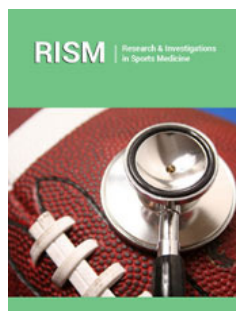


Perfectionism and Psychological Functioning in Sport Activity: Mediating Role of Basic Psychological Needs

ISSN: 2577-1914



Sacha Harnois^{1*}, Frédéric Langlois² and Paule Miquelon³

¹University of Quebec at Trois-Rivières, Canada

^{2,3}Department of Psychology, University of Quebec at Trois-Rivières, Canada

Abstract

It is demonstrated that the practice of a sport activity (SA) can bring significant benefits [1-3] and negatives outcomes [4-8]. Perfectionism is a personality trait that can influence the psychological functioning of athletes [9]. Nevertheless, two dimensions of perfectionism (i.e., personal high standards (PHS) and perfectionistic concerns (PC)), alone, don't fully explain the quality of individuals' psychological functioning [10,11]. Basic psychological needs (BPN) can also explain the quality of athletes' psychological functioning [12-15]. The aim of this study is to examine the relation between two dimensions of perfectionism, satisfaction and frustration of basic psychological needs (BPN), and psychological functioning in sport (i.e., positive emotions (PE) and negative emotions (NE) and flow state) in an adult population practicing individual/team SA. 304 participants practicing a SA at least once a month were retained for the analysis (42% men and 58% women; mean age was 32.65 years (SD = 12.05)). Results suggests that BPN satisfaction and frustration are two distinct constructs, as Bartholomew, Ntoumanis, Ryan & Thogersen-Ntoumani [16] underlined. In both models, PHS is positively and directly associated with positive psychological functioning and PC is directly associated to negative psychological functioning. Also, satisfaction of the need for competence is a mediator that may limit the negative effects of PC. Finally, it appears that the frustration of the need for social belonging is significant mediator of the relation between PC and psychological functioning. Frustration of the need for autonomy is a significant mediator of the relation between both dimension of perfectionism and NE. These results highlight the importance of assessing satisfaction and frustration of BPN to better understand how they can influence psychological functioning of individuals that present high level of PC. Future studies should attempt to target causal relationships between BPN, dimensions of perfectionism and functioning in SA.

Keywords: Perfectionism; Basic psychological needs; Positive and negative emotions; Flow state; Well-Being; Sports, Motivation, Performance

Abbreviations: SA: Sport Activity; PC: Perfectionistic Concerns; PHS: Personal High Standards; BPN: Basic Psychological Needs; SDT: Self-Determination Theory; PE: Positive Emotions; NE: Negative Emotions; SAT: Satisfaction; FRU: Frustration; AUT: Autonomy; BEL: Belonging; COMP: Competence

Introduction

It is currently well demonstrated that the practice of a sports activity (SA) can bring significant benefits, both in terms of physical and psychological health. In this regard, a meta-analysis by Kramer & Erikson [1] showed the robust positive effects that a SA could generate on cognition and the level of well-being. Maher & et al. [2] also showed that the practice of a SA significantly improved daily subjective well-being in adults. Furthermore, a recent study by Faulkner [3] revealed that being positively invested in the practice of a SA was associated with a greater feeling of well-being and better mental health, while decreasing the level of stress, as well as depressive and anxiety symptoms.

However, it has also been shown that the practice of a SA could be associated with anxiety, anger [4], depressive symptoms, eating disorders [5], substance abuse, burnout, stress,

***Corresponding author:** Sacha Harnois, University of Quebec at Trois-Rivières, 3351 Blvd des forges, Trois-Rivières, Québec, Canada

Submission:  August 30, 2022

Published:  October 14, 2022

Volume 9 - Issue 1

How to cite this article: Sacha Harnois, Frédéric Langlois, Paule Miquelon. Perfectionism and Psychological Functioning in Sport Activity: Mediating Role of Basic Psychological Needs. *Res Inves Sports Med.* 9(1), RISM.000705. 2022. DOI: [10.31031/RISM.2022.09.000705](https://doi.org/10.31031/RISM.2022.09.000705)

Copyright © Sacha Harnois. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use and redistribution provided that the original author and source are credited.

performance pressure [17] and insomnia [6]. These psychological difficulties deserve to be considered in a sports context since they can play a fundamental role in the development of fatigue, tension, confusion, anger and depressive symptoms [7]. Furthermore, these last symptoms can then reduce the optimal level of performance in athletes [7]. SA must therefore be associated with good emotional self-regulation for mood and performance to be optimal [8]. In short, the practice of a SA is associated with benefits as well as with disadvantages, both in terms of physical and psychological health.

That being said, which variables determine emotional functioning in a SA and in sports? According to Gaudreau & Thompson [9], perfectionism is a personality trait that can influence the psychological functioning of athletes. According to these authors, perfectionism is a multidimensional disposition of the personality representing a tendency to seek perfection and to evaluate oneself critically. A recent meta-analysis has shown that between 1989 and 2016, the average level of perfectionism had increased over the past three decades among the adult student population [18]. This meta-analysis also reports an increase in symptoms of depression, anxiety, suicidal thoughts, feeling of loneliness, eating disorders and body dysmorphia related to perfectionism. It would not be surprising if perfectionism also had negative impacts in a sports context. For all of these reasons, it is relevant to question the role played by perfectionism when practicing a SA.

Several conceptual models have been developed to explain the phenomenon of perfectionism [9,19,20]. In recent years, several studies have supported a two-dimensional conceptualization of perfectionism, represented by perfectionistic concerns (PC) and the pursuit of personal high standards (PHS) [21]. PC, often considered the unhealthy side of perfectionism, are characterized by social pressure to target perfection, combined with a propensity to evaluate oneself harshly, and to doubt one's ability to evolve according to high standards [9]. These concerns are positively related to performance anxiety, fear of failure and avoidance of personal goals [22]. Therefore, perfectionistic concerns predict more symptoms of depression [23], anxiety [24] and burnout [25]. Gaudreau & Verner-Filion [26] suggest that socially prescribed perfectionism (a construct similar to PC) is associated with a lower sense of well-being and satisfaction in athletes. As for the PHS, it is often presented as the healthy dimension of perfectionism and indicates the tendency to set high personal standards and consciously try to achieve them [9]. According to Stoeber [22], the PHS demonstrates a more favorable emotional and motivational quality, which can motivate athletes to work and perform more. The PHS is positively associated with self-confidence, the desire to succeed in achieving one's goals, and objective performance [22]. This more adaptive type of perfectionism is also associated with greater self-compassion, optimism [27] and internal attribution of success [28]. Hill & et al. [29] meta-analysis argues, after reviewing 52 studies on the relationship between perfectionism, well-being, motivation, and performance, that PC is clearly maladaptive for the psychological functioning of athletes, whereas the situation appears to be more complex for PHS where, it can generate both

positive and negative consequences on the level of psychological functioning.

Nevertheless, research has shown that the two dimensions of perfectionism alone do not fully explain the quality of individuals' psychological functioning in their sport [10,11]. Basic psychological needs (BPN) is another factor that can explain the quality of athletes' psychological functioning [12-15]. According to self-determination theory [SDT; 30,31], three BPN must be satisfied to ensure optimal functioning in humans [32, 33] namely, the need for competence, social belonging and autonomy. The need for competence refers to the desire to have an impact on one's environment and the positive results that this brings [32]. The need for social belonging refers to the desire to feel connected to others, to love and to be loved. Finally, the need for autonomy refers to the individual's will or desire to organize his/her own experiences and behaviors and to make them a coherent whole with him/herself [31]. According to Deci & Ryan [32], satisfaction with these three BPN revitalizes the individual's available energy and predicts better performance in several areas, such as work, interpersonal relationships, parenting, education, psychotherapy and sports. However, the frustration of these needs would lead individuals to turn to extrinsic motivations [32]. In this case, the individual may have difficulty integrating his/her behaviors into his/her identity and, consequently, feeling a sense of well-being [32-33]. In short, the frustration of the three BPN proposed by the SDT would lead to pathology, whereas their satisfaction would lead to well-being [34].

Although it seems natural to assume that satisfaction and frustration are antitheses, the results of a study by Bartholomew & et al. [16] suggest that frustration of BPN remains independent of their satisfaction. For this reason, it becomes essential to consider both the satisfaction and the frustration of BPN [34] when studying their impact in a domain of functioning, including the practice of SA. Until now, no study has examined the direct relation between perfectionism dimensions and satisfaction and the frustration of BPN in an adult sports population, which is why we are interested in the study by Mallinson & Hill [35] who examined the relation between the two dimensions of perfectionism and the frustration of BPN in a sample of adolescent athletes. Their results revealed that higher levels of PC were associated with a higher level of BPN frustration. In addition, some studies have examined the mediating role of BPN satisfaction or frustration on the relation between perfectionism and psychological functioning in athletes. For example, Costa & Oliva [10] showed that BPN frustration was an important mediator of the relation between unhealthy perfectionism (using the two unhealthy scales in the model of Frost & et al. [36], i.e., concerns about mistakes and doubts regarding action) and dependence on physical exercise in a population of 169 adults. More frustrated BPN and higher pathological perfectionism were associated with greater pathological symptoms of dependence on exercise. Given the lack of literature on an adult sports population regarding the indirect relations linking perfectionism and BPN, we consider the study by Jowett & et al. [11], who observed a negative relation between PC and engagement in sports through BPN satisfaction (as

a mediating variable) in a sample of adolescent athletes. As for PHS, it led in this study to a higher level of sports engagement through BPN satisfaction (also as a mediating variable).

In sum, it has been shown that perfectionism and BPN satisfaction and frustration are variables that can explain the variance in the psychological functioning of individuals who practice a SA, using functioning variables such as engagement in the activity. However, other facets of psychological functioning during the practice of a SA have not yet been examined. A proven way to measure psychological functioning in sports is to use the concept of flow. Csikszentmihaly & Csikszentmihaly [37] describe flow as an experience in an individual who is in an emotional state characterized by effortless pleasure in engaging in a task. Thus, the person feels fully involved in the task, he/she has the impression of being united with the activity, exercising full control over his/her abilities. This emotional state, which these authors call the flow state, greatly helps to perform to the best of one's abilities and with confidence. According to Stein & Jackson [38], the flow state occurs when a person perceives a balance between the challenges associated with a task and his/her own abilities. Until now, few researchers have tested the relation between BPN satisfaction and flow state in athletes.

However, in their four studies conducted with an adult sports population, Schüler & Brandstätter [39] found positive relations between BPN satisfaction and the flow state. Fazlagic & Belic [40] explored the relation between perfectionism and the flow state with 50 adult athletes. To assess perfectionism, the authors used the Frost & et al. [36], which has six subscales (concerns about mistakes, doubts about actions, personal standards, parental expectations, parental criticisms, and organization). The results of their study revealed that only the concerns about mistakes subscale was significantly and negatively correlated with the flow state. Of note, this subscale is very close to the PC of Gaudreau & Thompson's [9] two-dimensional model.

Among the various concepts that can explain the quality of athletes' psychological functioning, there is also the tendency for an individual to experience Positive Emotions (PE) and Negative Emotions (NE) in the practice of his/her sport. According to Gaudreau & Blondin [41], a person experiencing positive emotions exhibits an optimal state of energy, concentration, and commitment, which can manifest itself, among other things, by a feeling of alertness, attention, determination, enthusiasm and pride towards the task performed. On the other hand, an individual experiencing negative emotions exhibits a feeling of distress and a difficulty of commitment, which can be manifested, for example, by a feeling of fear, shame, nervousness, guilt, and irritability.

Some studies have focused on the link between perfectionism and PE as well as NE. In particular, Deck & et al. [42] showed, in a sports population made up of 182 adult students, that individuals who had a perfectionism oriented towards their personal standards (according to the model of Flett & Hewitt [43]) demonstrated more enthusiasm during the practice of physical exercise. Conversely,

their results showed that a socially prescribed (or maladaptive) perfectionism was associated with a lower level of enthusiasm for the activity. Another study conducted by Flett, Blankstein & Hewitt [44], with a sample of 92 adult female students (non-athletes), revealed that a maladaptive perfectionism (according to the model of Flett & Hewitt, [43]), was associated with fewer PE and more NE. In addition, an adaptive perfectionism was associated with more PE and fewer NE. Similar results were also observed in studies by Prud'homme & al. [45] and Richard & et al. [46], also conducted with an adult (non-athlete) population. However, Castro & et al. [47] showed that, in an adult student population of 344 individuals (non-athletes), the presence of NE was associated with a higher level of perfectionism, both adaptive and maladaptive (according to the models of Hewitt and Flett [19] and Frost & et al. [36]). According to these researchers' results, the presence of PE was associated with a lower level perfectionism, both adaptive and maladaptive.

Other studies have examined the link between PE, NE and BPN. Gunnell & et al. [48] showed that, in a sample of 155 adults practicing a SA, BPN satisfaction positively predicted PE and negatively predicted NE. Conversely, BPN frustration negatively predicted PE, but did not positively predict NE. In a study conducted with 203 adult students practicing a SA, Puente & Anshel [49] found that higher levels of self-determined motivation (through satisfaction of the need for competence and autonomy) promoted PE and the frequency of the SA. A study by Teixeira & Antonio [50], conducted with a sample of 153 adults practicing a SA, showed that BPN satisfaction was associated with PE, whereas BPN frustration was associated with NE during a SA practice. Finally, with a sample of 198 adult athletes, Wilson & et al. [51] showed that the satisfaction of BPN (more specifically the satisfaction of the needs for autonomy and competence) promoted PE more than NE in the practice of the SA. That said, to our knowledge, no study has yet measured the relation between perfectionism dimensions, BPN satisfaction/frustration and psychological functioning in an adult sports population.

The Present Study

The objective of this study is to examine the relation between the two dimensions of perfectionism (i.e., PHS and PC), BPN satisfaction and frustration, and psychological functioning in sport (i.e., PE and NE, as well as flow state) in an adult population practicing individual or team SAs. First, analyses will verify whether the concepts of BPN satisfaction and frustration are two distinct constructs. Secondly, we will determine whether the relation between the two dimensions of perfectionism and individuals' psychological functioning during the practice of the SA is explained or mediated by the satisfaction and frustration of BPN (i.e., the need for autonomy, competence and social belonging).

To our knowledge, no study has yet simultaneously examined the determinants and consequences of satisfaction and frustration of the three BPN in an adult sports population. However, several authors maintain that there is a difference between these two constructs [16] and that it is important to study both the level

of satisfaction and frustration of BPN. Therefore, the major contribution of this study will be to consider both the “satisfaction” and “frustration” dimensions of each BPN to explain the relation between the two dimensions of perfectionism and the psychological functioning in adults within a sports context. It is expected that: 1) BPN satisfaction and frustration are distinct constructs due to their negative relation and the sharing of a moderate covariance; 2) PHS is positively associated with PE and the flow state, but negatively associated with NE; 3) PC are positively associated with NE, but negatively associated with the flow state and PE; and 4) the two factors of perfectionism have an indirect effect on psychological functioning in a sports context through BPN satisfaction and frustration.

Method

Participants and procedures

A total of 810 French-speaking adults practicing a SA (individual

or in a team), aged between 18 and 72, participated in the study. The most reported SAs included hockey, badminton, aerobic training, cycling, martial arts and running. Questionnaires were completed online using the Survey Monkey platform. Participants were recruited through the Facebook social network. A publication containing the eligibility criteria (practicing a SA at least once a month and being at least 18 years old) as well as the nature and duration of the study was shared on various university and sports Facebook pages. People interested in participating in the study could access the questionnaire by clicking on a hyperlink. At the beginning of the questionnaire, the information associated with the informed consent to the study was presented to the participants, who then answered the other questions after having agreed to take part in the research. The duration of individual administration of the questionnaire, on a voluntary basis, was about twenty minutes. In total, the recruited sample comprised 42% men and 58% women. The mean age was 32.65 years ($SD = 12.05$). The other characteristics of the sample are presented in Table 1.

Table 1: Sociodemographic characteristics of participants.

Variables Results								
Age	M	32.65	SD	12.05				
Nationality	Canadian	60%	French	40%				
Sex (controlled)	Men	42%	Women	58%				
Level of education	University	73%	College	13%	Vocational studies	9%	High school	2%
Employment status	Full time	78%	Part time	10%				
Type of employment	Employed	58%	Student	32%	Unemployed	4%	Retired	4%
Marital status	Single	49%	Common law	30%	Married	18%		
Annual income	Less than 30,000\$	49%	Between 30,000\$ and 60,000\$	25%	Between 60,000\$ and 100,000\$	15%	More than 100,000\$	12%
Sport practiced (controlled)	Individual	75%	Team	25%				
Average duration of sports activity	Less than an hour	50%	Between 1h and 1h30	25%	More than two hours		25%	
Weekly frequency of sports activity	Less than three times per week			60%	Four times per week and more		40%	
Years practicing the sport		Less than three years			27%	More than three years		73%
Sports level	Recreational			60%	Competitive / professional		40%	
Former injuries linked	70% had an injury linked to the to the sport sport activity chosen							
Impact of injury on the practice of the sport	Moderately or a lot			35%	Very little or none		65%	

Measures

Self-reported questionnaires were administered to participants. The following section presents a description of the measures used.

Sociodemographic questionnaire

A sociodemographic questionnaire was developed by the researchers to gain a better knowledge of the participants'

characteristics. Variables such as age, sex, type of SA practiced, level of practice (recreational/competitive) as well as the frequency of SA practice were measured (Table 1).

Revised perfectionism questionnaire

The Revised Perfectionism Questionnaire (Revised PQ; [52]) was used to measure the two-dimensional perfectionism in the

participants. This questionnaire is a short version of the original questionnaire [53]. This version is composed of two subscales, the PHS and the PC, and includes 20 items: seven assessing the PHS (e.g., "I always try to succeed in everything I do") and 13 evaluating PC (e.g., "I feel uncomfortable as long as things are not perfect"). These items are rated using a five-point Likert-type scale ranging from 1 (does not describe me at all) to 5 (describes me completely). The structure of the short version was validated using a confirmatory analysis [54]. In the present study, the two subscales of this questionnaire show good reliability with Cronbach's alphas of .81 for the PHS and .95 for PC.

Scale of satisfaction of basic psychological needs in a sports context

The questionnaire on the satisfaction of basic psychological needs in a sports context [55] was used to measure BPN satisfaction among participants. This questionnaire includes three subscales: perception of satisfaction of the need for autonomy, perception of satisfaction of the need for social belonging and perception of satisfaction of the need for competence. It comprises 15 items, five of which assess the perception of satisfaction of the need for autonomy (e.g., I feel free to make my choices), five evaluate the need for social belonging (e.g., I have a lot of sympathy for the people with whom I interact), and five assess the need for competence (e.g., I have the feeling of doing well). For the dimension associated with the perception of competence, three items [3,12,15] are reversed. These items are rated using a four-point Likert-type scale (0 = Not applicable, 1 = Not at all true, 2 = Moderately true, and 3 = Completely true). A Spearman-Brown adjustment calculation [56] was performed to estimate the reliability of the subscales when a scale has fewer than 8 items [57]. Following adjustment, the subscales demonstrate satisfactory internal consistency, with Cronbach's alphas of .83 (autonomy), .77 (social belonging) and .80 (competence). The instructions for answering this questionnaire have been adapted (In general, when I practice my sports activity...) in order to include the practice of both recreational and competitive SA.

Scale of frustration of basic psychological needs in a sports context

The scale of frustration of basic psychological needs in a sports context [58] was used to measure the frustration of basic psychological needs among participants. This questionnaire includes three subscales: the perception of the frustration of the need for autonomy, the perception of the frustration of the need for social belonging and the perception of the frustration of the need for competence. The scale has 11 items, four of which assess the perception of the frustration of the need for autonomy (e.g., I do not have the possibility of making choices in the management of my training), four evaluate the perception of the frustration of the need for competence (e.g., There are situations where I feel inadequate) and three assess the perception of the frustration of the need for social belonging (e.g., I think that others ignore me). These items are rated using a four-point Likert-type scale

(0 = Not applicable, 1 = Not at all true, 2 = Moderately true, and 3 = Completely true). Originally, this questionnaire was validated with an adult sports population. It should also be noted that the validity article on this questionnaire, written by Martinet & Moiret [58], does indeed indicate a significant distinction between the constructs of frustration and satisfaction of basic psychological needs. A Spearman-Brown adjustment calculation [56] was also performed for the subscales of this questionnaire due to the small number of items [57]. With adjustment, the subscales demonstrate satisfactory internal consistency, with Cronbach's alphas of .76 (autonomy), .86 (social belonging) and .83 (competence). The instructions for answering this questionnaire have been adapted (In general, when I practice my sports activity...) in order to include the practice of a recreational as well as a competitive SA.

Inventory of positive and negative emotions

A French version of the inventory of positive and negative emotions (or PANAS, [59]), validated by Gaudreau & Blondin [41] with more than 500 adult athletes, was used to measure positive and negative emotions among participants. This questionnaire has a total of 20 items and measures participants' emotions by distinguishing two factors: positive emotions (10 items) (e.g., attentive, interested and enthusiastic) and negative emotions (10 items) (e.g., distressed, irritable and restless). The items were rated using a five-point Likert-type scale (1 = Very little or not at all, 2 = A little, 3 = Moderately, 4 = A lot, 5 = Very much). The Cronbach's alphas in the present study are .84 for negative emotions and .83 for positive emotions. The instructions have been adapted so that participants focus on their emotional experience during the practice of their sport. The instructions were as follows: "The next section of this questionnaire contains adjectives that describe feelings and emotions. For each of these adjectives, indicate to what extent it describes how you generally feel when you practice the sports activity that you indicated in answer to question 11 of this questionnaire".

Flow state scale

The Flow State Scale [60] was used to measure participants' flow state, described as an optimal psychological state to engage in an activity and experience PE during that activity. This scale has a total of 36 items and includes nine sub-scales: challenge (four items), action (four items), clear goals (four items), unambiguous feedback (four items), concentration (four items), loss of self-awareness (four items), time transformation (four items), autotelic experience (four items), and sense of control (four items). Items were rated using a Likert-type scale (1 = Totally disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly Agree). This questionnaire generally uses an overall score grouping together the nine Flow subscales. In the present study, the Cronbach's alpha for this mean global score is .92. The instructions for answering this questionnaire have been adapted (In general, when I practice my sports activity...) in order to include the practice of a competitive as well as a recreational SA.

Analysis

First, the procedures proposed by Tabachnick & Fidell [61] were used to identify outliers and missing data using the IBM Statistics SPSS software (version 27.0.1.0). Thus, even if 814 individuals participated in the study, only 304 participants were retained for the analyses because many had not completed at least 60% of the questionnaires. Descriptive analyses were then performed to determine the average of each variable and the normality of their distributions. The multivariate normality analyses revealed an abnormality of the data. However, the sample was kept as is, given the use of the bootstrap method ($B = 5000$), which remains robust to standard errors when structural equations are conducted with a sufficiently large sample ($n > 200$) that does not respect the criteria of normality [62]. Correlational analyses performed using the bootstrap method (5000) were therefore conducted to test the distinction between the constructs of satisfaction and frustration of BPN, with the aim of determining whether only one or two theoretical models should be used to examine the relations with perfectionism and psychological functioning in the sports context. These analyses revealed that satisfaction and frustration of basic psychological needs were distinct constructs and that two theoretical models should be used to examine the relations between perfectionism, BPN and psychological functioning in the sports context.

Subsequently, analyses by structural equations modeling were conducted with the AMOS software in order to test the two theoretical models by path analyses. The advantage of path analysis is to consider all the relations between the variables presented within the same model. The two theoretical models aimed to examine the direct and indirect links of both factors of perfectionism on psychological functioning in a sports context, through the satisfaction of BPN in the first model, and the frustration of BPN in the second. In these two models, BPN satisfaction and

frustration were considered as mediators of the relation between the two dimensions of perfectionism and psychological functioning in a sports context, measured using PE, NE, as well as the Flow state. Regarding the fit indices of these two models, it should be noted that the Root Mean Square of Approximation (RMSEA) is considered acceptable if it is less than .05, while the Comparative Fit Index (CFI) and the Normed Fit index (NFI) are acceptable if they are equal to or greater than .90.

The bootstrap method (5000) was used to test the indirect links between perfectionism and psychological functioning in a sports context, through the influence of BPN satisfaction and frustration. This method tests statistical inference by simulating data from a limited number of sample participants. This procedure was adequate for our data, as it has been demonstrated that, with structural equation analyses, the use of the bootstrap allows valid statistical analyses when the distribution is abnormal [62]. Finally, moderation analyses were also performed to examine the impact of differences associated with gender (man or woman) as well as the type of sport practiced (individual or team) on the links between the variables of each of the two models. As the results obtained for the moderation analyses showed no significant effect of gender or type of sport practiced on the links between the variables, they are not presented.

Result

Descriptive statistics

Within the sample, the mean scores observed for the perfectionism scale are $M = 26.11$; $SD = 5.11$ for PHS and $M = 34.84$; $SD = 13$ for PC. The mean scores observed for BPN satisfaction are $M = 37.8$; $SD = 4.65$ and $M = 15.51$; $SD = 3.85$ for BPN frustration. Finally, the mean scores observed on the different scales of psychological functioning in a sports context are $M = 141.12$; $SD = 14.76$ for Flow state, $M = 39.9$; $SD = 19.8$ for PE and $M = 16.7$; $SD = 5.6$ for NE.

Correlations

Table 2: Correlations between satisfaction and frustration of basic psychological needs.

	AUT FRU	BEL FRU	COMP FRU
AUT SAT			
r	-.41**	-.32**	-.20**
Sig	<.001	<.001	<.001
R ²	0.168	0.102	0.04
BEL SAT			
r	-.24**	-.26**	-.53**
Sig	<.001	<.001	<.001
R ²	0.057	0.067	0.281
COMP SAT			
r	-.33**	-.61**	-.37**
Sig	<.001	<.001	<.001
R ²	0.109	0.372	0.137

Note. Correlations conducted with the bootstrap method (5000)

SAT: Satisfaction; FRU: Frustration; AUT: Autonomy; BEL: Belonging; COMP: Competence.

r: Pearson correlation; Sig: significance level; R²: Determination coefficient

** p < .01

Pearson correlations, conducted using the bootstrap method (5000), were performed between the dimensions of satisfaction and frustration of the three BPN. As can be seen in Table 2, the results of these analyses reveal moderate negative relations between satisfaction and frustration of each of the three BPN. The correlation between satisfaction and frustration of the need for autonomy is moderate ($r(302) = -.41, p < .05$) and the same is true for the relation between satisfaction and frustration of the need for competence ($r(302) = -.37, p < .05$). The correlation between satisfaction and frustration of the need for social belonging is rather weak ($r(302) = -.26, p < .05$). It should be noted that Table 2 also presents the percentage of explained variance or the coefficient of determination (which is equal to the square of the correlation between the two variables multiplied by 100) between the satisfaction and the frustration of each of the three BPN. More specifically, the coefficients of determination are respectively 17%, 0.6% and 14% for the relation between satisfaction and frustration of the need for autonomy, the relation between satisfaction and frustration of the need for belonging, and the relation between satisfaction and frustration of the need for competence. These results suggest that the satisfaction and frustration for each of the three needs are distinct constructs that could have different

relations with psychological functioning in a sports context. For this reason, two path analysis models were performed to separately examine the mediating role of BPN satisfaction and frustration in the relation between perfectionism and psychological functioning in a sports context.

Path analyses

The first path analysis model aimed to test the presence of direct links between PHS, PC and psychological functioning in a sports context (measured by the flow state, PE and NE) as well as the presence of indirect links between these two variables through BPN satisfaction. The results are presented in Figure 1. They reveal the existence of a direct positive link between the PHS and the flow state as well as PE. Results also indicate that PC are positively and significantly associated with NE, whereas they are negatively and significantly associated with satisfaction of the three BPN. The strength of the negative relation between PC and satisfaction of the need for competence is moderate. In addition, results show that satisfaction of the need for competence is weakly and negatively associated with NE, whereas it is moderately and positively associated with flow state and PE. As for the indirect effects, the bootstrap method was used to analyze their magnitude and significance. The mediating role of the satisfaction of the need for competence in the relation between PC and flow, PE and NE is significant ($p < .01$). More precisely, PC indirectly predict, through the satisfaction of the need for competence, NE ($\beta = 0.04, CI95\% [0.02; 0.07]$), PE ($\beta = -0.06, CI95\% [-0.10; -0.03]$) as well as the flow state ($\beta = -0.08, CI95\% [-0.11; -0.05]$).

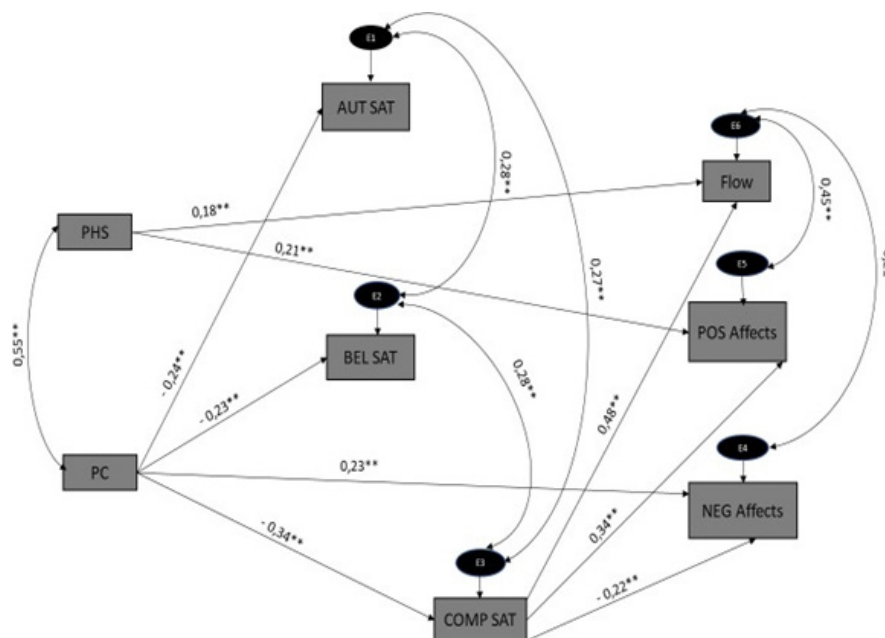


Figure 1: Results of the path analysis performed by structural equations to test the model examining the relation between the factors of perfectionism, the satisfaction of basic psychological needs and psychological functioning in a sports context.

*p < .05

**p < .01

SAT: Satisfaction; AUT: Autonomy; BEL: Belonging; COMP: Competence; POS: Positive; NEG: Negative

Given the large number of participants, the chi-square ratio was used to determine model fit. Since the chi-square value is 32.35 and the number of degrees of freedom is 13, the chi-square ratio is 2.49, which is acceptable according to the guidelines. Indeed, Kline [63] suggests that if the value of the chi-square ratio is between two and three, it is acceptable. It should be noted that the fit indices of the path analysis model, namely the CFI, the NFI and the RMSEA, are adequate given that their respective values are 0.96, 0.94 and 0.07 [0.01-0.09]. In other words, the fit indices demonstrate a good fit between the data and the first model.

The second path analysis model tests the same relations as the first model but in this one, the mediators are BPN **frustration**. The results are presented in Figure 2. They reveal the existence of a direct and positive link between the PHS and the flow state as well as PE. Results also reveal the existence of a direct and negative link between the PHS and the frustration of the need for autonomy. Results show a direct and positive link between PC and NE, and a direct and negative link between PC and flow state as well as PE. In addition, results show that PC have a direct and positive link (of moderate intensity) with the frustration of each of the three BPN. As for frustration of the need for belonging, it is weakly and

negatively associated with PE, and moderately associated with flow state, whereas it is positively and weakly associated with NE. In addition, frustration of the need for autonomy is moderately and positively associated with NE.

The bootstrap method was again used to analyze the magnitude and significance of indirect effects. The results reveal that the PHS indirectly and significantly predicts NE through the frustration of the need for autonomy ($p < .05$; $\beta = -0.03$, CI95% [0.06;0.01]). In addition, PC indirectly predict NE through the frustration of the need for autonomy ($p < .01$; $\beta = 0.07$, CI95% [0.05; 0.11]) and for social belonging ($p < .05$; $\beta = 0.04$, CI95% [0.01; 0.07]), and they also predict indirectly, through the frustration of the need for social belonging, the flow state ($p < .01$; $\beta = -0.06$, CI95% [-0.09; -0.04]) as well as PE ($p < .05$; $\beta = -0.03$, CI95% [-0.07;-0.01]).

Since the chi-square value is 14.08 and the number of degrees of freedom is 9, the chi-square ratio is 1.56, which is again acceptable as recommended by Kline [63]. It should be noted that the fit indices of the path analysis model, namely the CFI, the NFI and the RMSEA, are adequate given that their respective values are 0.99, 0.98 and 0.04 [0.00-0.08]. In other words, the fit indices demonstrate an excellent fit of the second model with the data.

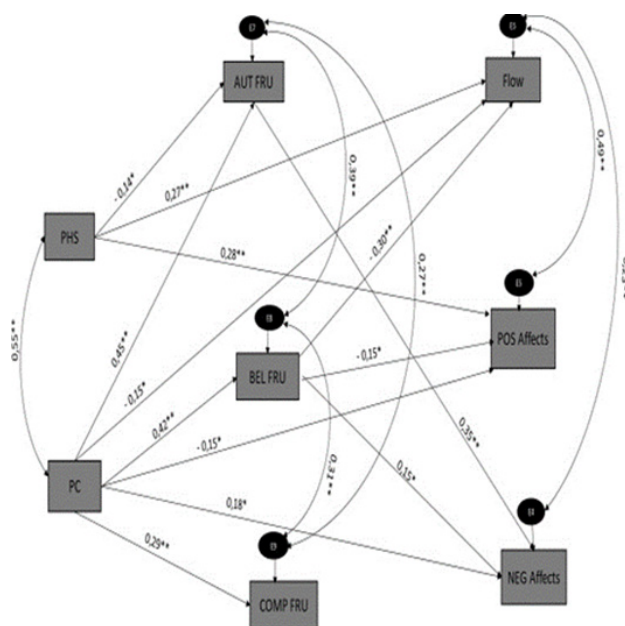


Figure 2: Results of the path analysis performed by structural equations to test the model examining the relation between the factors of perfectionism, the frustration of basic psychological needs and psychological functioning in the sports context.

* $p < .05$

** $p < .01$

FRU: Frustration; AUT: Autonomy; BEL: Belonging; COMP: Competence; POS: Positive; NEG: Negative

Discussion

The main objective of this study was to explore the mediating role of satisfaction and frustration of BPN (autonomy, competence and belonging) in the relation between the two factors of perfectionism (PHS and PC) and the level of psychological

functioning in a sports context, measured by the flow state as well as PE and NE. Four hypotheses were proposed regarding the direct and indirect links between the two factors of perfectionism and psychological functioning in a sports context.

Regarding the first hypothesis, the results suggest that BPN satisfaction and frustration are indeed two distinct constructs. As Bartholomew & Thogersen-Ntoumani [16] underlined, we observe an inverse and moderate relation between the two constructs. However, the two concepts share a low percentage of variance. These results support the position of Rodrigues & et al. [64] who suggest that the two constructs are quite distinct and that they can coexist in the same individual during the practice of his/her SA. For example, an individual who practices running alone may see his/her need for competence satisfied by achieving his/her own goals, while being frustrated in his/her need for social affiliation by not sharing this activity with others.

According to the second hypothesis, the PHS should positively predict PE and flow state, whereas it should negatively predict NE. In the two path analysis models, the PHS positively predicts flow state and PE, which partially confirms this hypothesis. The BPN frustration model seems to suggest that a strong PHS might act as a protective factor against BPN frustration in a sports context. These results corroborate those of Mallinson & et al. [65], which showed that perfectionism oriented towards one's own aspirations is associated with a more positive sports experience. However, the results do not support the second part of the hypothesis, which stipulates that the PHS is negatively related to NE. Indeed, they do not show a direct negative and significant relation between the PHS and NE. These results support those of Gotwals & et al. [66], which showed that the PHS was associated with adaptive characteristics, but rarely with maladaptive ones. The results of the present study therefore reveal that the PHS is positively associated with flow and PE, but that it does not reduce the risk of experiencing NE in a sports context.

According to the third hypothesis, PC should positively predict NE whereas they should negatively predict the flow state and PE. This hypothesis was also partially confirmed. Concerning NE, the results show that PC are indeed positively linked to them and that this link is stronger in the BPN satisfaction model than in the frustration model. This could be explained by the fact that the relation between BPN frustration and NE is relatively important, thus decreasing the strength of the direct link with PC. These results are in line with those of Frost & Henderson [67], who also showed that individuals who obtained a high score on the PC dimension also reported experiencing more anxiety, having less self-confidence in their sport, and experiencing more failures. Regarding the relation between PC, the flow and PE, the results obtained in the BPN satisfaction model do not reveal any significant relations between these variables. However, in the BPN frustration model, the relations between PC and the flow, as well as between PC and PE, are significant and negative. Thus, it seems that the relations between PC, the flow and PE emerge in a model that takes into account the frustration of BPN. It is therefore possible that, when considered as a mediating process, BPN frustration acts as a risk factor that decreases the level of psychological functioning of a perfectionist individual, who is more tormented by the fear of failure in a sports context.

The fourth hypothesis proposed that the two factors of perfectionism would have an indirect effect on psychological functioning in a sports context, through the satisfaction and frustration of BPN. This hypothesis was also partially confirmed. First, the results show that when BPN satisfaction is considered in the model, there is no indirect effect of the PHS on psychological functioning in a sports context. This suggests that the PHS is associated with psychological functioning in sport, without requiring the input of BPN satisfaction. However, this is not the case when it comes to PC. Indeed, the results reveal that the satisfaction of the need for competence acts as a protective factor in the relation between PC and NE. Moreover, the satisfaction of the need for competence also seems to play a very important role when it comes to promoting PE and the flow state in a sports context. More specifically, the less important concerns are about failure, the more the person will see his/her need for competence satisfied, and the more he/she is likely to experience a flow state and PE. That said, the satisfaction of the need for competence would also allow this same person to attenuate the level of NE experienced during the practice of a sports activity. Although to our knowledge, no study has yet tested all the relations between these variables within the same model, these results corroborate those of Jowett & et al. [11]. These authors have indeed shown that BPN satisfaction acts as an important mediator of the (positive) relation between the PHS and the level of engagement in sport. Conversely, these same authors observed a negative relation between PC and sports engagement when BPN satisfaction was present as a mediating variable.

In addition to the results presented above, others are also worth discussing, including the one indicating that the frustration of the need for autonomy and social belonging acts as a mediator of the relation between PC and NE. This suggests that an individual who has a higher level of PC, and who sees his/her need for autonomy and social belonging frustrated, would be at even greater risk of experiencing NE when practicing a SA. Another interesting result stems from the relation between PC, the frustration of the need for social belonging, the flow state and PE. It seems that the frustration of the need for social belonging in individuals with a higher level of fear of failure, would explain a significant part of the low level of PE and flow in the practice of a SA. These results corroborate those obtained in a study conducted by Costa, Coppolino & Oliva [10]. In this study, the authors found BPN frustration to be an important mediator of the relation between unhealthy perfectionism and the dependence on physical exercise. Therefore, BPN frustration appears to be an important factor to consider when examining perfectionism and its deleterious psychological repercussions in sport.

Theoretical implications

This study makes it possible to clearly distinguish the contribution of satisfaction and frustration of BPN in individuals who practice a SA. Contrary to previous studies that address only one of these two constructs, the results of this research show that the two concepts are quite distinct, and that they act differently in

the relation between perfectionism and psychological functioning in a sports context. The results suggest that a PHS-oriented perfectionism could be a factor that predisposes the individual to achieve a higher level of PE. However, it should be noted that the PHS and PC are strongly correlated with each other. These results again suggest that, more often than not, both dimensions of perfectionism seem to co-exist in the same individual. In other words, this last finding highlights the need to use a model that examines different profiles according to both the healthy and pathological dimensions of perfectionism, as advocated by several authors [9,21,26].

Practical Implications

The results of this study reveal the importance of considering BPN frustration in individuals with an unhealthy perfectionist profile in a sports context. Individuals who have a strong fear of failure may be predisposed to have a higher emotional sensitivity to the frustration of the needs for autonomy, competence and social belonging when practicing a SA.

Given the results, targeting the development of the perfectionist individual's need for competence associated with the SA could be a promising avenue because this need, when satisfied, seems to attenuate the negative effects of PC. It is therefore possible that promoting a sense of autonomy, as well as more intrinsic motivation in a sports context, could lead the person to feel more competent, to experience more PE and to perform better. This is what a study conducted by Healy, Ntoumanis & Arthur [68] revealed. In their research with an adult sports population, these authors have shown that setting oneself personalized goals can promote a sense of autonomy. According to these authors, an approach centered on the setting of objectives imposed by others (therefore more extrinsic) could have negative consequences on athletes' well-being. In line with this finding, Li & et al. [69] found that athletes who set goals based on mastery of a task (i.e., comparing oneself to oneself) reported higher levels of well-being and performance. In contrast, athletes who adopted a performance-based approach (i.e., comparing oneself to others) showed less intrinsic motivation and lower performance.

The results of the present study also underline the importance of the need for social belonging when practicing a SA. The more the participants reported PC, the more their sense of belonging was frustrated, and the worse their psychological functioning was. However, as Davis [70] points out, the quality of the interactions between the members who surround the person in his/her sport is central in promoting an optimal level of well-being (e.g., moral and emotional support between coach-individual). In this regard, and as underlined by Kamachi [71], the presence of a climate of cooperation and benevolence can be relevant in helping the person better regulate his/her emotions, thus promoting better performance.

Limits and Avenues for Future Research

Conclusions arising from the results of this study should be viewed with caution. On the one hand, the correlational design does not in any way make it possible to establish cause and effect links

between the variables. In addition, participants completed self-reported questionnaires during the COVID-19 lockdown period. Although according to the instructions, they were invited to answer according to their general experience in the practice of a sport (outside the context of the isolation measures), it is possible that their answer during this period does not reflect their usual sports experience. Moreover, the results suggest that the participants report a high level of PE in the practice of their sport. However, the study could have attracted people who were more satisfied with their practice of a SA, which represents a selection bias. The length of the questionnaires may also have been a limitation of this study since several participants did not complete them.

Also, it seems that the use of cross-sectional design to test mediations can lead to an overestimation of relations [72]. For this reason, it would be important to replicate the results of this study using a longitudinal design. Finally, an interesting avenue of research would be to continue exploring the level of psychological functioning in sports by considering attachment style as an independent variable, while also including BPN satisfaction and frustration. To our knowledge, no study has yet measured the relation between attachment, BPN satisfaction/frustration and the level of psychological functioning in the practice of a SA among individuals from the general adult population. However, the results of Wei & et al. [73] in a sample of 299 adult students suggest that BPN satisfaction acts as a mediator in the relation between an avoidant or anxious attachment style and feelings of shame, depression and loneliness.

Conclusion

The present study sheds new light on the relation between two factors of perfectionism, BPN satisfaction and frustration, and psychological functioning in a sports context in the general adult population. The results indicate that the PHS is positively associated with an important part of psychological functioning in a sports context, without taking into account the satisfaction of the needs for autonomy, competence and social belonging associated with this context. The results about the relation between PC and psychological functioning in a sports context also reveal that the satisfaction of the need for competence becomes a mediator that can limit the negative effects of this type of perfectionism. Finally, it appears that the frustration of the need for autonomy and social belonging are significant mediators of the relation between PC and psychological functioning in a sports context. In other words, the more individuals tend to fear failure and the judgment of others, the more they are at risk of experiencing frustration regarding their sense of autonomy and social belonging, and the worse their level of psychological functioning.

References

1. Kramer AF, Erickson KI (2007) Effects of physical activity on cognition, well-being, and brain: Human interventions. *Alzheimer's & Dementia: The Journal of the Alzheimer's Association* 3(2 Suppl 1): S45-S51.
2. Maher JP, Doerksen SE, Elavsky S, Hyde AL, Pincus AL, et al. (2013) A daily analysis of physical activity and satisfaction with life in emerging adults. *Health Psychology* 32(6): 647-656.

3. Faulkner J, O'Brien WJ, McGrane B, Wadsworth D, Batten J, et al. (2021) Physical activity, mental health and well-being of adults during initial COVID-19 containment strategies: A multi-country cross-sectional analysis. *Journal of Science and Medicine in Sport* 24(4): 320-326.
4. Murphy SM, Fleck SJ, Dudley G, Callister R (1990) Psychological and performance concomitants of increased volume training in elite athletes. *Journal of Applied Sport Psychology* 2(1): 34-50.
5. Schaal K, Tafflet M, Nassif H, Thibault V, Pichard C, et al. (2011) Psychological balance in high level athletes: Gender-based differences and sport-specific patterns. *PLoS ONE* 6(5): 1-10.
6. Malhotra RK (2017) Sleep, recovery, and performance in sports. *Neurologic Clinics* 35(3): 547-557.
7. Lane AM, Terry PC, Beedie CJ, Stevens M (2004) Mood and concentration grid performance: Effects of depressed mood. *International Journal of Sport and Exercise Psychology* 2(2): 133-145.
8. Lane AM, Thelwell R, Devonport TJ (2009) Emotional intelligence and mood states associated with optimal performance. *E-Journal of Applied Psychology* 5(1): 67-73.
9. Gaudreau P, Thompson A (2010) Testing a 2 × 2 model of dispositional perfectionism. *Personality and Individual Differences* 48(5): 532-537.
10. Costa S, Coppolino P, Oliva P (2016) Exercise dependence and maladaptive perfectionism: The mediating role of basic psychological needs. *International Journal of Mental Health and Addiction* 14(3): 241-256.
11. Jowett GE, Hill AP, Hall HK, Curran T (2016) Perfectionism, burnout and engagement in youth sport: The mediating role of basic psychological needs. *Psychology of Sport and Exercise* 24(1): 18-26.
12. Adie JW, Duda JL, 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.
13. Sheldon KM, Zhaoyang R, Williams MJ (2013) Psychological need-satisfaction, and basketball performance. *Psychology of Sport and Exercise* 14(5): 675-681.
14. Schüler J, Brandstätter V (2013) How basic need satisfaction and dispositional motives interact in predicting flow experience in sport. *Journal of Applied Social Psychology* 43(4): 687-705.
15. Felton L, Jowett S (2015) On understanding the role of need thwarting in the association between athlete attachment and well/ill-being. *Scandinavian Journal of Medicine & Science in Sports* 25(2): 289-298.
16. Bartholomew KJ, Ntoumanis N, Ryan RM, Thøgersen NC (2011) Psychological need thwarting in the sport context: Assessing the darker side of athletic experience. *Journal of Sport & Exercise Psychology* 33(1): 75-102.
17. Rice SM, Purcell R, De Silva S, Mawren D, McGorry PD, Parker AG (2016) The mental health of elite athletes: A narrative systematic review. *Sports Medicine* 46(9): 1333-1353.
18. Curran T, Hill AP (2019) Perfectionism is increasing over time: A meta-analysis of birth cohort differences from 1989 to 2016. *Psychological Bulletin* 145(4): 410-429.
19. Hewitt PL, Flett GL (1991) Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology* 60(3): 456-470.
20. Frost RO, Henderson KJ (1991) Perfectionism and reactions to athletic competition. *Journal of Sport & Exercise Psychology* 13(4): 323-335.
21. Stoeber J, Damian LE (2014) The Clinical Perfectionism Questionnaire: Further evidence for two factors capturing perfectionistic strivings and concerns. *Personality and Individual Differences* 61-62(1): 38-42.
22. 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.
23. Enns MW, Cox BJ, Clara I (2002) Adaptive and maladaptive perfectionism: Developmental origins and association with depression proneness. *Personality and Individual Differences* 33(6): 921-935.
24. Flett GL, Hewitt PL, Endler NS, Tassone C (1995) Perfectionism and components of state and trait anxiety. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues* 13(4): 326-350.
25. Hill AP, Curran T (2015) Multidimensional perfectionism and burnout: A metaanalysis. *Personality and Social Psychology Review* 20(3): 269-288.
26. Gaudreau P, Verner Filion J (2012) Dispositional perfectionism and well-being: A test of the 2 × 2 model of perfectionism in the sport domain. *Sport, Exercise, and Performance Psychology* 1(1): 29-43.
27. Lizmore MR, Dunn JGH, Causgrove Dunn J (2017) Perfectionistic strivings, perfectionistic concerns, and reactions to poor personal performances among intercollegiate athletes. *Psychology of Sport and Exercise* 33(1): 75-84.
28. 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.
29. Hill AP, Mallinson-Howard SH, Jowett GE (2018) Multidimensional perfectionism in sport: A meta-analytical review. *Sport Exercise and Performance Psychology* 7(3): 235-270.
30. Deci EL, Ryan RM (1985) *Intrinsic motivation and self-determination in human behavior*. Plenum.
31. Deci EL, Ryan RM (2000) The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry* 11(4): 227-268.
32. Deci EL, Ryan RM (2008) *Self-determination theory: A macrotheory of human motivation, development, and health*. *Canadian Psychology/Psychologie canadienne* 49(3): 182-185.
33. Ryan RM, Deci EL (2017) *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press, USA, pp.1-23.
34. Vansteenkiste M, Ryan RM (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.
35. Mallinson SH, Hill AP (2011) The relationship between multidimensional perfectionism and psychological need thwarting in junior sports participants. *Psychology of Sport and Exercise* 12(6): 676-684.
36. Frost RO, Marten P, Lahart C, Rosenblate R (1990) The dimensions of perfectionism. *Cognitive Therapy and Research* 14(5): 449-468.
37. Csikszentmihalyi M, Csikszentmihalyi I (1988) *Optimal experience: Psychological studies of flow in consciousness*. Cambridge University Press, UK, pp. 251-265.
38. Stein GL, Kimiecik JC, Daniels J, Jackson SA (1995) Psychological antecedents of flow in recreational sport. *Personality and Social Psychology Bulletin* 21(2): 125-135.
39. Schüler J, Brandstätter V (2013) How basic need satisfaction and dispositional motives interact in predicting flow experience in sport. *Journal of Applied Social Psychology* 43(4): 687-705.
40. Fazlagić AR, Belić M (2017) The connection of perfectionism and Flow with athletes of a different performance level. *Physical Culture* 71(2): 111-117.
41. Gaudreau P, Sanchez X, Blondin JP (2006) Positive and negative affective states in a performance-related setting: Testing the factorial structure

- of the PANAS across two samples of French-Canadian participants. *European Journal of Psychological Assessment* 22(4): 240-249.
42. Deck S, Roberts R, Hall C, Kouali D (2020) Exercise behaviour, enjoyment and boredom: A test of the 2x2 model of perfectionism. *International Journal of Sport and Exercise Psychology* 18(6): 779-793.
 43. Flett GL, Hewitt PL, Dyck DG (1989) Self-oriented perfectionism, neuroticism and anxiety. *Personality and Individual Differences* 10(7): 731-735.
 44. Flett GL, Blankstein KR, Hewitt PL (2009) Perfectionism, performance, and state positive affect and negative affect after a classroom test. *Canadian Journal of School Psychology* 24(1): 4-18.
 45. Prud'homme J, Dunkley DM, Bernier E, Berg JL, Ghelertier A, et al. (2017) Specific perfectionism components predicting daily stress, coping, and negative affect six months and three years later. *Personality and Individual Differences* 111(1): 134-138.
 46. Richard A, Dunkley DM, Zuroff DC, Moroz M, Elizabeth FJ, et al. (2021) Perfectionism, efficacy, and daily coping and affect in depression over 6 months. *Journal of Clinical Psychology* 77(6):1453-1471.
 47. Castro J, Soares MJ, Pereira AT, Macedo A (2017) Perfectionism and negative/positive affect associations: The role of cognitive emotion regulation and perceived distress/coping. *Trends in Psychiatry and Psychotherapy* 39(2): 77-87.
 48. Gunnell KE, Crocker PRE, Wilson PM, Mack DE, Zumbo BD (2013) Psychological need satisfaction and thwarting: A test of basic psychological needs theory in physical activity contexts. *Psychology of Sport and Exercise* 14(5): 599- 607.
 49. Puente R, Anshel MH (2010) Exercisers' perceptions of their fitness instructor's interacting style, perceived competence, and autonomy as a function of self-determined regulation to exercise, enjoyment, affect, and exercise frequency. *Scandinavian Journal of Psychology* 51(1): 38-45.
 50. Teixeira DS, Silva MN, Palmeira AL (2018) How does frustration make you feel? A motivational analysis in exercise context. *Motivation and Emotion* 42(3): 419-428.
 51. Wilson PM, Longley K, Muon S, Rodgers WM, Murray TC (2006) Examining the contributions of perceived psychological need satisfaction to well-being in exercise. *Journal of Applied Biobehavioral Research* 11(4): 243-264.
 52. Langlois F, Rhéaume J, Gosselin P (2009) Perfectionism: When the best becomes the enemy of the good, Université Laval, Canada.
 53. Rhéaume J, Freeston MH, Ladouceur R (1995) Functional and dysfunctional perfectionism: construct validity of a new instrument. Paper presented at the 1st annual World Congress of Behavioral Cognitive Therapy, Denmark.
 54. Langlois F, Roy P, Vanasse JP (2010) Confirmatory analysis of the Perfectionism Questionnaire (shorter form). Papier présenté à EABCT, Italy.
 55. Gillet N, Rosnet E, Vallerand RJ (2008) Development of a scale for satisfying basic needs in a sports context. *Canadian Journal of Behavioral Sciences* 40(4): 230-237.
 56. Spearman C (1910) Correlation calculated from faulty data. *British Journal of Psychology* 3(3): 271-295.
 57. Laveault D, Grégoire J (2002) Introduction to test theories in psychology and educational sciences. De Boeck, Belgium, pp. 392.
 58. Martinet G, Guillet-Descas E, Moiret S (2015) Reliability and validity evidence for the French Psychological Need Thwarting Scale (PNTS) scores: Significance of a distinction between thwarting and satisfaction of basic psychological needs. *Psychology of Sport and Exercise* 20(1): 29-39.
 59. Watson D, Clark LA, Tellegen A (1988) Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology* 54: 1063-1070.
 60. Fournier J, Gaudreau P, Demontrond-Behr P, Visioli J, Forest J, et al. (2007) French translation of the flow state scale-2: Factor structure, cross-cultural invariance, and association with goal attainment. *Psychology of Sport and Exercise* 8(6): 897-916.
 61. Tabachnik BG, Fidell SL, Ullman JB (2007) Using multivariate statistics (5th Edn.), pp. 481-498). Pearson, USA, pp. 980.
 62. Nevitt J, Hancock GR (2001) Performance of bootstrapping approaches to model test statistics and parameter standard error estimation in structural equation modeling. *Structural Equation Modeling* 8(3): 353-377.
 63. Kline P (1994) An easy guide to factor analysis. Routledge, UK, p. 208.
 64. Rodrigues F, Hair JF, Neiva HP, Teixeira DS, Cid L, et al. (2019) The Basic Psychological Need Satisfaction and Frustration Scale in Exercise (BPNSFS-E): Validity, reliability, and gender invariance in Portuguese exercisers. *Perceptual and Motor Skills* 126(5): 949-972.
 65. Mallinson SH, Hill AP, Hall HK, Gotwals JK (2014) The 2x2 model of perfectionism and school- and community-based sport participation. *Psychology in the Schools* 51(9): 972-985.
 66. Gotwals JK, Stoeber J, Dunn JGH, 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.
 67. Frost RO, Henderson KJ (1991) Perfectionism and reactions to athletic competition. *Journal of Sport & Exercise Psychology* 13(4): 323-335.
 68. Healy LC, Ntoumanis N, Arthur CA (2020) Goal motives and well-being in student-athletes: A person-centered approach. *Journal of Sport and Exercise Psychology* 42(6): 433-442.
 69. Li CH, Chi L, Suh Ruu Y, Guo KB, Ou CT, et al. (2011) Prediction of intrinsic motivation and sports performance using 2x2 achievement goal framework. *Psychological Reports* 108(1): 625-637.
 70. Davis L, Jowett S (2014) Coach-athlete attachment and the quality of the coach- athlete relationship: Implications for athlete's well-being. *Journal of Sports Sciences* 32(15): 1454-1464.
 71. Kamachi KD (2020) Leading, coaching & mentoring: a study of coach-athlete relationships as associated factors in performance. Pepperdine University, California, USA, pp. 1-243.
 72. Kline RB (2015) The mediation myth. *Basic and Applied Social Psychology* 37(4): 202-213.
 73. Wei M, Shaffer PA, Young SK, Zakalik RA (2005) Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology* 52(4): 591-601.