to install a more pronounced intention to participate in similar rope skipping exercises in the future. Contrary to the lack of direct

effects on these outcomes, through its facilitative effect on autonomy need satisfaction, low-contrast option choice did indirectly relate to these outcomes. This finding is in line with studies that indicate that the mere act of choosing is not by definition motivating (Flowerday, Schraw, & Stevens, 2004). Apart from the fact that the act of choosing may be more difficult and energy-consuming in case options are very closely aligned (Higgins, 1998; Luce, 1998), the options build into option choices need to entail opportunities for self-realization to facilitate athletes' motivation and engagement (Katz & Assor, 2007).

The current study further indicates that there is a potential pitfall connected to the use of low-contrast option choices, as they seem to backfire in term of athlete engagement in case this type of choice is provided without meeting recipients' autonomy need satisfaction. This is a legitimate concern, as previous studies have shown that option choices with little differences between alternatives are found to enhance perceptions of choice, but not necessarily feelings of volition and an internal locus of causality (Reeve et al. 2003), which constitute key aspects of autonomy need satisfaction (deCharms, 1968).

Opportunities for self-realization are more evident when provided options within a given choice differ to a greater extent, such as in the high-contrast option choice condition. Also, in this case, the act of choosing may require less mental effort, thus less easily drawing upon our limited resources for self-regulation (Baumeister et al., 1998; Shavir, Simonson, & Tversky, 1993). This type of choice was found to enhance not only athletes' autonomy need satisfaction, but also their engagement and their intentions to persevere, compared to when no choice was provided. In this case, autonomy need satisfaction appeared to play a truly mediating role as it could account for the direct effects of option choice on outcomes. Although the present findings indicate that high-contrast option choice yields an engagement-boosting effect, given that no performance measures were included, it remains to be seen whether offering choice also contributes to athletes' skill development.

Meta-analytic evidence across various live domains showed that choice of activities in general enhanced task performance (Patall et al., 2008), although no studies in the sports domain were included. Therefore, an avenue for future research is to examine the effect of different types of choice on competence need satisfaction and actual skill development.

IS ACTION CHOICE EFFECTIVE?

Although the provision of choice gets often equated with the offer of a menu of options (Sebire et al., 2016), sport coaches have different possibilities to build in choice. That is, rather than allowing their athletes to choose which exercises, programs or seasonal goals to pursue, they could allow choice about the way how activities are undertaken. Action choice (Reeve et al., 2003) can be operationalized in different ways, including the order of doing activities (Wulf & Adams, 2014), the pace of switching between activities (Mouratidis et al., 2011), when to use assistance devices (Wulf & Toole, 1999), or when to receive feedback (Janelle, Kim & Singer, 1995). Action choice may be a more feasible strategy in the eyes of coaches as they remain in charge of determining the content of the training (i.e., type of exercises offered). Findings of the current study indicate that action choice, which involved allowing participants to have a say in the order in which exercises are performed, promoted their engagement. Similar beneficial effects on intended perseverance were not observed, yet action choice contributed to this outcome via enhanced autonomy need satisfaction. Although the finding that compared to not providing choice, action choice has more advantages than low-contrast option choices confirms previous studies in the educational domain (Reeve et al., 2003), it remains to be seen whether the benefits of this type of action choice also radiate to athlete's skill-development as shown in a prior study by Wulf and Toole (1999). These authors reported that action choice about when to use assistance devices enhanced complex motor skill-retention. Likewise, providing gym attendants and kinesiology students with the opportunity to choose the order of balance

exercises, resulted in less errors both during practice as during retention (Wulf & Adams, 2014). Future research can aim to examine whether similar performance-enhancing effects of action choice can be found in the sport domain, involving more complex motor skills.

THE IMPACT OF INDECISIVENESS AS A PERSONAL FACTOR

A final question addressed by the current study was if choice is equally beneficial for all athletes, thereby especially taking dispositional indecisiveness into account. Results showed that, in general, effects of choice provision are not dependent on choice recipients' indecisiveness. A minor exception is that high indecisive people benefitted less from high-contrast option choice in terms of autonomy satisfaction.

Given that previous studies related indecisiveness with more troublesome decision making (e.g., Rassin et al., 2008), the limited amount of interactions is remarkable. One possible explanation for this finding is that the rope skippers in the current study perceived the choice as rather trivial. They knew the experimenter only shortly and were only taken aside for a short period in time. Therefore, it might be clear to them that the choice they made would have little or no impact on their rope-skipping future. Indeed, previous research indicated that indecisiveness was more strongly related with difficulties regarding career choices, compared to everyday choices (Germeijs & De Boeck, 2002). Future research might investigate whether findings would be different when choices carry greater importance with regard to the future endeavors of participants. Another possible explanation is that the amount of options provided was too limited for the consequences to be displayed, as dispositional indecisiveness has previously been showed to impair decisions about which movie to watch at the movies or what dish to order in the restaurant (Germeijs & De Boeck, 2002). As such, future research might examine whether indecisive people have a harder time choosing, when more options are available.

Regarding the relation between dispositional indecisiveness and action choices, available studies are scarce. However, in the above mentioned study (Germeijs & De Boeck, 2002) indecisiveness was unrelated to the one action choice under examination (i.e., the order in which lessons were studied). Knowing not missing out on a particular option in the case of action choice might explain this finding, as every provided option is performed. This is not the case for option choices, were indecisive people in particular might regret not being able to participate in a certain activity due to their choice. The role of indecisiveness within different types of choice is, to the best of our knowledge, not yet been examined, and, thus, constitutes an interesting avenue for future research.

LIMITATIONS AND STRENGTHS

A first limitation concerns the generalizability of the current findings. As only recreational rope-skippers participated in the study, the question remains whether providing choice is equally motivating for athletes stemming from other individual sports, from team sports, or for competitive athletes. On a similar vein, using different exercises for rope skippers under fifteen years of age, compared with rope-skippers fifteen years or older forestalled examining the impact of age and developmental level on choice effects. Future research could aim to provide an answer to these questions.

Second, by only taking autonomy need satisfaction into account, questions regarding the role of the other basic psychological needs, proposed by SDT (i.e., competence and relatedness; Ryan & Deci, 2002), are left unanswered. Regarding competence, SDT reasons that choices will be especially beneficial if athletes feel that they are capable of making the right choice (i.e., competence in choosing) and their choice is connected with a skill they can successfully perform (i.e., competence in performing). With regard to choice-competence, previous studies indeed showed that providing choice is less beneficial when they require more effort (Vohs et al., 2008), for example because of an overload in alternatives (Iyengar et al., 2004) or

alternatives are limitedly distinct from one another (Luce, 1998). With regard to competence in terms of skill execution, previous studies already indicated that peoples' choices are partially reflective of their expectations to perform well in the chosen activity (e.g., Feather, 1988). As the low-contrast option choices provides rope-skippers with similar alternatives, this type of choice might require more effort and provides fewer opportunities to match their choice with their skill level, in addition to the reduced opportunities to endorse personal preferences. Therefore, a fruitful avenue for future research is to examine if the effect of choice provision on competence need satisfaction might explain the lack of direct effects of low-contrast option choice.

Apart from autonomy and competence need satisfaction, which are, respectively, found to and presumed to be intervening variables, relatedness need satisfaction might also play a role, albeit in altering the effects of choice provision. Specifically, the effect of choice provision might be dependent on the relation between he choice provider and recipient (Roth, Kanat-Maymon, & Assor, 2016). As choice in the current study was offered by an experimenter, with whom the participants were unfamiliar, this could not be examined. Furthermore, choice provision might become more complex when one person has to decide for a group or when a group of individuals has to reach consensus before choosing. Because everyone could choose for him- or herself in the current study, everyone was afforded their exercise of choice. However, this procedure is not always feasible when athletes train in groups. In that case, it is possible that athletes are not ascribed their activity of choice, which has previously been found to be detrimental in terms of motivational functioning (Patall et al., 2008). Therefore, future research examining the effect of choice provision to groups of athletes would be interesting. Herein, the degree to which one person feels related to the group might also impact on the effect of being able to choose for advocating the personal preference in a group discussion.

A third limitation has to do with the measurement of perseverance in the current study, as only *intentions* to persevere were taken into account. It

remains unclear whether participants indicating that they intend to participate in a future 1-day rope skipping training camp would actually persevere harder as well. In general, the current study could benefit from the inclusion of non-questionnaire-based measurements.

Finally, one has to take into account that the high-contrast option choice condition was not yoked with the control group. As such, the effects of the current study with regard to the high-contrast option choice might also be attributed towards the exercises performed. To rule out this alternative explanation, future research might want to replicate this finding with a control group that is yoked with a high-contrast option choice group.

Despite these limitations, the current study is also characterized with particular strengths. First, the manipulations created a clear-cut distinction between action choice and option choice, whereas previous research often contaminated action choice with an aspect inherent in option choices, thereby allowing choice about both the actions to be performed and their particular implementation (e.g., Prusak, Treasure, Darst, & Pangrazi, 2004). As such, the current study allowed to more convincingly attribute the merits of action choice at the characteristics of the choice itself (i.e., choice about implementation), as the alternative explanation of having choice about more aspects of the activities at hand (both actions and implementation) was ruled out.

Second, using a yoked procedure instead of a matched design (e.g., Swann & Pittman, 1977) might also be considered a strength. In a matched design, equality of the chosen options between conditions is obtained by discarding participants who had chosen activities that could not be matched to the assigned options in the no-choice control group. However, past research found that this is often accomplished by experimenters exerting subtle pressure on participants to make a particular choice (e.g., Swann & Pittman, 1977) or by intentionally offering less attractive alternatives (e.g., Schraw et al., 1998), as to prevent having to discard many participants. As a consequence

of these subtle pressures, choice effects has been less profound in studies using a matched design (Patall et al., 2008).

PRACTICAL CONSIDERATIONS

Up to date, choice provision is an ambivalent theme among coaches, with some advocating it use, while others advise against it. The current study can introduce more detail in the debate among the practical merits and drawbacks of choice provision. Based on the results, action choice provision might be considered most useful for sport coaches, as it tended to spur athlete engagement compared with the usual practice in sports of not providing choice, while it allows coaches to remain in control of the exercises that are provided during training.

Low-option choices, on the other hand, can better be avoided. Although they are shown to increase autonomy in the current study, they do not increase athlete engagement or intentions to persevere. Furthermore, they may backfire in terms of engagement in case they are provided in a way that fails to support autonomy need satisfaction. When coaches want to motivate their athletes for rather repetitive or boring activities, they better do not rely on proposing variations on the same activity that differ little from one another, but rather turn to other motivating strategies, such as providing a meaningful rationale for the activity at hand (Jang, 2008).

Finally, high-contrast option choice provision can be beneficial in the context of sports, on the condition that it is used in moderation. For example, a coach planning on ending a training session with a fun activity for his athlete, might involve the athlete in choosing the activity. The current study clearly showed that providing athletes with a handful of sufficiently distinct alternatives will spur their engagement and intentions to persevere. However, when this type of choice is used too frequently, coaches might lose control over the training content and be perceived as chaotic, which might hamper skill and competence development in athletes (Delrue et al., 2018). Athletes rely on the guiding of their coach to acquire and consummate skills, meaning

that their progression is likely to slow down when they are too often in charge of their training content.

CONCLUSION

The current experimental field study showed that action choice, low-contrast- and high-contrast option choices all nurtured recreational rope skippers' autonomy satisfaction. However, only high-contrast option choices directly enhanced rope skippers' training engagement and intended perseverance, while action choices showed a clear trend towards being engagement enhancing. For these effects, autonomy need satisfaction functioned as an intervening variable. Rope skippers' dispositional indecisiveness did only alter the effects of choice provision in one out of nine cases, indicating that high-contrast option choice is less beneficial in terms of autonomy satisfaction for indecisive rope skippers. Overall, the current findings advocate using action choice most frequently in the context of sports, while also stressing the merits of sparingly providing high-option choices in order to spur athletes' engagement.

REFERENCES

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion, 32*(3), 189–199. https://doi.org/10.1007/s11031-008-9095-z

Aelterman, N., Vansteenkiste, M., Soenens, B., Fontaine, J., Haerens, L., & Reeve, J. (2018). Toward an integrative and fine-grained insight in motivating and demotivating teaching: The merits of a circumplex approach. *Journal of Educational Psychology*, Manuscript accepted for publication. https://doi.org/doi: 10.1037/edu0000293

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252–1265. https://doi.org/10.1037/0022-3514.74.5.1252

Botti, S., & Iyengar, S. S. (2006). The dark side of choice: When choice impairs social welfare. *Journal of Public Policy & Marketing, 25*(1), 24–38. https://doi.org/10.1509/jppm.25.1.24

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., … Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Cheon, S. H., Reeve, J., Lee, J., & Lee, Y. (2015). Giving and receiving autonomy support in a high-stakes sport context: A field-based experiment during the 2012 London Paralympic Games. *Psychology of Sport and Exercise, 19*, 59–69. https://doi.org/10.1016/j.psychsport.2015.02.007

Claver, F., Jimenez, R., Gil-Arias, A., Moreno, A., & Perla Moreno, M. (2017). The cognitive and motivation intervention program in youth

female volleyball players. *Journal of Human Kinetics*, *59*(1), 55–65. https://doi.org/10.1515/hukin-2017-0147

Cooper, S. E., Fuqua, D. R., & Hartman, B. W. (1984). The relationship of trait indecisiveness to vocational uncertainty, career indecision, and interpersonal characteristics. *Journal of College Student Development*, *25*(4), 353–356.

Cosme, D., Mobasser, A., Zeithamova, D., Berkman, E. T., & Pfeifer, J. H. (2018). Choosing to regulate: Does choice enhance craving regulation? *Social Cognitive and Affective Neuroscience*, *13*(3), 300–309. https://doi.org/10.1093/scan/nsy010

Cote-Lecaldare, M., Joussemet, M., & Dufour, S. (2016). How to support toddlers' autonomy: A qualitative study with child care educators. *Early Education and Development*, *27*(6), 822–840. https://doi.org/10.1080/10409289.2016.1148482

Crites, J. O. (1969). *Vocational psychology*. New York, NY, US: McGraw-Hill.

Curran, T., Hill, A. P., Ntoumanis, N., Hall, H. K., & Jowett, G. E. (2016). A three-wave longitudinal test of self-determination theory's mediation model of engagement and disaffection in youth sport. *Journal of Sport & Exercise Psychology*, *38*(1), 15–29. https://doi.org/10.1123/jsep.2015-0016

DeCharms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York, NY, US: Academic Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Delrue, J., Reynders, B., Aelterman, N., De Backer, M., Decroos, S., De Muynck, G.-J., … Vansteenkiste, M. (2018). Adopting a helicopter-perspective towards motivating and demotivating coaching: A circumplex approach. *Manuscript in Revision*.

Feather, N. T. (1988). Values, valences, and course enrollment: Testing the role of personal values within an expectancy valence framework. *Journal of Educational Psychology*, *80*(3), 381–391. https://doi.org/10.1037//0022-0663.80.3.381

Ferrari, J. R., & Dovidio, J. F. (2000). Examining behavioral processes in indecision: Decisional procrastination and decision-making style. *Journal of Research in Personality*, *34*(1), 127–137. https://doi.org/10.1006/jrpe.1999.2247

Flowerday, T., Schraw, G., & Stevens, J. (2004). The role of choice and interest in reader engagement. *Journal of Experimental Education*, *72*(2), 93–114. https://doi.org/10.3200/JEXE.72.2.93-114

Frost, R. O., & Shows, D. I. (1993). The nature and measurement of compulsive indecisiveness. *Behaviour Research and Therapy*, *31*(7), 683–692. https://doi.org/10.1016/0005-7967(93)90121-A

Germeijs, V., & De Boeck, P. (2002). A measurement scale for indecisiveness and its relationship to career indecision and other types of indecision. *European Journal of Psychological Assessment*, *18*(2), 113–122. https://doi.org/10.1027//1015-5759.18.2.113

Germeijs, V., & De Boeck, P. (2003). Career indecision: Three factors from decision theory. *Journal of Vocational Behavior*, *62*(1), 11–25. https://doi.org/10.1016/S0001-8791(02)00055-6

Germeijs, Veerle, Verschueren, K., & Soenens, B. (2006). Indecisiveness and high school students' career decision-making process: Longitudinal associations and the mediational role of anxiety. *Journal of Counseling Psychology*, *53*(4), 397–410. https://doi.org/10.1037/0022-0169.53.4.397

Higgins, E. T. (1998). From expectancies to worldviews: Regulatory focus in socialization and cognition. In J. M. Darley & Cooper (Eds.), *Attribution and social interaction: The legacy of Edward E. Jones* (pp. 243–309). Washington, DC: American Psychological Association.

Higgins, E. T., Trope, Y., & Kwon, J. (1999). Augmentation and undermining from combining activities: The role of choice in activity engagement theory. *Journal of Experimental Social Psychology*, *35*(3), 285–307. https://doi.org/10.1006/jesp.1999.1384

Iyengar, S. S., Jiang, W., & Huberman, G. (2004). How much choice is too much: Determinants of individual contributions in 401K retirement plans. In O. S. Mitchell & S. Utkus (Eds.), *Pension design and structure: New lessons from behavioral finance* (pp. 83–97). Oxford, UK: Oxford University Press.

Janelle, C., Kim, J., & Singer, R. (1995). Subject-controlled performance feedback and learning of a closed motor skill. *Perceptual and Motor Skills*, *81*(2), 627–634. https://doi.org/10.2466/pms.1995.81.2.627

Jang, H. (2008). Supporting students' motivation, engagement, and learning during an uninteresting activity. *Journal of Educational Psychology*, *100*(4), 798–811. https://doi.org/10.1037/a0012841

Jang, H., Reeve, J., & Halusic, M. (2016). A new autonomy-supportive way of teaching that increases conceptual learning: Teaching in students' preferred ways. *Journal of Experimental Education*, *84*(4), 686–701. https://doi.org/10.1080/00220973.2015.1083522

Katz, I., & Assor, A. (2007). When choice motivates and when it does not. *Educational Psychology Review*, *19*(4), 429–442. https://doi.org/10.1007/s10648-006-9027-y

Leiker, A. M., Bruzi, A. T., Miller, M. W., Nelson, M., Wegman, R., & Lohse, K. R. (2016). The effects of autonomous difficulty selection on engagement, motivation, and learning in a motion-controlled video game task. *Human Movement Science*, *49*, 326–335. https://doi.org/10.1016/j.humov.2016.08.005

Luce, M. F. (1998). Choosing to avoid: Coping with negatively emotion-laden consumer decisions. *Journal of Consumer Research*, *24*(4), 409–433. https://doi.org/10.1086/209518

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*(1), 99–128. https://doi.org/10.1207/s15327906mbr3901_4

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, *21*(11), 883–904. https://doi.org/10.1080/0264041031000140374

Markus, H. R., & Schwartz, B. (2010). Does choice mean freedom and well-being? *Journal of Consumer Research*, *37*(2), 344–355. https://doi.org/10.1086/651242

McKay, J. R., Drapkin, M. L., Van Horn, D. H. A., Lynch, K. G., Oslin, D. W., DePhilippis, D., … Cacciola, J. S. (2015). Effect of patient choice in an adaptive sequential randomization trial of treatment for alcohol and cocaine dependence. *Journal of Consulting and Clinical Psychology*, *83*(6), 1021–1032. https://doi.org/10.1037/a0039534

Mitchell, F., Gray, S., & Inchley, J. (2015). "This choice thing really works ..." Changes in experiences and engagement of adolescent girls in physical education classes, during a school-based physical activity programme. *Physical Education and Sport Pedagogy*, *20*(6), 593–611. https://doi.org/10.1080/17408989.2013.837433

Mouratidis, A. A., Vansteenkiste, M., Sideridis, G., & Lens, W. (2011). Vitality and interest-enjoyment as a function of class-to-class variation in need-supportive teaching and pupils' autonomous motivation. *Journal of Educational Psychology*, *103*(2), 353–366. https://doi.org/10.1037/a0022773

Muthén, L., & Muthén, B. (2010). *Mplus User's Guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

Osipow, S. H. (1999). Assessing career indecision. *Journal of Vocational Behavior*, *55*(1), 147–154. https://doi.org/10.1006/jvbe.1999.1704

Overskeid, G., & Svartdal, F. (1996). Effect of Reward on Subjective Autonomy and Interest When Initial Interest Is Low. *The Psychological Record*, *45*, 319–331.

Parker, L. E., & Lepper, M. R. (1992). Effects of fantasy contexts on childrens learning and motivation: Making learning more fun. *Journal of Personality and Social Psychology*, *62*(4), 625–633. https://doi.org/10.1037/0022-3514.62.4.625

Patall, E. (2012). The motivational complexity of choosing: A review of theory and research. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 249–279). New York, NY, US: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195399820.013.0015

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: A meta-analysis of research findings. *Psychological Bulletin*, *134*(2), 270–300. https://doi.org/10.1037/0033-2909.134.2.270

Patall, E. A., Cooper, H., & Wynn, S. R. (2010). The effectiveness and relative importance of choice in the classroom. *Journal of Educational Psychology*, *102*(4), 896–915. https://doi.org/10.1037/a0019545

Patall, E. A., Steingut, R. R., Vasquez, A. C., Trimble, S. S., Pituch, K. A., & Freeman, J. L. (2018). Daily autonomy supporting or thwarting and students' motivation and engagement in the high school science classroom. *Journal of Educational Psychology*, *110*(2), 269–288. https://doi.org/10.1037/edu0000214

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*(4), 279–306. https://doi.org/10.1023/A:1014805132406

Prusak, K. A., Treasure, D. C., Darst, P. W., & Pangrazi, R. P. (2004). The effects of choice on the motivation of adolescent girls in physical

education. *Journal of Teaching in Physical Education*, *23*(1), 19–29. https://doi.org/10.1123/jtpe.23.1.19

Rassin, E. (2007). A psychological theory of indecisiveness. *Netherlands journal of psychology*, *63*(1), 1–11. https://doi.org/10.1007/BF03061056

Rassin, E., Muris, P., Booster, E., & Kolsloot, I. (2008). Indecisiveness and informational tunnel vision. *Personality and Individual Differences*, *45*(1), 96–102. https://doi.org/10.1016/j.paid.2008.03.006

Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of choice. *Journal of Educational Psychology*, *95*(2), 375–392. https://doi.org/10.1037/0022-0663.95.2.375

Reeve, Johnmarshall, Vansteenkiste, M., Assor, A., Ahmad, I., Cheon, S. H., Jang, H., … Wang, C. K. J. (2014). The beliefs that underlie autonomy-supportive and controlling teaching: A multinational investigation. *Motivation and Emotion*, *38*(1), 93–110. https://doi.org/10.1007/s11031-013-9367-0

Roth, G., Kanat-Maymon, Y., & Assor, A. (2016). The role of unconditional parental regard in autonomy-supportive parenting. *Journal of Personality*, *84*(6), 716–725. https://doi.org/10.1111/jopy.12194

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic dialectical perspective. In Edward L. Deci & R. M. Ryan (Eds.), *Handbook of selfdetermination research* (pp. 3–33). Rochester, NY: Rochester University Press.

Ryan, R. M., & Lynch, J. H. (1989). Emotional autonomy versus detachment: revisiting the vicissitudes of adolescence and young adulthood. *Child Development*, *60*(2), 340–356. https://doi.org/10.2307/1130981

Ryan, Richard M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality*

and Social Psychology, *43*(3), 450–461. https://doi.org/10.1037/0022-3514.43.3.450

Ryan, Richard M., & Deci, E. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality*, *74*(6), 1557–1585. https://doi.org/10.1111/j.1467-6494.2006.00420.x

Ryan, Richard M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY, US: Guilford Press.

Schraw, G., Flowerday, T., & Reisetter, M. F. (1998). The role of choice in reader engagement. *Journal of Educational Psychology*, *90*(4), 705–714. https://doi.org/10.1037//0022-0663.90.4.705

Schwartz, B. (2006). More isn't always better. *Harvard Business Review*, *84*(6), 22-+.

Sebire, S. J., Kesten, J. M., Edwards, M. J., May, T., Banfield, K., Tomkinson, K., … Jago, R. (2016). Using self-determination theory to promote adolescent girls' physical activity: Exploring the theoretical fidelity of the Bristol Girls Dance Project. *Psychology of Sport and Exercise*, *24*, 100–110. https://doi.org/10.1016/j.psychsport.2016.01.009

Shafir, E., Simonson, I., & Tversky, A. (1993). Reason-based choice. *Cognition*, *49*(1–2), 11–36.

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*(3), 493–525. https://doi.org/10.1177/0013164408323233

Swann, W. B., & Pittman, T. S. (1977). Initiating play activity of children: Moderating influence of verbal cues on intrinsic motivation. *Child Development*, *48*(3), 1128–1132. https://doi.org/10.1111/j.1467-8624.1977.tb01281.x

Van Petegem, S., Beyers, W., Vansteenkiste, M., & Soenens, B. (2012). On the association between adolescent autonomy and psychosocial functioning: Examining decisional independence from a self-determination theory perspective. *Developmental Psychology*, *48*(1), 76–88. https://doi.org/10.1037/a0025307

Van Petegem, S., Zimmer-Gembeck, M. J., Soenens, B., Vansteenkiste, M., Brenning, K., Mabbe, E., … Zimmermann, G. (2017). Does general parenting context modify adolescents' appraisals and coping with a situation of parental regulation? The case of autonomy-supportive parenting. *Journal of Child and Family Studies*, *26*(9), 2623–2639. https://doi.org/10.1007/s10826-017-0758-9

Vandereycken, W., & Vansteenkiste, M. (2009). Let eating disorder patients decide: Providing choice may reduce early drop-out from inpatient treatment. *European Eating Disorders Review*, *17*(3), 177–183. https://doi.org/10.1002/erv.917

Vansteenkiste, M., Simons, J., Soenens, B., & Lens, W. (2004). How to become a persevering exerciser? Providing a clear, future intrinsic goal in an autonomy-supportive way. *Journal of Sport & Exercise Psychology*, *26*(2), 232–249. https://doi.org/10.1123/jsep.26.2.232

Vohs, K. D., Schmeichel, B. J., Nelson, N. M., Baumeister, R. F., Twenge, J. M., & Tice, D. M. (2008). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Journal of Personality and Social Psychology*, *94*(5), 883–898. https://doi.org/10.1037/0022-3514.94.5.883

Wilde, M., Basten, M., Grossmann, N., Haunhorst, D., Desch, I., Strueber, M., & Randler, C. (2018). The (non-)benefit of choosing: If you get what you want it is not important that you chose it. *Motivation and Emotion*, *42*(3), 348–359. https://doi.org/10.1007/s11031-018-9675-5

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology*, *96*(2), 236–250. https://doi.org/10.1037/0022-0663.96.2.236

Wulf, G., & Toole, T. (1999). Physical assistance devices in complex motor skill learning: Benefits of a self-controlled practice schedule. *Research Quarterly for Exercise and Sport*, *70*(3), 265–272. https://doi.org/10.1080/02701367.1999.10608045

Wulf, Gabriele, & Adams, N. (2014). Small choices can enhance balance learning. *Human Movement Science*, *38*, 235–240. https://doi.org/10.1016/j.humov.2014.10.007

APPENDIX

APPENDIX A: SUPPLEMENTARY TABLES

Supplementary Table 1. Perceptions Regarding the Attractiveness of Different Single Rope Exercises by Rope Skippers Aged 15 Years or Younger

	Fun	Challenge	Intentions to perform	Perceived competence	Unattractive character
AS	5.33	3.87	5.53	4.80	3.00
The release	5.33	4.40	5.73	3.40	3.67
Cross backwards	5.27	3.87	4.80	5.20	3.70
Elephant	5.20	4.40	4.93	4.53	3.64
Awesome annie	5.07	5.73	5.47	3.33	4.00
Double under 50 without failure	5.00	4.80	5.00	4.73	4.50
Toad backwards	4.93	5.00	5.27	4.13	3.74
Cross cross – EB	4.87	4.20	4.87	4.20	2.23
Push up	4.80	4.80	4.40	4.87	4.08
Caboose	4.80	3.33	4.47	5.40	3.14
Speedsteps	4.73	5.80	4.87	4.07	4.94
Buddy bounce	4.60	5.20	4.40	3.47	4.30
Little fisherman	4.47	3.33	4.00	4.67	3.33
Wrap TS	4.07	4.87	4.67	2.53	4.64
Double under backwards 50 without failure	4.00	5.60	4.47	3.47	5.33

Note. Exercises in bold are selected as creative, enjoying exercises, exercises that are underlined are retained as more repetitive, boring exercises.

Supplementary Table 2. Perceptions Regarding the Attractiveness of Different Single Rope Exercises by Rope Skippers Aged 15 Years or Older

	Fun	Challenge	Intentions to perform	Perceived competence	Unattractive character
EB-TS	5.60	4.20	5.67	5.40	3.12
CL-AS	5.27	5.00	5.27	4.27	3.93
Toad crougar crougar	5.20	4.47	5.33	4.40	3.37
AS AS	5.13	5.00	5.13	4.07	3.67
Wrap TS backwards	5.00	5.27	4.87	3.07	4.14
The release	5.00	4.47	4.73	3.93	3.44
Frog	5.00	6.13	5.20	2.87	4.37
Triple	5.00	6.07	5.13	2.93	4.57
Cross cross backwards	4.80	4.13	4.60	4.80	3.04
Buddy bounce	4.80	5.07	4.73	3.00	4.34
Caboose advanced	4.40	4.14	5.00	4.14	3.50
CL backwards	4.07	5.07	4.53	2.07	4.37
Speedsteps 120 without failure	4.07	5.47	4.20	3.87	4.67
Double under 75 without failure	3.73	5.53	3.47	3.47	5.00
Double under backwards 75 without failure	3.20	5.93	3.73	2.80	5.20

Note. Exercises in bold are selected as creative, enjoying exercises, exercises that are underlined are retained as more repetitive, boring exercises.

Supplementary Table 3. Detailed Overview of the Results Stemming from the Moderation Analyses

	Autonomy need satisfaction			Engagement			Intended perseverance		
	Contrast A	Contrast B	Contrast C	Contrast A	Contrast B	Contrast C	Contrast A	Contrast B	Contrast C
Indecisiveness	.13	.04	.20^{+}	.05	.03	.09	13	-.06	.12
Choice contrast	26*	.37**	.22*	-.06	.27*	.21^{+}	.02	.37**	-.05
Indecisiveness x choice contrast.	-.10	-.22*	-.06	-.02	-.08	-.02	.07	-.13	.05

Note. Contrast A involves the comparison between low-contrast option choice with no choice. Contrast B involves the comparison between high-contrast option choice with no choice. Contrast C involves the comparison between action choice and no choice.
*$p < .05$, **$p < .01$

CHAPTER 7

General Discussion

TABLE OF CONTENTS

The main objective of the current dissertation was to gain an insight in the unique and causal impact of coaches' motivating style in general and a number of specific coaching practices in particular, thereby shedding light on the question why these effects occur (i.e., underlying mechanisms) and for whom or when they occur (i.e., moderation). The dissertation is grounded in Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017), a broad theory on human motivation that has enjoyed increasing attention and popularity in the coaching and sport literature in general (Hagger & Chatzisarantis, 2007). This final chapter first provides an overview of the core findings of the five conducted empirical studies thereby relating them to the three general objectives outlined in the introduction, that is, (1) examining the (de)motivating impact of specific coach behaviors on athlete functioning, (2), uncovering the explaining mechanisms, and (3) shedding light on the role of individual differences potentially attenuating the impact of particular coaching practices. Second, this final chapter offers a number of reflections, hereby situating the findings in the broader literature and identifying avenues for future research. Finally, practical implications and limitations are discussed before ending with a summarized conclusion.

1. A TOPIC-WISE DESCRIPTION OF THE CURRENT DISSERTATION'S FINDINGS

The findings regarding the three general objectives of the study are discussed topic-wise in what follows, thereby referencing several chapters and addressing the different objectives along the way. The following topics are addressed: The unique contribution of a (de)motivating coaching style and its interaction with a (de)motivating parenting style, the (de)motivating impact of feedback, and the (de)motivating impact of choice provision.

1.1. THE UNIQUE CONTRIBUTION OF (DE)MOTIVATING COACH BEHAVIORS TO ATHLETE FUNCTIONING

As part of the first objective, involving the examination of the (de)motivating impact of specific coach behaviors on athlete functioning, Chapter 2 investigated whether coach behaviors have a unique contribution to youth athletes functioning above and beyond the role of parents (i.e., Research Question 1.1). Demonstrating the unique importance of coaches was deemed critical to justify a further detailed examination of specific coaching practices in the subsequent chapters. The findings indicated that both need-supportive coaching and parenting, when considered separately, related positively to athlete autonomous motivation and engagement. In contrast, the more athletes perceived their coaches and parents as need-thwarting, the more controlled motivation, amotivation, and disaffection they reported. When considered in conjunction, the pattern of findings changed, with only need-supportive coaching, and not parenting, contributing uniquely to both adaptive outcomes, whereas both need-thwarting coaching and parenting contributed uniquely negatively to athlete amotivation. Thus, the initially observed contribution of need-supportive parenting in the contribution of desirable outcomes fell to non-significance suggesting that especially coaches' motivating style matters.

As for the undesirable outcomes, both socialization figures yielded a unique role in the contribution of athletes' sense of helplessness and

discouragement (i.e., amotivation). However, this pattern did not hold for controlled motivation and disaffection. Although these two outcomes related to need-thwarting coaching and parenting when considered in isolation, when considered together their fairly strong separate relations fell below commonly accepted significance levels. Although these findings deserve replication, it can be concluded that coaches' motivating style has more consistent unique associations with soccer players' outcomes, whereas parents have a predominantly "*damaging potential*", a finding congruent with past work (Amado, Sanchez-Oliva, Gonzalez-Ponce, Pulido-Gonzalez, & Sanchez-Miguel, 2015).

Simultaneously examining coaching and parenting also allowed to shed a light on potential interactions patterns. Findings showed that coaching and parenting interacted with one another when contributing to athletes' motivation (i.e., autonomous, controlled, and amotivation), but not in the contribution of their engagement. Twenty percent of the interactions reached significance, all of them indicating that a beneficial motivating style from the one socialization figure, as either indicated by the presence of high need support or the absence of need thwart, could compensate for the detrimental contribution of a more demotivating style from the other, as indicated by respectively, low need support or high need thwart. Said differently, youth athletes were worst off when both coaches and parents were experienced as low on need support and high on need thwarting.

1.2. THE (DE)MOTIVATING IMPACT OF FEEDBACK

Given the demonstrated unique role of coaches in athletes' motivation and engagement, the subsequent chapters zoomed in on specific motivating practices, one of them being coach feedback. This topic was chosen because training and competition is replete of feedback (e.g., Halperin, Chapman, Martin, Abiss, & Wulf, 2016), which can be offered by coaches more directly or inferred by athletes themselves, for instance, by inspecting themselves how well they performed an activity. Under Objective 1, encompassing the examination of the (de)motivating effect of specific coach behaviors, several critical aspects of feedback were studied (i.e., Research Question 1.2), including its valence (Chapter 4 and 5) and the style of communicating feedback (Chapter 4).

Regarding *feedback valence*, results of two experimental field studies among tennis players indicated that positive, compared to negative, normative feedback yielded a positive impact on a diverse set of outcomes. Specifically, a moderate to large effect on tennis players' affective functioning (i.e., more competence satisfaction and enjoyment) was evident, whereas the effects on cognitive (i.e., less negative self-talk), and behavioral functioning (i.e., greater perseverance and challenge seeking) were, respectively, small and moderate. At the same time, feedback valence did not directly impact on players' experienced tension, positive self-talk, performance or cheating behavior.

As for *feedback communication style*, the findings of Chapter 4 showed relative small effects indicating that feedback provided in an autonomy-supportive way, compared to a controlling one, increased tennis players' affective (i.e., autonomy need satisfaction, enjoyment) and behavioral functioning (i.e., perseverance and challenge seeking), while no effects were found on self-talk (either positive or negative) and performance.

As part of Objective 2 on the uncovering of *explaining mechanisms*, negative self-talk and competence need satisfaction were, in a partially sequential way, found to function as intervening mechanisms, explaining the effects of feedback valence on enjoyment and perseverance (Research

Questions 2.1 and 2.2). Specifically, tennis players' receiving negative feedback were found to more often express worrying thoughts, signs of somatic fatigue and thoughts about disengagement (i.e., negative self-talk), which additionally decreased their sense of competence up and above the effect of negative feedback as such. Their reduced competence, in turn, undermined enjoyment and perseverance in the tennis exercises at hand. Two additional indirect effects of feedback valence were found. The first indirect effect showed that negative normative feedback was indirectly detrimental to performance, through increased negative self-talk and reduced competence need satisfaction. The second indirect effect showed that negative, normative feedback indirectly enhances tennis players' experienced pressure, through reduced competence need satisfaction.

Whereas competence need satisfaction accounted for the effects of feedback valence, autonomy need satisfaction accounted for the effect of an autonomy-supportive feedback communication style on enjoyment (Research Question 2.1), such that making use of inviting language during feedback communication provided tennis players with a sense of psychological freedom, which, in turn, caused them to enjoy the exercise more.

Simultaneously examining feedback valence and communication style also allowed examining their interaction, showing that feedback style did not alter the effects of feedback valence and vice versa. Although the effects of feedback valence were not dependent upon style, their effects were partially different among athletes high versus low in self-critical perfectionism. That is, as part of Objective 3 on the attenuating *role of individual differences*, it was found in Chapter 5 that high self-critical tennis players especially suffered from negative feedback in terms of competence need satisfaction (cf., Research Question 3.1). To sum up, these findings clearly underscore the merits of positive and autonomy-supportive, compared to negative and controlling normative feedback for athletes, with a cognitive (i.e., self-talk) and two affective (i.e., autonomy and competence need satisfaction) mechanisms explaining their impact.

1.3. HOW (DE)MOTIVATING IS THE PROVISION OF CHOICE FOR ATHLETES?

The second motivating practice that was examined in greater detail was the provision of choice. The reasons for selecting this motivating strategy above others are manifold, including the fact that several coaches doubt the feasibility of this practice, and the lack of experimental work on this topic in the sport literature. To gain a more refined and causal insight in the role of choice in the prediction of rope skippers' autonomy need satisfaction, engagement and intended perseverance (Research Question 1.2), Chapter 6 operationalized three different choice conditions. In two of these conditions, athletes could choose from a menu of three options, with either considerable (i.e., high-contrast option choice) or limited variance (i.e., low-contrast option choice) being built into the attractiveness of the offered options. In a third condition, the set of exercises was predetermined by the experimenter, but rope skippers could choose the order in which these three exercises were performed (i.e., action choice).

Findings on the *direct effects* of choice provision indicated that all three types of choice had a small (action choice, low contrast option choice) to moderate (high-contrast option choice) autonomy-enhancing effect on rope skippers, compared to practice as usual in which no choice was provided. While high-contrast option choice had a small engagement-enhancing effect and moderately increased rope skippers' intended perseverance compared to the control group participants, these benefits did not emerge for the participants in the low-contrast option choice condition. The findings for the action choice condition fell in-between, with action choice carrying a small engagement-enhancing effect without fostering a greater willingness to continue engaging in the same exercises, compared to control group participants.

With regard to Objective 2 on *explaining mechanisms*, the manipulated choices yielded a direct effect on outcomes for some choice manipulations but failed to do so for others. Autonomy need satisfaction was

found to serve an explanatory role in each of these cases (Research Question 2.1). That is, in the case of high-contrast option choice, autonomy need satisfaction could be considered a true mediating mechanism (given the direct effects on outcomes), in the case of the low-contrast choice condition, autonomy need satisfaction played an intervening role (given the lack of direct effects on outcomes). That is, to the extent low-contrast choice had promoted more autonomy need satisfaction, athletes in this condition, compared to those in the control group, reported more engagement and intended perseverance. As for the action choice condition, given the variable effects on outcomes, autonomy need satisfaction played both a mediating (in the case of engagement) and intervening (in the case of perseverance) role

As for Objective 3, on the role of *individual differences*; dispositional indecisiveness, reflecting the chronic difficulties to make decision over situations and domains (Crites, 1969; Osipow, 1999), played only a minimal role in altering the effects of choice provision (Research Question 3.2). The only significant interaction effect obtained indicated that rope skippers high in indecisiveness benefited somewhat less from high-contrast option choice in terms of autonomy need satisfaction, but not in terms of engagement and intended perseverance. In short, these findings suggest that not all types of choices have equal motivating effects. Yet, to the extent in which they satisfy athletes' autonomy need satisfaction, they indirectly increase enjoyment and intended perseverance.

2. THEORETICAL REFLECTIONS AND FUTURE DIRECTIONS

The current section will reflect upon the dissertations' findings by taking a view at the results from a different angle and situating them within the broader literature. In doing so, limitations with regard to a particular research question will be provided along with avenues for future research.

2.1. USING A CIRCUMPLEX MODEL OF (DE)MOTIVATING COACHING TO REFLECT ON THE CURRENT FINDINGS

2.1.1. INTRODUCING THE CIRCUMPLEX MODEL

While the experimental work included in the current dissertation especially zoomed in on specific motivating practices, it is useful to locate the current findings in a more overarching perspective as to better contextualize them and provide suggestions for future directions. Such a more panoramic perspective was recently offered by Aelterman et al. (in press) and Delrue et al. (2018), who developed a circumplex model compromising different need-supportive (i.e., autonomy support, structure) and need-thwarting (i.e., control, chaos) styles among teachers and coaches, respectively. This circumplex, depicted in Figure 1, went beyond past research that either focused on a limited set of motivating styles (e.g., autonomy support) or that created a composite score involving multiple motivating styles, much as was the case in Chapter 2 of this dissertation. Specifically, Delrue et al. (2018) created 15 authentic situations, each followed by four possible ways of reacting, with each reaction corresponding to one of four broader need-supportive or need-thwarting styles. Through Multidimensional Scaling analyses, which allows generating a visual insight in how the different (de)motivating practices are interrelated, they obtained evidence for a circular structure.

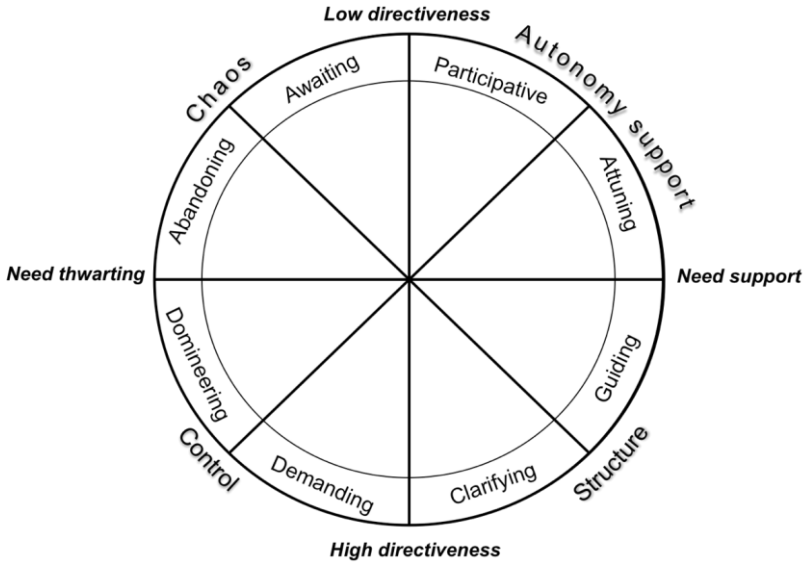


Figure 1. Graphical representation of how different motivating styles are interrelated according to the circumplex model (Aelterman et al., in press; Delrue et al., 2018)

Two different orthogonal dimensions were found to underlie the classification of the diversity in (de)motivating coaching practices. The horizontal dimension reflects the degree to which a motivating practice is rather *need supportive* (i.e., right end; e.g., taking the athletes' perspective) or need thwarting (i.e., left end; e.g., using shaming). The vertical dimension encompassed the degree of *directiveness* embedded in a given motivating practice, with the athlete taking relatively more the lead in the case of some practices (i.e., higher end; e.g., offering choice) and the coach taking the lead in the case of other practices (i.e., lower end; e.g., providing expectations). These two dimensions allowed to capture the variation across practices, with four major areas surfacing corresponding with autonomy support (upper right-quadrant), structure (lower-right quadrant), control (lower-left quadrant) and chaos (upper-left quadrant). Each of these four quadrants constituting a (de)motivating coaching style, which then can be described in terms of directiveness and need support. For instance, autonomy support is characterized as a need-supportive coaching style in which athletes' are

relatively more taking the lead. As such, the identification of this circumplex model and its constituting dimensions provides a more integrated view on (de)motivating coach behaviors.

Apart from the integration of various (de)motivating styles, the circumplex model also provided refinement as each motivating style was deconstructed in two associated, yet distinct motivating approaches (Aelterman, et al., in press; Delrue et al., 2018). As can be noticed in Figure 1, *autonomy support* encompasses transferring the initiative towards athletes as to try to establish a joint decision process (i.e., participative approach), or rather staying in charge to a greater extent, while making sure that one's approach is well-aligned with the athletes' perspective (i.e., attuning approach). Practices embedded in the participative approach are the provision of choice (e.g., Patall, Cooper, & Robinson, 2008) and engaging in a dialogue as to infer athletes' preferences (Hagay & Baram-Tsabari, 2015), whereas the attuning approach involves motivating practices as providing a meaningful rationale to highlight the relevance of the assigned activity (e.g., Assor et al., 2002; Jang, 2008), promoting interest and fun, and relying on inviting communication (e.g., Carpentier & Mageau, 2013; Mouratidis, Lens, & Vansteenkiste, 2010).

Structure encompasses nurturing and validating athletes' progress by expressing confidence in their abilities, offering adjusted and helpful information to support athletes' progress (Jang, Reeve, & Deci, 2010; Mouratidis, Vansteenkiste, Michou, & Lens, 2013) provide encouragement and positive feedback (Fransen, Boen, Vansteenkiste, Mertens, & Vande Broek, 2018) (i.e., guiding approach). Structure also involves being clear up front regarding expectations, learning objectives and desirable behaviors, along with a process-oriented monitoring of these aspects (i.e., clarifying approach).

Control encompasses forcing students to act, think, and feel in coach-prescribed ways through either the use of forceful language or threats with sanctions (i.e., demanding approach), or by actively suppressing athletes'

perspective and being highly judgmental and condemning, such that athletes feel personally attacked and hurt (i.e., domineering approach).

Finally, *chaos* falls apart in acting in a very inconsistent and unpredictable way, thereby suddenly withdrawing one's involvement such that athletes' feel left to their own devices (i.e., abandoning approach), or adopting a wait-and-see attitude and relying on athletes themselves to take initiative (i.e., awaiting approach). This circumplex model will be used to discuss the motivating practices of providing choice and feedback in greater detail, and to elaborate on the role of parents, relative to coaches.

2.1.2. CHOICE PROVISION THROUGH A CIRCUMPLEX LENS

When considered from the circumplex model, the practice of giving choice falls in the participative approach, which is part of the more general autonomy-supportive coaching style. Although choice can be located in that specific area, the question where exactly the practice falls, that is, closer to its neighboring approaches of attuning or awaiting, will likely depend on the way how choice is provided and to whom it is offered. The present study sheds light on these issues by differentiating different types of choices (action vs. option) and examining whether interpersonal differences (i.e., decisiveness) may alter the effectiveness of choice. Hence, a more detailed study of the topic of choice, as conducted in this dissertation, allows for a further deconstructing of the identified motivating approaches in the circumplex. That is, by identifying different operationalizations of a given practice or by examining specific conditions that maximize, buffer, or cancel the beneficial impact of a particular practice (Vansteenkiste, Haerens, Aelterman, & Soenens, 2018), a more intricate and complete understanding of which motivating practice works under which circumstances and for whom may be achieved (Vansteenkiste, Resnicow, & Williams, 2012).

Situating the Choice Conditions in the Circumplex. Recall that rope skippers in the high-contrast option choice could choose three times between one attractive and two more repetitive exercises. In the low-contrast option choice, the experimenter secured that athletes would engage in at least one

repetitive exercise as the second choice only provided repetitive options, whereas the first and last choice both involved three attractive exercises from which one to choose. Finally, the exercises to be performed were predetermined in the action choice condition, but rope skippers could choose the order of executing these exercise. As such, compared to the high-contrast option choice, in both the low-contrast option choice and the action choice condition, more restrictions were built into the provided choice, such that there was less decision latitude with respect to the type of exercises to choose from. Because the choice process of participants in the high-contrast option choice was less restricted, this type of choice may, compared to the other choice types, be situated more to the lower end of *directiveness*.

The different types of choices can not only be considered in terms of their directive character but also in terms of their *need-supportive potential*. That is, when comparing the low-, with the high-contrast option and the action choice condition, the former entails rather limited opportunities for choosers to act upon their preferences as they cannot decide upon the order and the offered options may not necessarily match their interests, as there is little variety in the attractive character of simultaneously provided exercises. For both the action and high-contrast option choice, more opportunities are provided as action choice allowed rope skippers choice about the order in which they execute exercises (see also Reeve, Nix, & Hamm), whereas high-contrast option choice could avoid doing a repetitive exercise and, in case they did select one or more repetitive exercises, also choose when in the sequence of three exercise to perform the more repetitive one(s). As a consequence, low-contrast option choice would be situated more to the left end of the need-support/need-thwart dimension.

In general, the effects found in Chapter 6 were in accordance with the presumed positioning of different types of choice within the circumplex model. That is, the benefits for low-contrast option choice, compared to the other two choice conditions, were indeed less clear as this type of choice did not facilitate engagement neither intended perseverance. On the other hand,

autonomy need satisfaction was enhanced in all three choice conditions compared to the control group, with no additional enhancement being observed for neither the action choice, $F(1,76) = .32$; $p = .57$, nor high-contrast option choice, $F(1,70) = 1.31$; $p = .26$, compared with the low-contrast option choice condition. It is important to notify that our measure of autonomy need satisfaction measured both more decisional (i.e., "During the past training session, I had a sense of choice and freedom in the things I did.") and volitional (i.e.; "During the past training session, the exercises I performed were well aligned with my personal preferences") aspects of autonomy (Chen, Vansteenkiste, Beyers, Soenens, & Van Petegem 2013; Soenens, Vansteenkiste, Van Petegem, Beyers, & Ryan, 2018; Van Petegem et al., 2012). Whereas decisional autonomy might follow every choice (Houlfort, Koestner, Joussemet, Nantel-Vivier, & Lekes, 2002), volitional autonomy only follows choices that are considered truly meaningful by the chooser (Reeve et al., 2003). One can speculate that the choice conditions could differently influence volitional autonomy, with their impact on decisional autonomy being similar. That is, it may be possible that the provision of choice translates less easily into perceived volition in the low-contrast option choice condition in comparison to the other two conditions. Technically, this indicates that, for the low-contrast option choice, experienced choice (i.e., decisional autonomy) - which was used as a manipulation check - should be less profoundly correlated to autonomy need satisfaction, which encompassed both decisional and volitional autonomy. This interpretation was confirmed through a series of intraclass correlation analyses (see also Ryan, Koestner, & Deci, 1991; Vansteenkiste & Deci, 2003), which showed that the within-condition correlation between perceived choice and autonomy need satisfaction was significantly lower in the low-contrast option choice, $r = .31$, as compared to the action choice condition, $r = ..67$; $z = -2.14$, $p = .01$, while it tended to be lower compared to the high-contrast option choice condition, $r = .58$; $z = -1.43$, $p = .08$.

Pitfalls of choice. While the experimenter in the high-option choice condition still offered a series of exercises, the decision space could even be more enlarged under other circumstances. For instance, a coach could at the beginning of a training be open for any input of his athletes or just build in 'free play' moments or even an entire free play training, where athletes can choose whatever they want to do (e.g., Lonsdale, Sabiston, Raedeke, Ha, & Sum, 2009). Under such circumstances, the choice would even be lower on directiveness and potentially less need-supportive due to a *lack of clear expectations and guidance* from their coach. Such choice practices, although potentially eliciting a lot of enjoyment and fun among athletes, may generate little learning benefits as they fall close or even within the awaiting approach. Notably, other types of choices may also come with potential pitfalls. For instance, the low-contrast option choice may be *perceived as a false choice*, especially if none of the offered options are perceived as meaningful or attractive to the athletes. The term 'false' would apply under such circumstances because, although coaches present the choice as a meaningful one to enact one's preferences, underlying the restrictive nature of offered options is the coach's hidden agenda about which the coach fails to communicate in a transparent way. Such choice may even come across as manipulative. Indeed, when choices are perceived to be accompanied by pressures to choose a particular option, they were found to be less beneficial (Moller, Deci, & Ryan, 2006). All of these considerations, together with the findings of Chapter 6, suggest that the offer of choice as a motivational practice is a highly complex one; yet, from the circumplex model, it becomes intelligible under which circumstances choice does produce the greatest benefits and when its effects are minimized or even cancelled out.

Choice and competence. A final note about choice has to do with the outcomes that were included within the current dissertation. Few, if any of these outcomes focused on competence satisfaction and skill enhancement, which fulfills a central role in the sports domain. Choice provision has generally been found to enhance competence satisfaction (Patall et al., 2008).

However, when considering the role of choice in competence need satisfaction, both competence with respect to the choice process and with regard to the activity at hand need to be considered.

With regard *to competence in choosing*, athletes may be better capable of choosing an option in the case of high-contrast option choice or action choice, as the differences between options is less clear in the case of low-contrast option choice, making it harder to choose. Because the offered options lean so closely to each other in this case, athletes may dwell about the options, thereby consuming more self-regulatory resources (Vohs et al., 2008).

As for *competence in the chosen activity*, the high-contrast option choice might be most beneficial, as such choice most profoundly allows athletes to pick an exercise that matches with their own skill level. To the extent athletes choose such optimally challenging exercises, they may both practice their skills more and possibly even extend them, leading to the incremental development of their competence. On the other hand, athletes may also feel pressured to engage in the most challenging exercises right away. In that respect the combination with action choice might turn out to be most beneficial for skill development and, thus, competence satisfaction. For example, self-chosen use of physical assistance devices (e.g., ski poles) during complex skill acquisition (i.e., ski slaloming on a simulator) has been found to increased skill acquisition (Wulf & Toole, 1999). Also when athletes can determine for themselves the pace of switching from the one exercise to the other, their competence may be developed more quickly as they may decide only to turn to a more difficult drill when they feel sufficiently competent to perform at a lower level (Leiker et al., 2016). As such, a fruitful avenue for future research is to examine the impact of choice on these different aspects of competence, with especially the latter interpretation requiring a longitudinal design as to see the potential effects of choice provision on skill development in the longer term.

2.1.3. COMPARING DIFFERENT TYPES OF FEEDBACK THROUGH A CIRCUMPLEX LENS

The circumplex model can also be used to reflect upon feedback provision and to acquire a more refined understanding of its effects. In general, feedback provision, and especially positive feedback has been found to belong to the guiding – the most competence-supportive - approach (Delrue et al., 2018). Mirroring these findings, the results of Chapters 4 and 5, indicated that positive, compared to negative feedback, led to greater competence need satisfaction, enjoyment, and perseverance. Although this feedback was found to be beneficial, it was normative in nature, as it compared tennis players' performance with that of similar others or with a norm table. Other forms of feedback are possible, with task-based feedback including information regarding one's skill execution (Tzetzis, Votsis, & Kourtessis, 2008) and intra-personal feedback focusing on improvements in relation to one's past performance (Tenenbaum et al., 2001).

Because *normative feedback* compares athletes' performance with the performance of others, the feedback implicitly conveys the importance of performance goals, the pursuit of which has been found to relate negatively to enjoyment (Duda, Chi, Newton, Walling, & Catley, 1995) and perseverance (Vallerand, Gauvin, & Halliwell, 1986). Presumably, these normative comparisons are more evaluative in nature, such that they may open the door for contingent self-worth (Kernis, 2003), with athletes becoming more hooked upon the positive normative feedback they receive from their coaches. Considered from this perspective, normative feedback may be perceived as more demanding by athletes, compared to the other forms of feedback. Indeed, task- and intrapersonal feedback yield a much clearer process-orientation, such that they are likely the most central practices of a guiding approach.

The differences between different types of feedback may even especially be evident in the case of negative (instead of positive) feedback. Negative normative feedback may be perceived as more intrusive and even rejecting, while negative task-based feedback, because of its focus on task-

related points of improvement, might be perceived as less evaluative, even informational and pointing towards a hint how to overcome the weakness. Hence, negative task-based feedback may still be considered as guiding, although this would largely depend on the way of communicating the feedback (e.g., Carpentier & Mageau, 2013; Mouratidis et al., 2010).

Indeed, as shown in the present dissertation, also the *communication style* of conveying normative feedback matters. Inviting and informational language in communicating feedback is considered a practice more central to the attuning approach within the circumplex model, whereas the use of commanding and forceful language is part of the demanding approach. This reasoning is supported by the findings of Chapter 4 showing that an inviting, compared to a controlling, feedback communication style enhanced autonomy need satisfaction and subsequent enjoyment.

By considering the interaction between valence and style of feedback, respectively part of the guiding and attuning approach, a deeper insight was gained in the motivational effects of the combined presence of two motivating styles on the circumplex. While style and valence of feedback did not interact in the prediction of tennis players' functioning, evidence for the interactive interplay between both was recently found among elementary school children working on a series of intrinsically motivating puzzle tasks (Mabbe, Vansteenkiste, De Muynck, & Soenens, 2018). Specifically, the motivationally undermining effect of negative normative feedback on children's competence feelings and intrinsic motivation was dampened if the feedback was offered in an autonomy-supportive way.

It needs to be investigated whether an interaction effect between feedback valence and style would appear with other types of feedback. Compared to negative normative feedback, which is strongly negatively related to athletes' competence need satisfaction, negative task-based feedback has been found to be only weakly, negatively related to competence need satisfaction (Carpentier & Mageau, 2016). This means that the way in which such feedback is communicated may be more critical in whether the

feedback will be perceived as need-supportive, rather than need supportive (see also Carpentier & Mageau, 2013; Mouratidis et al., 2010). However, randomizing task-based and intrapersonal feedback manipulations in a way that the feedback is credible for participants is a challenging task to do, as accurate task-based and intrapersonal feedback is highly dependent on athletes' performance.

2.1.4. REFLECTING ON MOTIVATING PARENTING THROUGH A CIRCUMPLEX LENS

By providing a more refined view on motivating coach behaviors, the circumplex model also allows to reflect on Chapter 2 of the current dissertation regarding the unique and combined contribution of parenting and coaching on soccer players' motivation and engagement. Very global items were used to tap into motivating coaching and parenting, using 4 items each to tap into each motivating style (i.e., autonomy support, structure, relational support, control, chaos, relational rejection). For example, one structuring item formulated for both socializing agents was: "With regard to my soccer participation, my parent/coach stress that I am good at soccer". These more *generic formulation* of the items allows one to formulate similar items for both socializing figures and to directly contrast mean-level differences and contributions, as was done in Chapter 2. Also, from a pragmatic standpoint, the more limited set of items (i.e., 24 for each socializing agent) is less time-consuming for the participants and, moreover, captures all six discerned motivating (i.e., autonomy support, structure and relational support) and demotivating (i.e., control, chaos and rejection) styles, thus, being fairly exhaustive in its reach. At the same time, when considered from the circumplex model, this set of items also has its costs. That is, there is room for refinement as not all subareas in the circumplex were well represented; in fact, the used measures are rather narrow in scope. Also, it is unclear which situations soccer players had in mind when completing the questionnaire. Indeed, regarding the example item provided earlier, it is possible that parents stress their offspring's ability as a soccer player at one moment (e.g., prior to

a competition) but are more critical on another moment (e.g., during the drive home after an unexpected loss).

To acquire a more refined insight on motivating parenting in the context of sports, the *creation of a vignette based questionnaire*, much alike the questionnaire for coaches on which the circumplex model is based (Delrue et al., 2018) might be useful. Using vignettes allows including different situations and parental roles to be included in the questionnaire. For example, such a questionnaire may tap into situations prior to and following both training sessions and competitive games, as well as include parent-child interactions about sportsmanship, thereby encompassing parents' tangible (e.g., transportation, voluntary work for the club), emotional (e.g., share emotions after a won/lost competition) or informational (e.g., discussing healthy sports nutrition) roles (Fredricks & Eccles, 2004; Harwood & Knight, 2015; Van Yperen, 1998). By using such measures, indicators of both coaches' and parents' motivating styles will be much more attuned to the practices coaches and parents often engage in when it comes to youth sports, thus contributing to the ecological validity of the questionnaire. Also, the assessment of a more extensive set of items may lead to increased construct validity and possibly result in a more refined picture of (de)motivating parenting and coaching compared to the findings reported in Chapter 2 in the current dissertation.

2.2. FILLING THE BLACK BOX: ON INTERVENING VARIABLES AND THEIR INTERRELATIONSHIPS

Although need satisfaction has been repeatedly shown to play an intervening role between athlete-reported need-supportive coaching and athletes' concurrent functioning (e.g., Adie, Duda, & Ntoumanis 2008; Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Reinboth, Duda, & Ntoumanis, 2004), the vast majority of these studies are correlational in nature, leaving the question unaddressed whether need-based experiences can be causally influenced by need-supportive coaching. The few

experimental studies available in the sport context (Wulf, Chiviacowsky, & Cardozo, 2014) fail to examine the mechanisms underlying the impact of particular coaching practices on athletes' functioning (Vansteenkiste, Niemiec & Soenens, 2010).

The experimental studies in the current dissertation addressed this void in the literature by examining the potential mediating role of psychological need satisfaction in the effects of feedback and choice provision on athletes' motivational, affective, behavioral, and moral functioning. In addition to need satisfaction, also self-talk received attention because it is a mechanism that is frequently observed in sports with consecutive small breaks in the action such as tennis (Van Raalte, Cornelius, Brewer, & Hatten, 2000). When compared to need satisfaction which is considered a more general, all-encompassing mechanism that is present in a wide range of situations, self-talk is a more specific mechanism that is frequently observed in performance domains. Therefore, the supplementary role of self-talk, above and beyond need satisfaction, was examined.

As noted, congruent with theoretical assumptions and our hypotheses, both competence and autonomy need satisfaction functioned as intervening variables for, respectively, feedback valence on the hand and feedback communication style and choice provision on the other hand. Findings indicated that part of the reason why negative normative feedback undermined players' competence is through the activation of negative self-talk, a finding in line with previous studies (Hardy, Oliver, & Tod, 2009; Oliver, Markland, & Hardy, 2010).

Chapter 3 went one step further compared to the experimental studies as it was shown that negative self-talk may not only vary as a function of variation to experimental conditions, but also as a function of individual differences in fear of failure. That is, tennis players' who are more tempted to avoid incompetence because of the anticipated shame and humiliation upon failing (Atkinson, 1957), more frequently expressed worries, somatic fatigue and disengagement-related ideas in their self-talk, which subsequently

contributed to their experienced pressure. Although fear of failure also elicited more anxiety-controlling (i.e., positive) self-talk, this did not alter tennis players' pressure.

As self-talk and need-based experiences were measured concurrently in Chapter 4, the study did not allow to determine the order of effects in these associations. That is, negative self-talk may not only precede need-based experiences, thereby amplifying the effect of negative feedback, it may also follow from experienced need frustration, thereby surfacing as an observable by-product of the exposure to need-thwarting environments. In other words, athletes may engage in negative self-talk more often when they experience need frustrations. To examine possible reciprocal relations between need-based experiences and self-talk (see Karamitrou, Comoutos, Hatzigeorgiadis, & Theodorakis, 2017), both need to be repeatedly measured over time. Specifically, athletes would need to perform multiple series of exercises in a consecutive manner, with self-talk being measured on-the-spot and need satisfaction in-between series.

While the pattern of outcomes and antecedents related to negative self-talk was very clear, this was much less the case for positive self-talk. Positive self-talk was not impacted by the experimental manipulations and did not predict any outcomes. The lack of effect from feedback valence to positive self-talk is in line with some previous studies (e.g., Zourbanos, Hatzigeorgiadis, Tsiakaras, Chroni, & Theodorakis, 2010), leading researchers to suggest that positive self-talk is less susceptible to socio-contextual influences (Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012). Indeed, the one personal antecedent under examination (i.e., fear of failure) showed a positive modest relation with positive self-talk (Chapter 3). The lack of relations between positive self-talk and outcome variables is largely at odds with previous studies reporting positive relationships between positive spontaneous self-talk and self-efficacy (Zourbanos et al., 2016), perceived competence and vigor (Zourbanos, Hatzigeorgiadis, Chroni, Theodorakis, & Papaioannou 2009), and experienced need satisfaction (Delrue et al., 2016).

Possibly, the tone in which self-talk is verbalized within these experimental circumstances needs to be taken into account as the same self-talk statement can be uttered in a more informational (as indicated by a lower intensity, slower speech rate and less voice energy) or more evaluative way, causing a different impact on outcome variables (Oliver et al., 2010). Potentially, negative self-talk is predominantly expressed in a controlling way, whereas expressions of positive self-talk may vary between more autonomy-supportive and more controlling prosody. As such, the opposing relationships of autonomy-supportive and controlling self-talk may lead to a null finding. A fruitful avenue for future research then is to also examine observed self-talk's prosody (Weinstein, Zougkou, & Paulmann, 2018).

To examine athletes' self-talk prosody, the self-talk measurement needs to include an on-the-spot audiotaped self-talk indicator. Chapter 3 of the current dissertation showed that such indicators converge well with self-reported self-talk indicators. These findings justify the creation of a multi-informant measure of self-talk, which may be most valid as it does not take the error variance related to both separate measure into account. Therefore, future research preferably relies on this measurement type whenever feasible.

2.3. REFINING SDT'S UNIVERSALITY CLAIM USING THE PRINCIPLE OF UNIVERSALITY WITHOUT UNIFORMITY

Within SDT, it is claimed that the satisfaction of one's basic psychological needs yields universal benefits, thus entailing desirable outcomes despite differences in cultural background (Chen et al., 2015; Sheldon, Elliot, Kim, & Kasser, 2001), gender (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006), or socio-economic status (Chen, Van Assche, Vansteenkiste, Soenens, & Beyers, 2015). Because the findings regarding the individual differences may seem at odds with this universality claim, the current section reflects on SDT's universality claim from the principle of universalism without uniformity (Schweder & Sullivan, 1993).

The principle of '*universality without uniformity*' entails the view that most important psychological processes have both universal and contextual features and has previously been evoked to explain cross-cultural differences of parenting (Wang, Pomerantz, & Chen, 2007). Specifically, it was argued that need satisfaction in se would be beneficial for everyone; yet, personal and cultural factors might alter the degree to which a (de)motivating practice and style supports or thwarts these needs (Soenens, Vansteenkiste, & Van Petegem, 2015). This reasoning relies on the notion of *functional significance* (Deci & Ryan, 1985), referring to how an external event, such as coach (de)motivating behavior, is perceived and interpreted. In other words, especially the interpretation of the coach's behavior by athletes will determine whether basic psychological needs will be met.

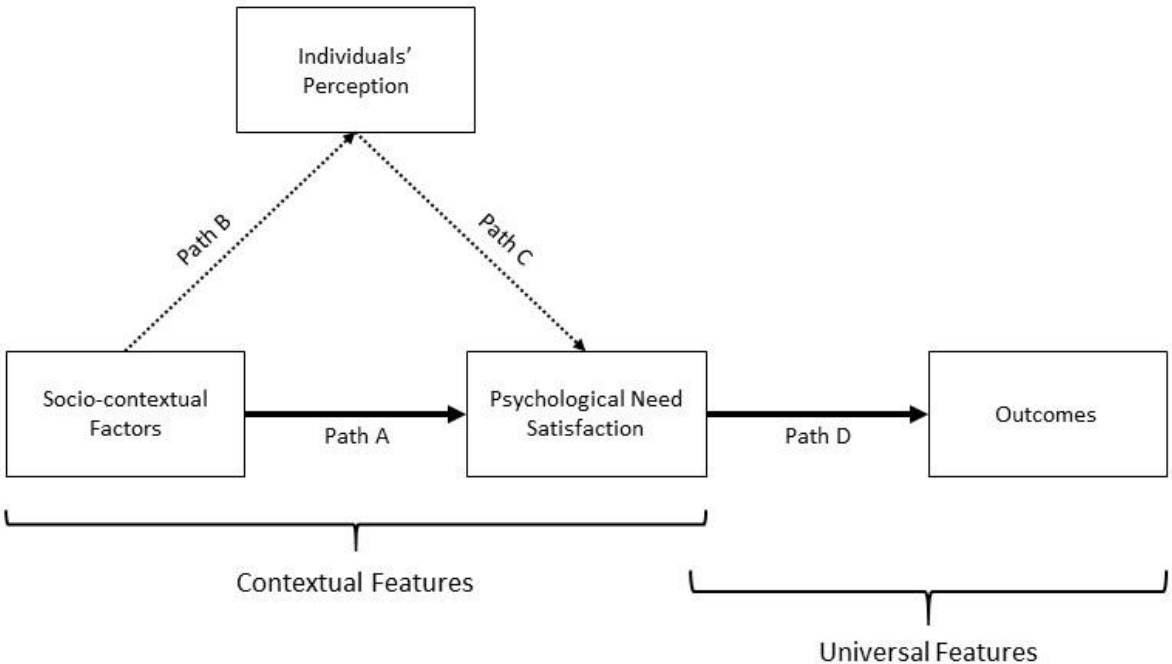


Figure 2. Graphical representation of the principle of universality without uniformity and the notion of functional significance

Figure 2 depicts a motivational sequence thereby graphically presenting the ideas implied within the notion of universality without uniformity and functional significance. According to SDT, socio-contextual factors can impact upon individuals' need-based experiences (i.e., path A), which, in turn, relates to outcomes (i.e., path D). First, based on the notion of functional significance, it can be posited that not the objective context, but especially individuals' interpretations of the context (i.e., Path B), relate to individuals' need satisfaction (i.e., Path C). Because two athletes, one high and the other low in self-critical perfectionism, may interpret the same (de)motivating coach behavior (e.g., feedback provision) differently, they may also derive different experiences of need satisfaction and need frustration from it. Whereas there is room for interpersonal differences in the interpretation of objective events, the principle of universality without uniformity equally states that important psychological processes have universal features. Thus, second and applied to the notion of basic psychological needs, the relation between need-based experiences and outcomes is considered universal. As such, this indicates that moderation might happen at paths A and B, but less likely at path D. To illustrate, it is reasonable to assume that providing choice will support autonomy need satisfaction to a greater degree for athletes from an individualistic culture, compared to athletes from a collectivistic culture (e.g., Iyengar & Lepper, 1999). However, once athletes need for autonomy is satisfied, all athletes will benefit equally (Chen et al., 2015).

This reasoning is supported by the findings of the current dissertation, such that both interactions that were found could be situated in the relationship between an objective (de)motivating coach strategy and athletes' need satisfaction. This is, personal characteristics did not attenuate the direct effect of feedback and choice provision on athletes motivational, affective, behavioral, and moral functioning, neither did they moderate the relationship between need satisfaction and outcomes (i.e., path D). Specifically, Chapter 5 showed that self-critical perfectionism altered the impact of negative

normative feedback so that athletes' who displayed more self-critical perfectionism suffered more from negative feedback in terms of competence need satisfaction. Likewise, Chapter 6 showed that rope skippers high on dispositional decisiveness benefitted less in terms of autonomy need satisfaction from being offered high-contrast option choice. Additional moderation analyses showed that the included individual differences (i.e., self-critical perfectionism and dispositional indecisiveness) did not moderate the relation between need satisfaction and athlete outcomes, with β's ranging in absolute value from .00 to .09 (M = .04; all p > .3).

3. PRACTICAL IMPLICATIONS

The current dissertation provides insight in the unique and causal impact of coaches' motivating style in general and a number of specific coaching practices in particular, thereby shedding light on the question why these effects occur (i.e., underlying mechanisms) and for whom they occur (i.e., moderation). On the basis of these findings, and other related findings in the broader literature, the current section provides coaches, parents and sport psychologists with practical recommendations about supporting youth athletes' enduring motivation and engagement for sports.

3.1. HOW COACHES CAN CONTRIBUTE TO ATHLETES' MOTIVATION AND ENGAGEMENT.

In the context of youth athletes' sport participation, coaches are often assumed to be the most central socialization figure. In line with this view, coaches were found either to encourage athletes' motivation and engagement by being need-supportive and to undermine it by being need-thwarting. With regard to their contribution up and above the contribution of parents, their supportive contribution showed to be somewhat more robust when compared to their thwarting contribution. As such, coach-education programs might want to predominantly emphasize the promotion of need-supportive behaviors, with less emphasis on the avoidance of need-thwarting behaviors,

relatively speaking. In this regard, a *coach education program* training coaches in adopting an autonomy-supportive and structuring style was found to be effective (Reynders et al., 2018). That is, coaches self-reported provision of autonomy-support and structure increased after having followed 12 hours of coach education. Athletes, not aware of their coach following a coach education program, noticed the behavior change of their coach and, apart from their altered perceptions of their coach, also reported increased autonomous motivation and training engagement.

A core practice of coaches during training and competition is the *provision of feedback*. Given that negative normative feedback yielded several costs, this type of feedback, which merely indicates that an athlete is performing inferior than a (similar) peer or the norm for his/her age and skill-level, should be discouraged. Indeed, when communicating such feedback, the coach does not provide any hint or strategy about how the athlete can close the gap with his or her peers. Although some coaches believe such interpersonal comparison may increase effort-expenditure, with athletes feeling pressured to demonstrate their capabilities, these motivational benefits may be short-lived (Pelletier, Fortier, Vallerand, & Brière, 2001; Ryan et al., 1991) and may open the door for feelings of helplessness in case of continued failure (Abramson, Seligman, & Teasdale, 1978). Although positive, normative feedback yielded various benefits, we hasten to encourage its use because the interpersonal component inherent in normative feedback might still be perceived as evaluative, thereby decreasing athletes' enjoyment (Duda et al., 1995) and effort expenditure (Vallerand et al., 1986). Although not examined in the current dissertation, other types of feedback, such as task-oriented corrective feedback that helps athletes towards better skill execution or intra-individual feedback that provides athletes with information on improvements in comparison to previous performances might be more useful.

Coaches may not only pay attention to which type of feedback they convey but also to the way of doing so. Coaches' awareness for the pitfalls of a coercive communication style (e.g., "So disappointing! Why did I come to

your match if you are not going to use the open stance in forehand?") may be highlighted, thereby encouraging them to *communicate in a more inviting way* (e.g., "Remember to make use of the open stance in forehand more often when you can"). It may be especially important to raise coaches' awareness regarding their feedback communication style during competitive games as observed feedback in such cases is predominantly controlling and seldom autonomy-supportive (Halperin et al., 2016). A study among soccer players showed that such controlling language during competition awakens antisocial behaviors and resentment towards the referee among athletes (Delrue et al., 2017). One potential reason why coaches are tempted to rely on controlling communication is that they fear being perceived as too soft and to lose their grip on the training environment. Findings of the current dissertation may convince coaches who express such doubts as tennis players who received feedback in an inviting way were found to challenge themselves to a greater extent later on and ceased their effort expenditure less frequently.

Whereas all coaches frequently provide feedback during training and competition, the merits of *providing choice* are much more debated among coaches (Reeve et al., 2014), such that coaches less frequently implement choice provision during training (Delrue et al., 2018). In line with this gut feeling of coaches, the current dissertation showed that not all choices are equal and some choice types are more beneficial than others. In order to spur athlete engagement, coaches can either allow athletes to decide which exercises to perform (i.e., option choice) or allow them to choose how particular exercises are performed (i.e., action choice), with the former also increasing athletes' intended perseverance. In the case of option choice, coaches can provide athletes with a menu of options with wide variety regarding their content and attractiveness or by asking athletes for input at the beginning of the training.

However, a first pitfall of this strategy is to rely too often upon this strategy, thereby having the risk of being perceived as too awaiting (see circumplex model) and, as a consequence diminishing their athletes' learning

benefits. This choice strategy is thus to be used in moderation. For example, in a training session that last 90 minutes, coaches may decide upon the training content of the first 80 minutes and decide to provide their athletes choice about the way in which they close the training session. To ensure sufficient structure, coaches might also infer athletes' preferences at the end of a training to be able to take these into account when preparing the upcoming training session. In doing so, coaches can naturally embed choice provision in their training sessions, thoughtfully providing options that build upon the skills athletes already possess or have acquired during the training session.

A second pitfall is to provide a menu of options that are too similar to one another. Especially when offered options are all likely to be perceived as unattractive or not meaningful by athletes, the choice may come across as manipulative. When this is the case, athletes may feel that the coach has a hidden agenda and the choice is merely a strategy to force athletes to act according to that agenda. As a consequence, the beneficial effects on engagement and intended perseverance will be cancelled out and even defiance may arise (e.g., Van Petegem, Vansteenkiste, Soenens, Beyers, & Aelterman, 2015). Thus, to maximize the motivating impact of providing option choice, coaches preferably provide 3 to 5 options to choose from (Patall et al., 2008) with enough variation between the offered options, such that athletes are more likely to be able to act upon their preference (Katz & Assor, 2007).

In the case of action choice, coaches can allow athletes to choose the order in which they perform a series of exercises. Whereas offering this type of choice and simultaneously ensure an organized training often is straightforward when athletes train individually or in small groups, it might be more challenging when athletes train in larger groups and consensus is required about the chosen order. In the latter case, athletes whose preference was not in line with the groups' consensus might perceive that their choice was actively denied, causing the provision of choice to do more harm than good (Brehm, 1966; Patall et al., 2008). Although not examined in the current

dissertation, action choices can also be operationalized in other ways, with providing choice about the pace of progressing through activities (Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011), when to receive feedback (Janelle, Kim, & Singer, 1996), when to use an assistance device (Wulf & Toole, 1999), or the difficulty level of exercises (Leiker et al., 2016) found to be beneficial.

3.2 HOW PARENTS CAN CONTRIBUTE TO ATHLETES' MOTIVATION.

In line with the contribution of coaches when considered in isolation, parents were also found either to encourage athletes' motivation and engagement by being need-supportive, and to undermine it by being need-thwarting. With regard to their contribution up and above the contribution of coaching however, only a damaging contribution remained, indicating that need-thwarting parenting is more detrimental than parental need-support is beneficial. As such, information sessions or workshops regarding appropriate parental, compared to coaching behaviors, should emphasize *the avoidance of need-thwarting parenting* practices to a greater extent. As the effectiveness of such sport-parenting education programs is unknown up to date, future research might develop and examine the effectiveness of a parental education program, similar to the one described for coaches in the section above.

The insight that the current dissertation provided in the mechanisms explaining the impact of coach feedback valence can also be of practical value for parents. The explaining role of competence need satisfaction is useful for parents who notice that their offspring's coach is overly critical. In an attempt to dampen the detrimental impact of critical coach feedback, parents might take actions trying to *preserve their children's competence need satisfaction*. For example, they may guide children's attention to made personal progression or moments of good skill execution within the performance. Although competence need satisfaction was not taken into account within the study involving both coaching and parenting, the finding that parents were able to buffer for the detrimental impact of demotivating coach behavior on motivation and engagement is in line with this reasoning.

The same study also indicated that athletes perceive their coaches and parents to act in a similar way. Although several explanations might account for this finding, some potential explanations attribute an important role to parents, which are still speculative at this point. A first possibility is that parents' perceived motivating style affects athletes' perception of their coach. The motivating style experienced by soccer players at home would then serve as a template or mental representation coloring these players' perception of other socialization figures outside the home context, thereby creating a perceiver bias. A second possibility involves that need-supportive parenting enhances youth athletes' autonomous motivation for and engagement in sports, such that they elicit more need-supportive interaction patterns from their coaches. Third, this considerable correspondence in athletes' perceptions of coach and parental behaviors may be attributable to the effects of observable learning, with parents copying the motivating style of the coach. In the case of an overly critical coach, this would imply that parents are, as to say, primed to drag up the negative feedback of the coach, thereby instilling a negative spiral, which increasingly undermines youth athletes' competence satisfaction.

Although the findings of the current dissertation suggest at first sight that parental need-supportive behaviors are less important for youth athletes' motivation than their need-thwarting behaviors or coaches (de)motivating styles, there is a possibility that parents are indirectly important. As such, making parents aware of this potentially indirect processes is deemed important to support youth athletes' enduring motivation.

3.3. HOW SPORT PSYCHOLOGIST CAN FOSTER YOUTH ATHLETES' MOTIVATION AND ENGAGEMENT.

Finally, sport psychologist may also play a role in fostering youth athletes' motivation and engagement. First, they might play a key role in providing coaches and parents with information on (de)motivating coaching

styles, either in collective workshop or in so called 'coach the coach' or 'coach the parent' individual counseling trajectories.

Besides working with coaches and parents, it is common in practice that a sport psychologist works with an athlete without having the mandate to alter a coach's motivating style. If in such a case harshness or criticalness of the coach is found to be a causal or maintaining factor in the athletes' complaints, sport psychologist can *target interventions at the athletes' competence need satisfaction and negative self-talk*, as these were identified as the mechanisms trough which an overly critical coach impacts on athletes' functioning. To illustrate, athletes' can be advised to keep a success log upon completion of training sessions and competitive games, in which they write down three aspects they perceived doing well in order to enhance their competence need satisfaction (e.g., Selk, 2009). With regard to self-talk, sport psychologists can implement a self-talk intervention teaching athletes to use instructed self-talk on predetermined moments following critical feedback of their coach. Previous work has shown that such interventions help prevent interfering thoughts, such as the spontaneous negative self-talk examined in the current dissertation (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004), instill or maintain confidence (Hatzigeorgiadis, Zourbanos, & Theodorakis, 2007; Hatzigeorgiadis, Zourbanos, Goltsios, & Theodorakis, 2008) and spur effort expenditure (Hatzigeorgiadis et al., 2007).

4. LIMITATIONS AND FUTURE DIRECTIONS

As is the case for every scientific contribution, the current dissertation is subject to a number of limitations, which might be addressed in future studies. In general, two broad themes underlie the current dissertation's limitations, related to methodology and selectivity.

Although the experimental studies in the present dissertation allow drawing causal conclusions, the *ecological validity* of the conducted manipulations could be further enhanced. Although the studies were conducted on the training courts and involved athletes as participants, Chapter

4 and 5 relied on normative feedback, which is less frequently used by coaches in the context of daily training. However, this type of feedback can be much more easily be experimentally manipulated without undermining the credibility of the feedback. Further, in Chapter 6, ecological validity was hampered by introducing rope skipping exercises using a video instead of a real demonstration, and by not providing feedback during the exercises, except for one standardized message aimed at ensuring participants to perform the exercises for the entire predetermined time. As such, the conditions under which the participants performed exercises in these well-controlled circumstances were slightly different compared to normal training sessions, which may have interfered with the results. In addition, both the feedback and the choice were offered by an experimenter, instead of the participants' familiar coach. Regarding the study among parental and coach contribution to soccer players' motivation and engagement, its cross-sectional nature prevents, rather evidently, drawing causal conclusions.

With regard to the *generalizability* of the findings, the cross-sectional design encompassed only soccer players, whereas the experimental studies included only athletes from individual sports (i.e., tennis and rope skipping). As such, it remains unclear whether the contribution of coach and parental motivating styles would be similar for individual athletes and in team sports other than soccer. Parents are more often present during competitions in individual, compared to team sports where transportation to the games is often regulated by a rotation system. Hence, parents in individual sports are presumed to have more opportunities to affect their children's sport participation (Bois, Lalanne, & Delforge, 2009). Future research might want to examine this issue in greater detail. Similarly, the impact of feedback and choice provision on team sport athletes is still unclear. Previous research already showed that participative practices, among which the provision of choice, are more frequently implemented by individual, compared to team sport coaches (Delrue et al., 2018). However, the question still remains whether choice provision is also less beneficial in the context of team sports,

as its operationalization in team sports more often requires athletes to reach consensus about which option to pursue. The debate leading towards consensus might attenuate the impact of choice provision, although such debate was previously used in choice manipulations within physical education, which also carried beneficial effects (Mouratidis et al., 2011). As for feedback provision, team sport athletes are more used to be compared to one another, as this is implicitly done on a weekly basis when coaches select the team. As such, one could speculate that they will be more resilient towards negative normative feedback.

A final methodological issue to be mentioned involves the *conceptualization* of the individual differences under examination in the current dissertation. Both self-critical perfectionism as dispositional indecisiveness were measured in a general way, that is, they lacked context-specificity. Although general aspects of individuals' personality are assumed to manifest in a broad variety of contexts, the specific manifestation of a trait in a specific context generally is of greater importance to individuals' functioning in the given context. As such, future research might examine whether self-critical attitudes in sports and decisiveness regarding sport-related choices play a greater role compared to the findings of the current dissertation.

Apart from the three abovementioned methodological limitations, a final note concerns two specific aspects of motivating youth athletes' that were not taken into account by the current dissertation. First, the dissertation exclusively focused on the (de)motivating role of socialization figures in a position of authority, as coaches and parents are included. In doing so, the potential *role of peers*, who constitute a more horizontal relationship to an individual athlete in terms of authority, is left out. Future research might want to zoom in on this particular source of influence (see for example Smith, Gustafsson, & Hassmen, 2010). Second, apart from Chapter 2, *relational support* has not been examined in the current dissertation. This is partly because it is more difficult and time consuming to manipulate, as it requires a

connection between participant and experimenter to begin with. However, previous research found that even without a connection to start with, showing caring for and having interest in participants' experiences during instruction enhanced motivation, positive feedback, and progression in a swimming task (Gonzalez & Chiviacowsky, 2018).

5. GENERAL CONCLUSION

Given the physical, psychological, and social benefits that are associated with regular sport participation and the observation that youth frequently drop out from sports during adolescence (Butcher et al., 2002), supporting youth athletes enduring motivation and engagement for sport is important. Results of the current dissertation provide a more differentiated view on specific motivating practices, which might inform and help coaches, parents, and sport psychologists to support youth athletes' enduring motivation for sports. In conclusion, both coaches and parents were found to matter in contributing to athletes' motivation and engagement, with the latter showing a predominantly damaging role. Given that coaches were found to contribute uniquely to the support of youth athletes' sport motivation and engagement, specific coaching practices were examined in greater detail. First, negative normative feedback should be discouraged as the critical tone evident in the feedback awakened a negative voice in athletes, which manifests in negative self-talk. In turn, this negative self-talk was found to undermine athletes' feelings of effectiveness up and above negative coach feedback, with these feelings of effectiveness being subsequently related to reduced enjoyment and increased experienced tension during sport participation, reduced perseverance and inferior performance. Second, choice provision was found to hold the potential of enhancing athletes' feelings of volition, engagement and intended perseverance, although not all choices exerted equal positive effects. Specifically, choices regarding which exercises to perform are most effective in terms of autonomy satisfaction, engagement and intended perseverance when the perceived variation between offered

options is sufficiently large, but are least effective when little variation is perceived, with the impact of choice about the order in which to perform predetermined exercises falling in between. Finally, the impact of both motivating strategies on need satisfaction was found to be attenuated, but not cancelled out, by athletes' individual differences, while the effects of motivating strategies on outcomes were irrespective of individual differences. This suggests that it is important to take individual differences into account when tailoring specific motivating strategies to particular individuals.

6. REFERENCES

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49–74. https://doi.org/10.1037/0021-843X.87.1.49

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion, 32*(3), 189–199. https://doi.org/10.1007/s11031-008-9095-z

Aelterman, N., Vansteenkiste, M., Soenens, B., Fontaine, J., Haerens, L., & Reeve, J. (2018). Toward an integrative and fine-grained insight in motivating and demotivating teaching: The merits of a circumplex approach. *Journal of Educational Psychology*, Manuscript accepted for publication. https://doi.org/doi: 10.1037/edu0000293

Amado, D., Sanchez-Oliva, D., Gonzalez-Ponce, I., Pulido-Gonzalez, J. J., & Antonio Sanchez-Miguel, P. (2015). Incidence of parental support and pressure on their children's motivational processes towards sport practice regarding gender. *Plos One*, *10*(6), e0128015. https://doi.org/10.1371/journal.pone.0128015

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology*, *72*, 261–278. https://doi.org/10.1348/000709902158883

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, *64*(6, Pt.1), 359–372. https://doi.org/10.1037/h0043445

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thogersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological

need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459–1473. https://doi.org/10.1177/0146167211413125

Bois, J. E., Lalanne, J., & Delforge, C. (2009). The influence of parenting practices and parental presence on children's and adolescents' pre-competitive anxiety. *Journal of Sports Sciences*, *27*(10), 995–1005. https://doi.org/10.1080/02640410903062001

Brehm, J. W. (1966). *A theory of psychological reactance*. New York, NY: Academic Press.

Butcher, J., Lindner, K. J., & Johns, D. P. (2002). Withdrawal from competitive youth sport: A retrospective ten-year study. *Journal of Sport Behavior*, *25*, 145–163.

Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise*, *14*(3), 423–435. https://doi.org/10.1016/j.psychsport.2013.01.003

Carpentier, J., & Mageau, G. A. (2016). Predicting sport experience during training: The role of change-oriented feedback in athletes' motivation, self-confidence and needs satisfaction fluctuations. *Journal of Sport & Exercise Psychology*, *38*(1), 45–58. https://doi.org/10.1123/jsep.2015-0210

Chen, B., Van Assche, J., Vansteenkiste, M., Soenens, B., & Beyers, W. (2015). Does psychological need satisfaction matter when environmental or financial safety are at risk? *Journal of Happiness Studies*, *16*(3), 745–766. https://doi.org/10.1007/s10902-014-9532-5

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., … Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Chen, B., Vansteenkiste, M., Beyers, W., Soenens, B., & Van Petegem, S. (2013). Autonomy in family decision making for chinese adolescents: Disentangling the dual meaning of autonomy. *Journal of Cross-Cultural Psychology*, *44*(7), 1184–1209. https://doi.org/10.1177/0022022113480038

Crites, J. O. (1969). *Vocational psychology*. New York, NY, US: McGraw-Hill.

Deci, E. L., La Guardia, J. G., Moller, A. C., Scheiner, M. J., & Ryan, R. M. (2006). On the benefits of giving as well as receiving autonomy support: Mutuality in close friendships. *Personality and Social Psychology Bulletin*, *32*(3), 313–327. https://doi.org/10.1177/0146167205282148

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Delrue, J., Mouratidis, A., Haerens, L., De Muynck, G.-J., Aelterman, N., & Vansteenkiste, M. (2016). Intrapersonal achievement goals and underlying reasons among long distance runners: Their relation with race experience, self-talk, and running time. *Psychologica Belgica*, *56*(3), 288–310. https://doi.org/10.5334/pb.280

Delrue, J., Reynders, B., Aelterman, N., De Backer, M., Decroos, S., De Muynck, G.-J., … Vansteenkiste, M. (2018). Adopting a helicopter-perspective towards motivating and demotivating coaching: A circumplex approach. *Manuscript in Revision*.

Delrue, J., Vansteenkiste, M., Mouratidis, A., Gevaert, K., Vande Broek, G., & Haerens, L. (2017). A game-to-game investigation of the relation between need-supportive and need-thwarting coaching and moral

behavior in soccer. *Psychology of Sport and Exercise, 31*, 1–10. https://doi.org/10.1016/j.psychsport.2017.03.010

Duda, J. L., Chi, L. K., Newton, M. I., Walling, M. D., & Catley, D. (1995). Task and ego orientation and Intrinsic motivation in sport. *International Journal of Sport Psychology, 26*(1), 40–63.

Fransen, K., Boen, F., Vansteenkiste, M., Mertens, N., & Vande Broek, G. (2018). The power of competence support: The impact of coaches and athlete leaders on intrinsic motivation and performance. *Scandinavian Journal of Medicine & Science in Sports, 28*(2), 725–745. https://doi.org/10.1111/sms.12950

Fredricks, J. A., & Eccles, J. S. (2004). Parental Influences on Youth Involvement in Sports. In M. R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 145–164). Morgantown, WV, US: Fitness Information Technology.

Gonzalez, D. H., & Chiviacowsky, S. (2018). Relatedness support enhances motor learning. *Psychological Research-Psychologische Forschung, 82*(3), 439–447. https://doi.org/10.1007/s00426-016-0833-7

Hagay, G., & Baram-Tsabari, A. (2015). A strategy for incorporating students' interests into the high-school science classroom. *Journal of Research in Science Teaching, 52*(7), 949–978. https://doi.org/10.1002/tea.21228

Hagger, M. S., & Chatzisarantis, N. L. (2007). *Intrinsic motivation and self-determination in exercise and sport*. Champaigne, IL: Human Kinetics.

Halperin, I., Chapman, D. W., Martin, D. T., Abbiss, C., & Wulf, G. (2016). Coaching cues in amateur boxing: An analysis of ringside feedback provided between rounds of competition. *Psychology of Sport and Exercise, 25*, 44–50. https://doi.org/10.1016/j.psychsport.2016.04.003

Hardy, J., Oliver, E., & Tod, D. (2009). A framework for the study and application of self-talk within sport. In S. D. Mellalieu & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 37–74). London, UK: Routledge.

Harwood, C. G., & Knight, C. J. (2015). Parenting in youth sport: A position paper on parenting expertise. *Psychology of Sport and Exercise*, *16*, 24–35. https://doi.org/10.1016/j.psychsport.2014.03.001

Hatzigeorgiadis, A., Theodorakis, Y., & Zourbanos, N. (2004). Self-talk in the swimming pool: The effects of self-talk on thought content and performance on water-polo tasks. *Journal of Applied Sport Psychology*, *16*(2), 138–150. https://doi.org/10.1080/10413200490437886

Hatzigeorgiadis, Antonis, Zourbanos, N., Goltsios, C., & Theodorakis, Y. (2008). Investigating the functions of self-talk: The effects of motivational self-talk on self-efficacy and performance in young tennis players. *Sport Psychologist*, *22*(4), 458–471. https://doi.org/10.1123/tsp.22.4.458

Hatzigeorgiadis, Antonis, Zourbanos, N., & Theodorakis, Y. (2007). The moderating effects of self-talk content on self-talk functions. *Journal of Applied Sport Psychology*, *19*(2), 240–251. https://doi.org/10.1080/10413200701230621

Houlfort, N., Koestner, R., Joussemet, M., Nantel-Vivier, A., & Lekes, N. (2002). The impact of performance-contingent rewards on perceived autonomy and competence. *Motivation and Emotion*, *26*(4), 279–295. https://doi.org/10.1023/A:1022819120237

Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of Personality and Social Psychology*, *76*(3), 349–366. https://doi.org/10.1037//0022-3514.76.3.349

Janelle, C., Kim, J., & Singer, R. (1995). Subject-controlled performance feedback and learning of a closed motor skill. *Perceptual and Motor Skills*, *81*(2), 627–634. https://doi.org/10.2466/pms.1995.81.2.627

Jang, H. (2008). Supporting students' motivation, engagement, and learning during an uninteresting activity. *Journal of Educational Psychology*, *100*(4), 798–811. https://doi.org/10.1037/a0012841

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology*, *102*(3), 588–600. https://doi.org/10.1037/a0019682

Karamitrou, A., Comoutos, N., Hatzigeorgiadis, A., & Theodorakis, Y. (2017). A self-determination approach to understanding of athletes' automatic self-talk. *Sport Exercise and Performance Psychology*, *6*(4), 340–354. https://doi.org/10.1037/spy0000104

Katz, I., & Assor, A. (2007). When choice motivates and when it does not. *Educational Psychology Review*, *19*(4), 429–442. https://doi.org/10.1007/s10648-006-9027-y

Kernis, M. H. (2003). Toward a conceptualization of optimal self-esteem. *Psychological Inquiry*, *14*(1), 1–26. https://doi.org/10.1207/S15327965PLI1401_01

Leiker, A. M., Bruzi, A. T., Miller, M. W., Nelson, M., Wegman, R., & Lohse, K. R. (2016). The effects of autonomous difficulty selection on engagement, motivation, and learning in a motion-controlled video game task. *Human Movement Science*, *49*, 326–335. https://doi.org/10.1016/j.humov.2016.08.005

Lonsdale, C., Sabiston, C. M., Raedeke, T. D., Ha, A. S. C., & Sum, R. K. W. (2009). Self-determined motivation and students' physical activity during structured physical education lessons and free choice periods. *Preventive Medicine*, *48*(1), 69–73. https://doi.org/10.1016/j.ypmed.2008.09.013

Mabbe, E., Soenens, B., De Muynck, G.-J., & Vansteenkiste, M. (2018). The impact of feedback valence and communication style on intrinsic motivation in middle childhood: Experimental evidence and generalization across individual differences. *Journal of Experimental Child Psychology*, *170*, 134–160. https://doi.org/10.1016/j.jecp.2018.01.008

Moller, A. C., Deci, E. L., & Ryan, R. M. (2006). Choice and ego-depletion: The moderating role of autonomy. *Personality and Social Psychology Bulletin*, *32*(8), 1024–1036. https://doi.org/10.1177/0146167206288008

Mouratidis, A. A., Vansteenkiste, M., Sideridis, G., & Lens, W. (2011). Vitality and interest-enjoyment as a function of class-to-class variation in need-supportive teaching and pupils' autonomous motivation. *Journal of Educational Psychology, 103*(2), 353–366. https://doi.org/10.1037/a0022773

Mouratidis, A., Lens, W., & Vansteenkiste, M. (2010). How you provide corrective feedback makes a difference: The motivating role of communicating in an autonomy-supporting way. *Journal of Sport & Exercise Psychology*, *32*(5), 619–637. https://doi.org/10.1123/jsep.32.5.619

Mouratidis, A., Vansteenkiste, M., Michou, A., & Lens, W. (2013). Perceived structure and achievement goals as predictors of students' self-regulated learning and affect and the mediating role of competence need satisfaction. *Learning and Individual Differences*, *23*, 179–186. https://doi.org/10.1016/j.lindif.2012.09.001

Oliver, E. J., Markland, D., & Hardy, J. (2010). Interpretation of self-talk and post-lecture affective states of higher education students: A self-determination theory perspective. *British Journal of Educational Psychology*, *80*(2), 307–323. https://doi.org/10.1348/000709909X477215

Osipow, S. H. (1999). Assessing career indecision. *Journal of Vocational Behavior*, *55*(1), 147–154. https://doi.org/10.1006/jvbe.1999.1704

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: A meta-analysis of research findings. *Psychological Bulletin*, *134*(2), 270–300. https://doi.org/10.1037/0033-2909.134.2.270

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*(4), 279–306. https://doi.org/10.1023/A:1014805132406

Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of choice. *Journal of Educational Psychology*, *95*(2), 375–392. https://doi.org/10.1037/0022-0663.95.2.375

Reeve, Johnmarshall, Vansteenkiste, M., Assor, A., Ahmad, I., Cheon, S. H., Jang, H., … Wang, C. K. J. (2014). The beliefs that underlie autonomy-supportive and controlling teaching: A multinational investigation. *Motivation and Emotion*, *38*(1), 93–110. https://doi.org/10.1007/s11031-013-9367-0

Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, *28*(3), 297–313. https://doi.org/10.1023/B:MOEM.0000040156.81924.b8

Reynders, B., Van Puyenbroeck, S., Decroos, S., De Backer, M., Delrue, J., De Muynck, G.-J., … Vande Broek, G. (2018). Coaching the coach: Intervention effects on coaches' need-supportive behavior and athletes' motivation and engagement. *Manuscript in Revision*.

Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion*, *15*(3), 185–205. https://doi.org/10.1007/BF00995170

Ryan, Richard M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY, US: Guilford Press.

Selk, J. (2009). *10-minute toughness: The mental-training program for winning before the game begins*. Columbus, OH: McGraw Hill.

Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology*, *80*(2), 325–339. https://doi.org/10.1037//0022-3514.80.2.325

Shweder, R. A., & Sullivan, M. A. (1993). Cultural psychology: Who needs it? *Annual Review of Psychology*, *44*, 497–523. https://doi.org/10.1146/annurev.ps.44.020193.002433

Smith, A. L., Gustafsson, H., & Hassmen, P. (2010). Peer motivational climate and burnout perceptions of adolescent athletes. *Psychology of Sport and Exercise*, *11*(6), 453–460. https://doi.org/10.1016/j.psychsport.2010.05.007

Soenens, B., Vansteenkiste, M., & Van Petegem, S. (2015). Let us not throw out the baby with the bathwater: Applying the principle of universalism without uniformity to autonomy-supportive and controlling parenting. *Child Development Perspectives*, *9*(1), 44–49. https://doi.org/10.1111/cdep.12103

Soenens, B., Vansteenkiste, M., Van Petegem, S., Beyers, W., & Ryan, R. M. (2018). How to solve the conundrum of adolescent autonomy? On the importance of distinguishing between independence and volitional functioning. In B. Soenens, M. Vansteenkiste, & S. Van Petegem (Eds.), *Autonomy in adolescent development: Towards conceptual clarity* (pp. 1–32). Abingdon, UK: Routledge.

Tenenbaum, G., Hall, H. K., Calcagnini, N., Lange, R., Freeman, G., & Lloyd, M. (2001). Coping with physical exertion and negative feedback under competitive and self-standard conditions. *Journal of Applied*

Social Psychology, *31*(8), 1582–1626. https://doi.org/10.1111/j.1559-1816.2001.tb02743.x

Theodorakis, Y., Hatzigeorgiadis, A., & Zourbanos, N. (2012). Cognitions: Self-talk and performance. In S. Murphy (Ed.), *Oxford handbook of sport and performance psychology. Part 2: Individual psychological processes in performance* (pp. 191–212). New York, NY, US: Oxford University Press.

Tzetzis, G., Votsis, E., & Kourtessis, T. (2008). The effect of different corrective feedback methods on the outcome and self confidence of young athletes. *Journal of Sports Science and Medicine*, *7*(3), 371–378.

Vallerand, R. J., Gauvin, L. I., & Halliwell, W. R. (1986). Negative effects of competition on childrens intrinsic motivation. *Journal of Social Psychology*, *126*(5), 649–656. https://doi.org/10.1080/00224545.1986.9713638

Van Petegem, S., Beyers, W., Vansteenkiste, M., & Soenens, B. (2012). On the association between adolescent autonomy and psychosocial functioning: Examining decisional independence from a self-determination theory perspective. *Developmental Psychology*, *48*(1), 76–88. https://doi.org/10.1037/a0025307

Van Petegem, S., Vansteenkiste, M., Soenens, B., Beyers, W., & Aelterman, N. (2015). Examining the longitudinal association between oppositional defiance and autonomy in adolescence. *Developmental Psychology*, *51*(1), 67–74. https://doi.org/10.1037/a0038374

Van Raalte, J. L., Cornelius, A. E., Brewer, B. W., & Hatten, S. J. (2000). The antecedents and consequences of self-talk in competitive tennis. *Journal of Sport & Exercise Psychology*, *22*(4), 345–356. https://doi.org/10.1123/jsep.22.4.345

van Yperen, N. W. (1998). Being a sport parent: Buffering the effect of your talented child's poor performance on his or her subjective well-being. *International Journal of Sport Psychology*, *29*(1), 45–56.

Vansteenkiste, M., & Deci, E. L. (2003). Competitively contingent rewards and intrinsic motivation: Can losers remain motivated? *Motivation and Emotion*, *27*(4), 273–299. https://doi.org/10.1023/A:1026259005264

Vansteenkiste, Maarten, Aelterman, N., Haerens, L., & Soenens, B. (2018). Seeking stability in stormy educational times: A need-based perspective on (de)motivating teaching grounded in self-determination theory. In E. Gonida & M. Lemos (Eds.), *Motivation in education at a time of global change: Theory, research, and implications for practice*. Emerald.

Vansteenkiste, Maarten, Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick, *The decade ahead: Theoretical perspectives on motivation and achievement* (Vol. 16A, pp. 105–165). Bingley, UK: Emerald.

Vansteenkiste, Maarten, Williams, G. C., & Resnicow, K. (2012). Toward systematic integration between self-determination theory and motivational interviewing as examples of top-down and bottom-up intervention development: Autonomy or volition as a fundamental theoretical principle. *International Journal of Behavioral Nutrition and Physical Activity*, *9*, 23. https://doi.org/10.1186/1479-5868-9-23

Vohs, K. D., Schmeichel, B. J., Nelson, N. M., Baumeister, R. F., Twenge, J. M., & Tice, D. M. (2008). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Journal of Personality and Social Psychology*, *94*(5), 883–898. https://doi.org/10.1037/0022-3514.94.5.883

Wang, Q., Pomerantz, E. M., & Chen, H. (2007). The role of parents' control in early adolescents' psychological functioning: A longitudinal

investigation in the united states and china. *Child Development*, *78*(5), 1592–1610. https://doi.org/10.1111/j.1467-8624.2007.01085.x

Weinstein, N., Zougkou, K., & Paulmann, S. (2018). You "have" to hear this: Using tone of voice to motivate others. *Journal of Experimental Psychology-Human Perception and Performance*, *44*(6), 898–913. https://doi.org/10.1037/xhp0000502

Wulf, G., & Toole, T. (1999). Physical assistance devices in complex motor skill learning: Benefits of a self-controlled practice schedule. *Research Quarterly for Exercise and Sport*, *70*(3), 265–272. https://doi.org/10.1080/02701367.1999.10608045

Wulf, Gabriele, Chiviacowsky, S., & Cardozo, P. L. (2014). Additive benefits of autonomy support and enhanced expectancies for motor learning. *Human Movement Science*, *37*, 12–20. https://doi.org/10.1016/j.humov.2014.06.004

Zourbanos, N., Hatzigeorgiadis, A., Chroni, S., Theodorakis, Y., & Papaiciannou, A. (2009). Automatic self-talk questionnaire for sports (ASTQS): Development and preliminary validation of a measure identifying the structure of athletes' self-talk. *Sport Psychologist*, *23*(2), 233–251. https://doi.org/10.1123/tsp.23.2.233

Zourbanos, N., Hatzigeorgiadis, A., Tsiakaras, N., Chroni, S., & Theodorakis, Y. (2010). A multimethod examination of the relationship between coaching behavior and athletes' inherent self-talk. *Journal of Sport & Exercise Psychology*, *32*(6), 764–785. https://doi.org/10.1123/jsep.32.6.764

Zourbanos, N., Haznadar, A., Papaioannou, A., Tzioumakis, Y., Krommidas, C., & Hatzigeorgiadis, A. (2016). The relationships between athletes' perceptions of coach-created motivational climate, self-talk, and self-efficacy in youth soccer. *Journal of Applied Sport Psychology*, *28*(1), 97–112. https://doi.org/10.1080/10413200.2015.1074630

NEDERLANDSTALIGE SAMENVATTING

De (de)motiverende invloed van coach feedback, keuze bieden en zelfspraak in de sportwereld ontrafeld vanuit de Zelf-Determinatie Theorie

INLEIDING

Regelmatige sportparticipatie brengt een resem fysieke, psychologische en sociale voordelen met zich mee voor jongeren, zoals onder meer blijkt uit, respectievelijk, een verbeterde cardiovasculaire conditie, een hogere zelfwaarde, en toegenomen vaardigheden om samen te werken met anderen (Fraser-Thomas, Coté, & Deakin, 2005). Ondanks deze veelvuldige voordelen kan sportparticipatie, en competitiesport in het bijzonder, ook stress en angst ontlokken bij jeugdsporters (Smith, Smoll, Cumming, & Grossbard, 2006). Zo kan competitie als bedreigend worden ervaren en kan het verliezen van een wedstrijd teleurstelling en kritiek ontlokken bij coaches en ouders. Bovendien kan de sociale vergelijking die onlosmakelijk met competitie is verbonden demotiverend werken en jongeren op sociaal vlak van elkaar doen vervreemden. Waar sommige jeugdsporters in staat zijn om aan dergelijke druk te weerstaan, betrokken blijven en op niveau blijven presteren worden andere overvallen door deze druk, verliezen ze langzamerhand het plezier in hun sport, besteden ze er steeds minder tijd aan, en staken ze zelfs uiteindelijk hun sportbeoefening (Butcher, Lindner, & Johns, 2002).

De kern van de zaak is dat de mate waarin jeugdsporters de vruchten kunnen plukken van hun sportparticipatie, of eerder kwetsbaar zijn voor de nadelen op zijn minst gedeeltelijk afhankelijk is van hun motivatie om te sporten en de waargenomen motiverende stijl van hun coach. In het licht van deze veronderstelling was het hoofddoel van dit proefschrift om een groter inzicht te verwerven in de unieke en causale invloed van de motiverende stijl van coaches in het algemeen, en een aantal specifieke motiverende bouwstenen in het bijzonder. Op deze manier trachtte dit proefschrift na te gaan waarom en voor wie deze specifieke bouwstenen een motiverende, dan wel een demotiverende impact hebben. Het proefschrift is gestoeld op de zelfdeterminatietheorie (ZDT; Deci & Ryan, 2000; Ryan & Deci, 2017), een omvangrijke theorie over menselijke motivatie en optimaal functioneren dat een omvattend theoretisch kader biedt om de effecten van verschillende

gedragingen van coaches en ouders op het functioneren van jeugdsporters te onderzoeken (vb., Gaudreau et al., 2016). De ZDT stelt dat de bevrediging van de drie psychologische basisbehoeftes aan autonomie (d.i., het gevoel hebben zichzelf te kunnen zijn), competentie (d.i., zich bekwaam voelen) en relationele verbondenheid (d.i., een warme en hechte band met belangrijke anderen ervaren) de motor vormt voor het optimaal functioneren van jeugdsporters, terwijl de theorie veronderstelt dat de frustratie van deze behoeftes schadelijk is. Dit betekent dat coaches voor de uitdaging staan om een behoefte-ondersteunende omgeving te creëren door autonomieondersteunend, structurerend en relationeel ondersteunend op te treden, terwijl ze behoefteondermijnende gedragingen zoals gekenmerkt door controle, chaos en relationele verwerping proberen te vermijden.

Hoewel veelvuldig onderzoek reeds de bovenvermelde beweringen van de ZDT ondersteunt, zijn er binnen de hedendaagse wetenschappelijke literatuur op zijn minst vier lacunes op te merken, die dit proefschrift trachtte te verhelpen. Ten eerste werd tot de (de)motiverende stijl van coaches tot op heden voornamelijk afzonderlijk bestudeerd, zonder de rol van andere socialisatiefiguren in rekening te brengen. Dit brengt met zich mee dat de vraag naar de unieke en gezamenlijke bijdrage van coaches en ouders bijkomende aandacht verdient. Ten tweede, de overgrote meerderheid van reeds uitgevoerde studies is correlationeel van aard, waardoor het oorzakelijk verband tussen motiverend coachgedrag en het functioneren van jeugdsporters nog onduidelijk is. Ten derde, de beperkte experimentele studies die in de sportwereld voorhanden zijn over de oorzakelijk invloed van coachgedrag leggen zelden de verklarende mechanismen bloot die inzicht kunnen geven in waarom een bepaald gedrag (de)motiverend werkt (Vansteenkiste, Niemiec, & Soenens, 2010). Ten vierde, gegeven het gebrek aan experimenteel onderzoek naar specifieke motiverende coachgedragingen is het tot op heden onduidelijk of individuele verschillen tussen en de persoonlijkheid van sporters de invloed van een bepaalde (de)motiverende bouwsteen verandert.

In overeenstemming met deze lacunes in de literatuur, streefde het huidige proefschrift 3 globale objectieven na aan de hand van 5 verschillende studies waar in totaal 624 sporters uit verschillende individuele (m.n., tennis en rope skipping) en teamsporten (m.n., voetbal) aan deelnamen. Deze objectieven zijn (1) het onderzoeken van specifieke (de)motiverende coachgedragingen op het functioneren van sporters, (2) de verklarende mechanismen voor deze (de)motiverende impact blootleggen en (3) individuele verschillen identificeren die de reactie van sporters op deze (de)motiverende gedragingen kunnen veranderen.

RESULTATEN EN DISCUSSIE

DE UNIEKE EN GEZAMENLIJKE BIJDRAGE VAN COACHES EN OUDERS

Unieke en gezamenlijke bijdragen. Een cross-sectionele studie bij 255 jeugdvoetbalspelers (M_{leeftijd} = 13.72; Hoofdstuk 2) wierp een licht op de (de)motiverende bijdrage van ouders en coaches. Hierbij werd de rol van coaches en ouders zowel afzonderlijk als gezamenlijk onderzocht. Wanneer ze afzonderlijk van elkaar werden onderzocht vertoonden (de)motiverende gedragingen van coaches en ouders een gelijkaardige bijdrage tot de motivatie en betrokkenheid van jeugdsporters. Meer bepaald bleken sporters die hun coaches en ouders als meer behoefteondersteunend waarnamen meer autonoom gemotiveerd en betrokken te zijn. In tegenstelling, wanneer sporters hun coaches en ouders als meer behoefteondermijnend ervaren, rapporteren ze meer amotivatie en onbetrokkenheid.

Wanneer coaches en ouders gezamenlijk in rekening werden gebracht, bleek een grotere behoefteondersteuning van de coaches (maar niet van de ouders) uniek samen te hangen met een toegenomen autonome motivatie en betrokkenheid van jeugdvoetbalspelers. Met betrekking tot behoefteondermijning, ging een toename van behoefteondermijning van zowel coaches als ouders gepaard met een toename in amotivatie bij de voetbalspeler. Als dusdanig vertoont de (de)motiverende stijl van coaches een

meer consistente samenhang met het functioneren van voetbalspelers, wat de meer gedetailleerde benadering van de (de)motiverende impact van verschillende coachgedragingen binnen het huidige proefschrift verder verantwoordt.

Praktische implicaties. De bevindingen van Hoofdstuk 2 bieden waardevolle inzichten omtrent de meest waardevolle insteek voor informatiesessies en workshops betreffende motiverend coachen en het motiverend invullen van de rol als sportouder. Gezien zowel behoefteondersteuning als behoefteondermijning een aanzienlijk bijdrage hadden op het functioneren van jeugdsporters wanneer coaches en ouders afzonderlijk van elkaar werden onderzocht, is het belangrijk dat zowel het aanmoedigen van behoefteondersteunende als het ontmoedigen van behoefteondermijnende gedragingen aan bod komen in dergelijke bijdrages. Echter, op basis van de unieke bijdrages van coaches en ouders wordt een verschillende nadruk aanbevolen naarmate de informatiesessie of workshop bedoeld is voor coaches, dan wel voor ouders. Omdat de perceptie van jeugdvoetballers omtrent het behoefteondersteunende gedrag van coaches in grotere mate samenhing met wenselijke uitkomsten, vergeleken met het verband tussen behoefteondermijning van coaches en onwenselijke uitkomsten, is het zinvol om in sessies voor coaches het aanmoedigen van behoefteondersteunende gedragingen in grotere mate te benadrukken. Voor ouders, daarentegen, kan deze nadruk beter komen te liggen op het ontmoedigen van behoefteondermijnende gedragingen daar enkel behoefteondermijnend gedrag van ouders een verband vertoonde met het functioneren van jeugdsporters, bovenop de bijdrage van coaches.

(DE)MOTIVERENDE EFFECTEN VAN FEEDBACK

Feedback valentie. Op basis van twee experimentele veldstudies waarbij respectievelijk 120 en 90 competitietennisspelers ($M_{leeftijd}$ = 24.5 en 15.6, resp.; Hoofdstuk 4 en 5) bleek negatieve, vergeleken met positieve normatieve feedback een negatieve impact te hebben. Meer bepaald leidde het

bij de tennisspelers tot een verminderd affectief (m.n., minder competentiebevrediging en plezier), cognitief (m.n., meer negatieve zelfspraak) en gedragsmatig functioneren (m.n., verminderde doorzetting en in kleinere mate zoeken naar uitdagingen). Deze effecten kwamen tot stand omdat tennisspelers die negatieve feedback kregen, in grotere mate zorgende gedachten, signalen van lichamelijke vermoeidheid en gedachten rond opgeven uitdrukten (d.i., negatieve zelfspraak; Hoofdstuk 4), waardoor ze hun competentiegevoel verder ondermijnden, bovenop de reeds competentie-ondermijnende impact van de negatieve feedback (Hoofdstuk 4 en 5). Dit verminderd competentiegevoel ondermijnde op zijn beurt de plezierbeleving en het doorzettingsvermogen van de tennisspelers tijdens de oefeningen. Bemerk dat de negatieve zelfspraak hierbij in kaart werd gebracht door een combinatie van zelfrapportage door de tennisspelers en door onderzoekers beoordeelde zelfspraak, welke systematisch bleken samen te hangen in een sample van 120 competitietennisspelers (M_{leeftijd} = 24.5; Hoofdstuk 3). Tot slot bleek positieve feedback, via het aanwakkeren van het competentiegevoel van tennisspelers, prestaties te bevorderen en spanning te verlichten, terwijl een zelfkritisch perfectionistische ingesteldheid bij tennisspelers het competentieondermijnende effect van negatieve effect bleek te versterken.

Feedback communicatie. Met betrekking tot de manier waarop feedback gecommuniceerd wordt toonde Hoofdstuk 4 aan dat feedback die in uitnodigende taal gegeven wordt, vergeleken met meer dwingend taalgebruik, het affectief (m.n., toegenomen autonomiebevrediging en plezierbeleving) en gedragsmatig functioneren (m.n., meer doorzetting en in grotere mate zoeken naar uitdagingen) bevordert. Waar de behoefte aan competentie de impact van feedback valentie verklaarde, staat de behoefte aan autonomie in voor de effecten van uitnodigend taalgebruik op de plezierbeleving van tennisspelers. Als dusdanig leidt het gebruik van uitnodigende taal bij het geven van feedback tot een gevoel van psychologische vrijheid bij tennisspelers, wat er op zijn beurt voor zorgt dat ze meer plezier hebben in de tennisoefeningen die ze uitvoeren.

Samenvatting en praktische implicaties. De bevindingen van het huidige proefschrift wijzen duidelijk op de voordelen van positieve, uitnodigend gecommuniceerde feedback ten opzichte van de negatieve, dwingend gecommuniceerde tegenhanger, waarbij een cognitief (m.n., zelfspraak) en twee affectieve mechanismen (m.n., competentie en autonomiebevrediging) werden blootgelegd als de verklarende mechanismen. Op basis van deze bevindingen is het gebruik van negatieve, normatieve feedback af te raden. Hoewel sommige coaches de hardnekkige overtuiging bezitten dat dergelijke feedback de drang om zich te bewijzen kan losmaken bij sporters, waardoor ze zich harder zullen inspannen, zullen de motivationele voordelen van deze strategie hooguit kortstondig zijn (Pelletier, Fortier, Vallerand, & Brière, 2001; Ryan, Koestner, & Deci, 1991). Bovendien kan dergelijke feedback in het geval van herhaaldelijk falen zelfs de deur openen naar een gevoel van hulpeloosheid (Seligman et al., 1978). Verder belichten de bevindingen de keerzijde van dwingend taalgebruik, waarop coaches zeker tijdens wedstrijden veelvuldig terugvallen (Halperin, Chapan, Martin, Abiss, & Wulf, 2016). Een mogelijke reden waardoor coaches verleid worden om dwingende taal te hanteren is hun vrees om als te soft gepercipieerd te worden en hierdoor hun grip op het sportgebeuren te verliezen. De bevindingen van het huidige proefschrift kunnen tegemoetkomen aan deze vertwijfeling aangezien tennisspelers die op een uitnodigende manier feedback kregen nét meer inspanningen leverden in een deel van de training waaraan ze vrijwillig konden deelnemen en ze zelfstandig konden invullen.

DE(MOTIVERENDE) EFFECTEN VAN KEUZE

Optie- en actiekeuze. Om een meer verfijnd inzicht te krijgen in de rol van keuze bij het bevorderen van de autonomiebevrediging, betrokkenheid en voorgenomen doorzettingsvermogen van rope skippers werd een experimentele veldstudie uitgevoerd bij 159 recreatieve rope skippers (M_{leeftijd} = 17.2; Hoofdstuk 6). Het opzet omvatte 1 vergelijkingsgroep waarbinnen rope skippers geen keuze werd aangeboden en 3 verschillende keuzegroepen

waarbinnen rope skippers herhaaldelijk de keuze kregen om een oefening te kiezen uit drie verschillende voorgestelde opties (d.i., optiekeuze) of de volgorde konden kiezen waarin 3 door de experimentleider vastgelegde oefeningen werden uitgevoerd (d.i., actiekeuze). Er werden twee verschillende optiekeuze-condities gecreëerd, waarbij de aantrekkelijkheid van de aangeboden opties sterk varieerde in de ene conditie (d.i., hoge-contrast optiekeuze), terwijl deze aantrekkelijkheid heel gelijkend was in de andere conditie (d.i., lage-contrast optiekeuze).

Hoewel elk type keuze de autonomiebevrediging van sporters bevorderde, verschilden de effecten op betrokkenheid en intenties tot doorzetten. Terwijl de hoge-contrast optiekeuze beide uitkomsten bevorderde, had de lage-contrast optiekeuze hier geen effect op. De effecten van actiekeuze situeerden zich daartussen, gezien het wel de betrokkenheid van rope skippers bevorderde, maar geen impact had op hun voornemens om door te zetten in vergelijking met de rope skippers die geen keuze kregen. Voor elk van de drie keuzecondities functioneerde autonomiebevrediging als een tussenliggend mechanisme. Dit wil zeggen tot in de mate dat de aangeboden keuze erin slaagde om een gevoel van psychologische vrijheid te ontlokken bij de sporters, ze ook hun betrokkenheid en intenties tot doorzetten bevorderde. Tot slot bleef de evidentie voor de modererende rol van besluiteloosheid, een karaktertrek gekenmerkt door chronische moeilijkheden om beslissingen te maken in verschillende situaties en levensdomeinen (Crites, 1969; Osipow, 1999), beperkt. Er werd namelijk aangetoond dat hoge-contrast optiekeuze de autonomiebevrediging minder bevorderde bij besluiteloze rope skippers. Echter, soortgelijke bevindingen bleven uit voor betrokkenheid, intenties om door te zetten of voor de andere 2 types keuze.

Samenvatting en praktische implicaties. Hoofdstuk 6 toonde aan dat niet alle keuzes even motiverend werken. Tegelijkertijd voedt elke vorm van keuze wel de autonomiebevrediging van sporters, welke op zijn beurt een aantal voordelen met zich meebrengt. Om de betrokkenheid van sporters aan te wakkeren kunnen coaches zowel keuze bieden omtrent welke oefeningen

sporters willen uitvoeren (d.i., optiekeuze) of sporters laten beslissen omtrent de manier waarop ze bepaalde oefeningen die door de coach werden vastgelegd uitvoeren (d.i., actiekeuze), waarbij het eerste type keuze het voornemen bij sporters om te volharden verder versterkt. Alhoewel optiekeuze het meest voordelen biedt, houdt het ook het meest valkuilen in. Een eerste valkuil voor coaches is om té frequent gebruik te maken van deze strategie en als gevolg hiervan te weinig structuur bieden aan hun sporters, waardoor deze minder snel zaken bijleren. Een tweede valkuil betreft het aanbieden van een aantal opties die heel gelijkaardig zijn. Zeker wanneer sporters deze opties weinig aantrekkelijk of betekenisvol vinden, kan ze de aangeboden keuze als manipulatief opvatten. In dat geval krijgen sporters het gevoel dat de coach een verborgen agenda heeft en de aangeboden keuze louter een strategie is om sporters te laten handelen naar die verborgen agenda, waardoor de potentiële voordelen van optiekeuze verloren gaan. Om deze reden kan actiekeuze gezien worden als een veiligere manier om sporters hun betrokkenheid aan te wakkeren. In het geval van actiekeuze bepalen coaches de oefeningen die worden uitgevoerd, waardoor ze voldoende structuur garanderen. Er bestaan verschillende vormen van actiekeuze, zo kunnen coaches keuze laten met betrekking tot de volgorde waarin oefeningen worden uitgevoerd, net zoals in het huidige proefschrift, maar kunnen ze ook keuze laten inzake de moeilijkheidsgraad van de oefeningen (Leiker et al., 2016), het ritme waarmee men overschakelt van de ene naar de andere oefening (Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011), het moment waarop feedback wordt gegeven (Janelle & Singer, 1996), of wanneer gebruik gemaakt wordt van hulpmiddelen bij het aanleren van een vaardigheid (Wulf & Toole, 1999).

ALGEMENE CONCLUSIE

Gegeven de fysieke, psychologische en sociale voordelen die regelmatige sportbeoefening met zich meebrengt en de vaststelling dat veel adolescenten hun sportbeoefening staken (Butcher et al., 2002), is het belangrijk om de duurzame motivatie en betrokkenheid bij jeugdsporters te voeden. Resultaten van het huidige proefschrift tonen aan dat, bovenop de rol van ouders, de (de)motiverende stijl van de coach van tel is. Een aantal experimentele studies haakten in op specifieke coachgedragingen en wijzen coaches erop om zich te weerhouden van negatieve en dwingend gecommuniceerde feedback. Dergelijke feedback ontlokt de kritische stem in sporters wat zich uit in toegenomen negatieve zelfspraak. Vervolgens ondermijnt deze negatieve zelfspraak het vertrouwen van sporters, wat op zijn beurt de ervaren spanning verhoogt en nefast is voor hun plezierbeleving, volharding en prestaties. Het huidige proefschrift wees ook op het potentieel van keuze om sporters' autonomiebevrediging, plezierbeleving en intenties om te volharden te versterken, hoewel niet elke vorm van keuze even effectief bleek. Voornamelijk keuze omtrent de volgorde waarin oefeningen worden uitgevoerd (d.i., actiekeuze) en keuze waarbij sporters kunnen kiezen welke oefening ze willen uitvoeren uit een menu van een aantal opties die voldoende sterk variëren in termen van aantrekkelijkheid (d.i., hoge-contrast optie keuze) bracht de meeste voordelen met zich mee. Tot slot bleken individuele verschillen de effecten van specifiek coachgedrag in beperkte mate te beïnvloeden. Zo versterkte zelfkritisch perfectionisme het competentieondermijnend effect van negatieve, normatieve feedback, terwijl besluiteloosheid het autonomiebevorderende effect van hoge-contrast optiekeuze afzwakte, maar niet tenietdeed. De effecten van coachgedrag op sporters' functioneren was daarentegen onafhankelijk van individuele verschillen tussen sporters.

ENGLISH SUMMARY

The (De)motivating Impact of Coach Feedback, Choice Provision, and Self-Talk in Sports Disentangled from a Self-Determination Theory Perspective

INTRODUCTION

Regular sport participation among youth comes with a host of physical, psychological, and social benefits, as manifested via, respectively, improved cardiovascular fitness, greater self-esteem, and better cooperative skills (Fraser-Thomas, Coté, & Deakin, 2005). In spite of these multiple advantages, sport participation, and particularly competitive sport participation, can also evoke stress and anxiety in youth athletes (Smith, Smoll, Cumming, & Grossbard, 2006). Competition may, for instance, elicit threat; the loss of a game or a poor performance may come with disappointment and criticism from coaches and parents, and the social comparison inherent in competition may be socially alienating and demotivating. While some athletes are able to withstand these pressures, thereby remaining engaged and performing up to standards, others get overwhelmed by these stressors, gradually lose their enjoyment in sport and even disengage or drop out (Butcher, Lindner, & Johns, 2002).

The critical point is that athletes' capacity to reap the benefits from their sport participations or instead being more vulnerable to its down side is at least partially dependent upon their motivation for practicing sports and the perceived motivating style of their coach. In light of this assumption, the main objective of the current dissertation was to gain an insight in the unique and causal impact of coaches' motivating style in general, and a number of specific coaching practices in particular. In doing so, the current dissertation sought to examine why and for whom specific coaching practices may have a motivating or a rather demotivating effect. The dissertation was grounded in Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017), a broad theory on human motivation and optimal functioning that offers an encompassing theoretical framework to examine the effect of diverse coaching and parenting behaviors on athlete functioning (e.g., Gaudreau et al., 2016). Specifically, within SDT, the satisfaction of three basic psychological needs for autonomy (i.e., feeling volitional), competence (i.e., feeling

effective) and relatedness (i.e., feeling cared for) are said to represent the critical nutriments for athletes' optimal functioning, whereas the frustration of basic psychological needs is deemed detrimental. As such, coaches face the challenge to create a need-supportive coaching environment, thereby being autonomy-supportive, structuring and relational-supportive, while equally avoiding a need-thwarting environment characterized by coach control, chaos, and rejection.

Although abundant research confirms the above-mentioned claims made by SDT, at least four lacunae can be identified in the extant literature that the current dissertation aims to overcome. First, the (de)motivating style of the coach has been largely studied in isolation, that is, without considering the role of other socializing agents. As a result, the question whether coaches and parents contribute in unique ways to athletes' motivation and engagement and whether they may possibly work in tandem deserves further investigation. Second, the vast majority of past work is correlational, leaving the question open whether motivating practices yield a causal impact on athletes' functioning. Third, experimental research regarding critical socio-contextual factors contributing to optimal functioning to date seldom identify the mechanisms that explain their impact (Vansteenkiste, Niemiec, & Soenens, 2010). Fourth, given the lack on experimental research on specific coaching practices, it is unclear to date whether such practices yield an equally (de)motivating impact on athletes, or whether their impact is dependent on athletes' individual differences and personality.

Congruent with these identified lacunae in the literature, the present dissertation pursued 3 global objectives in 5 empirical studies involving 624 participants from both individual (i.e., tennis and rope skipping) and team sports (i.e., soccer). That is, (1) the examination of the (de)motivating impact of specific coach behaviors on athletes' functioning, (2) unraveling explanatory mechanisms accounting for that impact, and (3) identifying individual differences that might alter athletes' reactions to those (de)motivating practices.

RESULTS AND DISCUSSION

THE UNIQUE AND COMBINED CONTRIBUTION OF COACHING AND PARENTING

Separate and simultaneous contributions. A cross sectional study involving 255 youth soccer players (M_{age} = 13.72; Chapter 2) was conducted to shed a light on the (de)motivating contribution of coaching and parenting. Herein, the role of coaching and parenting was examined both separately, and simultaneously. When examined apart from each other, both coaches' and parents' (de)motivating styles showed a similar contribution to youth soccer players' motivation and engagement. Specifically, athletes' perceiving their coaches and parents as highly need supportive, reported more autonomous motivation for soccer and were more engaged. Conversely, athletes perceiving coaches and parents as highly need thwarting were more amotivated and disaffected.

When considered together, perceived coach (but not parental) need support was uniquely related to soccer players' autonomous motivation and engagement, while both perceived coach and parental need-thwarting were related to amotivation. As such, the coaches' motivating style generally appeared to have more consistent unique associations with soccer players' outcomes, which further justified examining the (de)motivating impact of specific coach behaviors in the current dissertation.

Practical implications. The findings of Chapter 2 provide valuable insights regarding the most relevant content for information sessions and workshops regarding motivating coaching and parenting. As both need-support and need-thwarting are found to have considerable contributions when coaching and parenting were examined separately, coach and parent education sessions should encompass both the promotion of need support and the containment of need thwarting. However, based on the unique contributions of coaching and parenting, a differential emphasis on need support, compared to need thwarting is advocated. As soccer players' perceptions of coaches' behaviors

were more frequently related to beneficial outcomes, as compared to detrimental outcomes, the emphasis in coach education sessions should shift more towards the promotion of coach need support. For parents, however, this emphasis should shift more towards containment of need-thwarting behaviors, as only need-thwarting parenting was found to have a unique association with soccer players' functioning.

(DE)MOTIVATING EFFECTS OF FEEDBACK PROVISION

Feedback valence. Based on two experimental field studies involving 120 and 90 competitive tennis players (M_{age} = 24.5 and 15.6; resp. Chapter 4 and 5), negative, compared to positive, normative feedback was found to yield a negative impact on a diverse set of outcomes, including players' affective (i.e., less competence satisfaction and enjoyment), cognitive (i.e., more negative self-talk), and behavioral functioning (i.e., reduced perseverance and challenge seeking). These effects emerged because tennis players' receiving negative feedback were found to more often express worrying thoughts, signs of somatic fatigue and thoughts about disengagement (i.e., negative self-talk; Chapter 4), which additionally decreased their sense of competence above and beyond the effect of manipulated negative feedback as such (Chapter 4 and 5). Their reduced competence, in turn, undermined athletes' enjoyment and perseverance in the tennis exercises at hand. Note that the negative self-talk involved a combination of both self-reported and rated self-talk, which were found to be connected in a systematic way in a sample of 120 competitive tennis players (M_{age} = 24.5; Chapter 3). Additionally, positive feedback valence had an indirect performance-enhancing and tension-reducing effect via competence need satisfaction and tennis players' self-critical perfectionism was found to aggravate the competence-undermining effect of negative feedback.

Feedback communication style. As for feedback communication style, the findings of Chapter 4 indicated that feedback provided in an autonomy-supportive way, compared to a controlling one, increased tennis

players' affective (i.e., autonomy need satisfaction enjoyment) and behavioral functioning (i.e., perseverance and challenge seeking). Whereas competence need satisfaction accounted for the effects of feedback valence, autonomy need satisfaction accounted for the effect of feedback communication style on enjoyment, such that relying on inviting language during feedback communication provided tennis players with a sense of psychological freedom, which, in turn, helped to explain why they enjoyed the exercise more.

Summary and practical implications. To sum up, the current dissertation's findings clearly underscore the merits of positive and autonomy-supportive, compared to negative and controlling normative feedback for athletes, with a cognitive (i.e., self-talk) and two affective (i.e., competence and autonomy need satisfaction) mechanisms explaining their impact. On the basis of these findings, coaches are discouraged to use negative, normative feedback. Although some coaches believe such feedback may increase effort-expenditure, with athletes feeling pressured to demonstrate their capabilities, these motivational benefits may be short-lived (Pelletier, Fortier, Vallerand, & Brière, 2001; Ryan, Koestner, & Deci, 1991) and may open the door for feelings of helplessness in case of continued failure (Abramson, Seligman, & Teasdale, 1978). Furthermore, the current findings highlight potential downsides of the frequently used controlling communication by coaches (Halperin, Chapan, Martin, Abiss, & Wulf, 2016). One potential reason why coaches are tempted to rely on controlling communication is that they fear being perceived as too soft and lose their grip on the training environment. Findings of the current dissertation may help remove some of the skepticism expressed by coaches as tennis players who received feedback in an inviting way were found to challenge themselves to a greater extent during free-choice play.

(DE)MOTIVATING EFFECTS OF OFFERING CHOICE

Option and Action Choice. To gain a more refined and causal insight in the role of choice in the prediction of rope skippers' autonomy need satisfaction, engagement and intended perseverance, an experimental field study among 159 recreational rope skippers (M_{age} = 17.2; Chapter 6) was conducted. One no-choice control group and three different choice conditions were operationalized, with athletes being either offered the opportunity to choose a preferred exercise from a menu of three options (i.e., option choice) or to choose the order of performing three exercises (i.e., action choice). Two types of option choice conditions were created, with the variation in the attractiveness of the offered options being extensive in the one condition (i.e., high-contrast option choice) and more limited in the other condition (i.e., low-contrast option choice).

Although all three choice conditions promoted athletes' autonomy need satisfaction, they yielded differential effects on engagement and intended persistence. While the high-contrast option choice promoted these two outcomes, these benefits were not observed in the case of low-contrast option choice. The effects of action choice fell in-between, with athletes' engagement but not heir intended perseverance being enhanced compared to the control group. For all three choice conditions, autonomy need satisfaction served as an intervening mechanism indicating that to the extent choice had enhanced a sense of volition rope skippers also reported enhanced engagement and greater intended perseverance. Finally, limited evidence for the moderating role of indecisiveness, an individual difference variable reflecting chronic difficulties to make decision over situations and domains (Crites, 1969; Osipow, 1999), was obtained. Specifically, rope skippers high in indecisiveness benefited somewhat less from high-contrast option choice in terms of autonomy need satisfaction, but not in terms of engagement and intended perseverance. No moderation effects were observed for the two other types of choice.

Summary and practical implications. In short, the findings of Chapter 6 suggest that not all types of choices are equally motivating. At the same time, they all impact on athletes' autonomy need satisfaction which, in

turn, comes with a number of benefits. In order to spur athlete engagement, coaches can either allow athletes to decide which exercises to perform (i.e., option choice) or allow them to choose how particular exercises are performed (i.e., action choice), with the former also increasing athletes' intended perseverance. Whereas option choice comes with most benefits, it also has the most pitfalls. A first pitfall of this strategy is for coaches to rely too often upon this strategy, and, as a consequence, providing insufficient structure and diminishing athletes' learning benefits. A second pitfall is to provide a menu of options which are similar to one another. Especially when offered options are all likely to be perceived as unattractive or not meaningful by athletes, the choice may come across as manipulative. When this is the case athletes feel that the coach has a hidden agenda and the choice is merely a strategy to force athletes to act according to that agenda, causing the benefits of choice provision to disappear. Therefore, action choice might be considered as a safer way to increase athlete engagement. In the case of action choice, coaches select the exercises that will be performed, thereby ensuring sufficient guidance. In doing so, they can provide choice regarding the order in which athletes perform the exercises, as in the current dissertation, or provide different types of action choice. For example, they can allow choice regarding the difficulty of the exercises (Leiker et al., 2016), the pace of progressing through activities (Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011), when to receive feedback (Janelle & Singer, 1996), or when to use an assistance device (Wulf & Toole, 1999).

GENERAL CONCLUSION

Given the physical, psychological and social benefits that are associated with regular sport participation and the observation that youth frequently drop out from sports during adolescence (Butcher et al., 2002), supporting youth athletes enduring motivation and engagement for sport is important. Results of the current dissertation indicate that the motivating role of coaches does matter, above and beyond the role of parents. A series of experimental studies zooming in on specific motivating practices indicate that coaches do well to refrain from providing negative and coercively communicated normative feedback. Such feedback awakens athletes' critical and demeaning inner voice, leading them to express greater negative self-talk. In turn, such negative self-talk undermines athletes' feelings of effectiveness, which subsequently predicts their reduced enjoyment, perseverance and performance, while increased the experienced tension during sport participation. At the same time, the offer of choice was found to hold the potential of enhancing athletes' feelings of volition, engagement and intended perseverance, although not all choices yielded equal positive effects. Especially choice with respect to the order of exercises (i.e., action choice) and the offer of options that largely differ in attractiveness (i.e., high-contrast option choice) came with the greatest benefits. Finally, individual differences were found to attenuate the effects of motivating practices. Self-critical perfectionism aggravated the competence undermining effect of negative feedback valence, while indecisiveness reduced, but not canceled out, the autonomy-enhancing effect of high-contrast option choice provision. In contrast, the effects of both motivating practices on outcomes were irrespective of these individual differences.

REFERENCES

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology*, *87*(1), 49–74. https://doi.org/10.1037/0021-843X.87.1.49

Butcher, J., Lindner, K. J., & Johns, D. P. (2002). Withdrawal from competitive youth sport: A retrospective ten-year study. *Journal of Sport Behavior*, *25*, 145–163.

Crites, J. O. (1969). *Vocational psychology*. New York, NY, US: McGraw-Hill.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Fraser-Thomas, J. L., Côté, J., & Deakin, J. (2005). Youth sport programs: An avenue to foster positive youth development. *Physical Education and Sport Pedagogy*, *10*(1), 19–40. https://doi.org/10.1080/1740898042000334890

Gaudreau, P., Morinville, A., Gareau, A., Verner-Filion, J., Green-Demers, I., & Franche, V. (2016). Autonomy support from parents and coaches: Synergistic or compensatory effects on sport-related outcomes of adolescent-athletes? *Psychology of Sport and Exercise*, *25*, 89–99. https://doi.org/10.1016/j.psychsport.2016.04.006

Halperin, I., Chapman, D. W., Martin, D. T., Abbiss, C., & Wulf, G. (2016). Coaching cues in amateur boxing: An analysis of ringside feedback provided between rounds of competition. *Psychology of Sport and Exercise*, *25*, 44–50. https://doi.org/10.1016/j.psychsport.2016.04.003

Janelle, C., Kim, J., & Singer, R. (1995). Subject-controlled performance feedback and learning of a closed motor skill. *Perceptual and Motor Skills*, *81*(2), 627–634. https://doi.org/10.2466/pms.1995.81.2.627

Leiker, A. M., Bruzi, A. T., Miller, M. W., Nelson, M., Wegman, R., & Lohse, K. R. (2016). The effects of autonomous difficulty selection on engagement, motivation, and learning in a motion-controlled video game task. *Human Movement Science*, *49*, 326–335. https://doi.org/10.1016/j.humov.2016.08.005

Mouratidis, A. A., Vansteenkiste, M., Sideridis, G., & Lens, W. (2011). Vitality and interest-enjoyment as a function of class-to-class variation in need-supportive teaching and pupils' autonomous motivation. *Journal of Educational Psychology*, *103*(2), 353–366. https://doi.org/10.1037/a0022773

Osipow, S. H. (1999). Assessing career indecision. *Journal of Vocational Behavior*, *55*(1), 147–154. https://doi.org/10.1006/jvbe.1999.1704

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*(4), 279–306. https://doi.org/10.1023/A:1014805132406

Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion*, *15*(3), 185–205. https://doi.org/10.1007/BF00995170

Ryan, Richard M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY, US: Guilford Press.

Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The sport anxiety scale-2. *Journal of Sport & Exercise Psychology*, *28*(4), 479–501. https://doi.org/10.1123/jsep.28.4.479

Vansteenkiste, M., Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick, *The decade ahead: Theoretical perspectives on motivation and achievement* (Vol. 16A, pp. 105–165). Bingley, UK: Emerald.

Wulf, G., & Toole, T. (1999). Physical assistance devices in complex motor skill learning: Benefits of a self-controlled practice schedule. *Research Quarterly for Exercise and Sport*, *70*(3), 265–272. https://doi.org/10.1080/02701367.1999.10608045

APPENDIX

Data Storage Fact Sheets

Data Storage Fact Sheet

Name/identifier study: DSFS De Muynck et al._Dissertation_Chapter2_2018

Author: Gert-Jan De Muynck

Date: 22/06/2018

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De Muynck, G.-J., Morbée, S., Soenens, B., Haerens, L., Vermeulen, O., Vande Broek, G. & Vansteenkiste, M. (2018). The unique and interactive contribution of (de)motivating coaching and parenting to youth soccer players' motivation and engagement. *Manuscript in preparation*.

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Data Storage Fact Sheet

Name/identifier study: DSFS De Muynck et al._DissertationChapter3 _2018

Author: Gert-Jan De Muynck

Date:22/06/2018

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Name/identifier study: DSFS De Muynck et al._JSEP_2017

Author: Gert-Jan De Muynck

Date:22/06/2018

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Data Storage Fact Sheet

Name/identifier study: DSFS De Muynck et al._DissertationChapter5_2018

Author: Gert-Jan De Muynck

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De Muynck, G.-J., Vansteenkiste, M., Vandenkerckhove, B., Vande Broek, G., & Soenens, B. (2018). The interplay between normative feedback and self-critical perfectionism on competitive tennis players' competence, affect, and cheating behavior: An experimental study. *Manuscript in preparation*.

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* Reference of the publication in which the datasets are reported:

De Muynck, G.-J., Vansteenkiste, M., Degraeuwe, L., Vande Broek, G., & Soenens, B. (2018). Towards a more refined insight in the critical motivating features of choice: An experimental study among recreational rope skippers. *Manuscript in preparation*.

* Which datasets in that publication does this sheet apply to?: Main Study

3. Information about the files that have been stored

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3a. Raw data

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* Have the raw data been stored by the main researcher? [X] YES / [ ] NO

If NO, please justify:

* On which platform are the raw data stored?

- [X] researcher PC
- [X] research group file server

- [ ] other (specify): ...

* Who has direct access to the raw data (i.e., without intervention of another person)?

- [X] main researcher

- [X] responsible ZAP

- [X] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

3b. Other files

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* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results. Specify: SPSS syntax file describing the transformation of raw data into the used variables, and parcels needed for analysis in Mplus.

- [X] file(s) containing processed data. Specify: .dat file for analyses in Mplus

- [X] file(s) containing analyses. Specify: SPSS syntax file for the conducted analyses. Mplus file (.out) for the conducted analyses

- [ ] files(s) containing information about informed consent. Specify: ...

- [ ] a file specifying legal and ethical provisions. Specify: ...

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC
- [X] research group file server
- [ ] other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher
- [X] responsible ZAP
- [X] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

4. Reproduction

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* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:
- address:
- affiliation:
- e-mail: