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Passion and emotions: The mediating role of cognitive appraisals

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ABSTRACT

Research reveals that harmonious passion leads to more positive emotions than obsessive passion, whereas the opposite result is true with respect to negative emotions. The purpose of this research was to evaluate the role of cognitive appraisals as mediators of the passion-emotion relationships. In Study 1, 227 participants engaged in different sports completed an online questionnaire about their passion for their specific sport, as well as cognitive appraisals and emotions generally experienced during an important game of their sport. Results of a structural equation modeling analysis and an indirect effect test showed that harmonious passion was linked to positive emotions through the mediating role of challenge appraisals, and that obsessive passion was linked to negative emotions through the mediating role of threat appraisals. In Study 2, 194 athletes completed questionnaires before and after a competitive game and focused on cognitive appraisals and emotions experienced during the game. Results of analyses conducted separately in the victory and defeat conditions based on game outcomes supported the model found in Study 1 in the case of defeat for both types of passion, and in the case of victory for harmonious passion only. Obsessive passion was not linked to threat appraisals among victorious athletes. These results suggest that both types of passion trigger different cognitive appraisals that lead to corresponding emotions. Future research is needed to replicate these findings and to better understand the role of passion and cognitive appraisals in emotions experienced in the realm of sports.

1. Introduction

Sport is an important source of emotional experiences, sometimes leading athletes to experience positive emotions and sometimes negative ones. This is understandable given that passionate athletes are strongly invested in their sports activity. However, the mere fact of being passionate is not sufficient to predict the emotional consequences of sports involvement (Vallerand, Rousseau, Grouzet, Dumais, & Grenier, 2006; Vallerand & Verner-Filion, 2020). Indeed, past research reveals that it is necessary to take into consideration the nature of the athlete's type of passion (Vallerand et al., 2003, 2006). Passion can be harmonious or obsessive, with harmonious passion (HP) generally leading to positively valenced emotions and obsessive passion (OP) to negatively valenced emotions (e.g., Vallerand et al., 2006). However, few studies to date have examined the processes underlying the differentiated emotional experiences of the two types of passion. One promising mechanism deals with cognitive appraisals. Recent research has shown that the two types of passion are differentially related to distinct appraisal patterns (Schellenberg & Bailis, 2016) and these different appraisals have been found to lead to positive or negative emotions (e.g., Jones, Meijen, McCarthy, & Sheffield, 2009; Moors, Ellsworth, Scherer, & Frijda, 2013). The present research seeks to test the main hypothesis that appraisals play a key mediating role in the passion-emotion relationship in two studies.

1.1. The Dualistic Model of Passion

According to the Dualistic Model of Passion (DMP; Vallerand, 2015; Vallerand & Houlfort, 2019), passion is a strong inclination towards an activity that an individual loves, finds important, and invests a significant amount of time and energy in (Vallerand et al., 2003). In addition, when passionate, the activity is integrated in identity. For example, individuals who are passionate about their sport could define themselves as "weightlifters" or "basketball players", depending on the discipline. The assumption that the passionate activity is embedded in one's self-concept is in line with the Self-Determination Theory (SDT; Ryan & Deci, 2017), in which individuals are conceptualized as having a natural tendency to integrate elements of the environment into their self and

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identity. These elements can be integrated within the self in an autonomous or controlled way (Sheldon, 2002; Vallerand & Ratelle, 2002).

Additionally, the DMP posits that passion can be either harmonious or obsessive in nature. An HP is developed when an important and meaningful activity such as the practice of a sport is internalized into the self through autonomous forms of regulation, meaning that it is in congruence with the values of the individual and is performed without contingencies attached thereto (Mageau et al., 2009, 2011; Vallerand et al., 2003). With HP, the activity becomes an important component of one's identity and is in harmony with the other aspects of the person's life (Vallerand, 2008, 2010, 2015; Vallerand et al., 2003).

In contrast, OP is developed when the activity that the person loves is internalized in identity in a more controlled way and is performed because of intra or interpersonal contingencies connected to the activity, like feelings of self-esteem and social acceptance or other extrinsic benefits (Mageau et al., 2009, 2011; Ryan & Deci, 2017; Vallerand et al., 2003). With OP, one loves the activity, but because of its controlling nature, OP can take an inordinate place in identity and engender conflicts with other spheres of the individual's life (Vallerand, 2015; Vallerand et al., 2003). With OP, activity engagement is generally derived out of a desire to avoid feelings of shame or guilt or because the person feels compelled to engage in the beloved activity. Thus, OP can lead the individual to feel bad and ruminate about the activity when engaging in other activities (Carpentier, Mageau, & Vallerand, 2012; Vallerand et al., 2003).

Past research provides strong evidence that HP is generally associated with more adaptive outcomes than OP as pertains to a variety of cognitive, affective, relational, and behavioral outcomes, such as higher levels of concentration, positively valenced emotions and better relationships and persistence (see Curran, Hill, Appleton, Vallerand, & Standage, 2015; Vallerand, 2015, for reviews). In the sports domain specifically, HP has been linked to greater psychological well-being (e.g., Vallerand et al., 2006), approach-oriented coping strategies (Verner-Filion et al., 2014), and concentration and flow (Philippe, Vallerand, Andrianarisoa, & Brunel, 2009) among other outcomes (for a more complete review, see Vallerand & Verner-Filion, 2020). Conversely, OP for sports has been shown to be unrelated to well-being (e.g., Vallerand et al., 2006) and flow (Philippe et al., 2009), as well as positively related to avoidance-oriented coping strategies (Verner-Filion et al., 2014), burnout (Lopes & Vallerand, 2020), and immoral behavior such as cheating (Bureau, Vallerand, Ntoumanis, & Lafrenière, 2013). Despite these past findings, more research is still needed on this topic. As such, Vallerand and Verner-Filion (2020) suggested that the role of passion in success and failure experiences (such as victory and defeat in sport) represents an important area of research. A better understanding of the mechanisms underlying the relationship between passion and emotions is also an important field of study. The present research thus focused on both topics, which are addressed below.

1.2. Passion, emotions and performance outcomes

Emotions are short-lived psychophysiological phenomena that represent modes of adaptation to changing demands of the environment (Levenson, 1994). In the context of a dimensional approach, emotions that are subjectively pleasant and accompanied by a certain level of arousal are commonly referred to as positive emotions (e.g., enthusiastic, proud, attentive). In contrast, emotions that are rather subjectively unpleasant and accompanied with a certain level of arousal are referred to as negative emotions (e.g., distressed, upset, ashamed), independently of how functionally adaptive they are in a given situation (Watson, 2000; Watson, Clark, & Tellegen, 1988).

The link between passion and emotions is well established in the scientific literature, with HP typically leading to positive emotions and OP to negative emotions *during* task engagement (e.g., Curran et al., 2015; Rousseau & Vallerand, 2008; Vallerand, 2015). In addition, OP has regularly been linked to negative emotions *after* engagement in the activity, as well as when it is impossible to engage in the beloved activity (Carpentier et al., 2012; Mageau & Vallerand, 2007; Vallerand, 2008, 2010, 2015; Vallerand et al., 2003). Finally, it should be mentioned that HP, has been at times negatively linked to negative emotions (Philippe, Vallerand, Houlfort, Lavigne, & Donahue, 2010; Vallerand, 2010, 2015). This last finding has been obtained mainly when controlling for OP as in path analytical models (e.g., Philippe et al., 2010, 5-study article) or in a meta-analysis (Curran et al., 2015). While most research on passion and emotions has used the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), where emotions are grouped as a function of valence into positive and negative emotions, similar findings have been obtained when looking at specific emotions. For instance, Lecoq and Rimé (2009, Study 1) have shown that HP was significantly and positively related to the specific emotions of joy, happiness, and awe, unrelated to surprise, and negatively and significantly related to disgust. Conversely, OP was positively linked with shame, sadness, fear, and anxiety, positively to awe and unrelated to the other emotions (Lecoq & Rimé, 2009, Study 1). Thus, it appears that independently of the scale used, HP generally leads to more positive emotions than negative emotions whereas OP leads to the reverse relationships.

When assessing the mechanisms underlying the relationship between passion and emotions in sport, it appears important to take the outcomes of the event into account. Experiencing success or failure can significantly influence the emotional experience, with victory and defeat being generally related to positive and negative emotions, respectively (Nummenmaa & Niemi, 2004). This seems to be particularly true when an individual such as an athlete is engaging in an activity of subjective importance (Hanin, 2007; Lazarus, 1991, 1999; Verner-Filion, Schellenberg, Rapaport, Bélanger, & Vallerand, 2018). However, past research on passion reveals that the effects of victory and defeat on emotion variables may be especially strong for OP and less so for HP (Lafrenière, St-Louis, Vallerand, & Donahue, 2012; Mageau, Carpentier, & Vallerand, 2011; Verner-Filion et al., 2018). In any case, the relationship between passion and emotions is definitely more than a question of victory or defeat. Multiple mechanisms may be at play, and very little research so far has examined the mechanisms specifically involved in this relationship (see Vallerand, 2015). Past research has suggested that self-processes such as mindfulness (St-Louis, Verner-Filion, Bergeron, & Vallerand, 2018) and coping processes (Verner-Filion et al., 2014) are involved in the production of emotion. Of major interest is the fact that some past experimental studies indicate that HP and OP also differentially affect information processing (e.g., Bélanger, Lafrenière, Vallerand, & Kruglanski, 2013), thereby suggesting that HP and OP affect cognition differently and cognition, in turn, may play a role in emotional outcomes related to passion. Thus, it may be important to look at the mediating role of cognitive appraisals in the passion-emotions relationship.

1.3. Cognitive appraisals

Much research supports the role of appraisals in emotions (e.g., Moors et al., 2013). The literature on appraisals considers that the physiological, behavioral, and emotional responses are strongly determined by cognitive evaluations (Reisenzein, 2006; Lazarus, 1991, 1999; Moors et al., 2013). Primary appraisals represent a process by which one interprets the importance of a situation or event for their well-being and goals (Lazarus, 1991, 1999; Moors et al., 2013). As Lazarus (1999) put it, the fundamental questions underlying this process are: *"Do I have a goal at stake, or are any of my core values engaged or threatened? And if there is a stake, what might the outcome be?"* (p. 76). Secondary appraisals refer to the cognitive-evaluative process where one focuses on what can be done about the situation (Lazarus, 1991, 1999). This process often constitutes the cognitive underpinning of coping, and it is impacted by the perception one has of the options and resources available to face the demanding situation (Lazarus, 1991, 1999). Although different views seem to exist concerning the implications of primary and secondary

appraisals, most authors conceptualize challenge and threat states as involving elements from both primary and secondary appraisals (Blascovich & Mendes, 2000; Jones et al., 2009; Meijen, Turner, Jones, Sheffield, & McCarthy, 2020).

Both challenge and threat appraisals are important as they have been linked to emotional experiences in the context of sport (Meijen et al., 2020). The first represents a challenge appraisal (CA) type and occurs when a demand is evaluated as an opportunity for growth or gain. According to the model of Lazarus (1991, 1999), a situation is considered a challenge if it is evaluated above all as a positive opportunity to control a difficult demand. Such a definition is also reflected in recent sports conceptualizations such as the Theory of Challenge and Threat States in Athletes (TCTSA; Jones et al., 2009) and its recent revised conceptualizations (e.g., Revised Theory of Challenge and Threat States in Athletes, TCTSA-R, Meijen et al., 2020). Second, threat appraisals (TA) occur when a demand is assessed as a potential source of loss or damage. According to the model of Lazarus (1991, 1999), the apprehension of a negative event fosters this type of cognitive evaluation. It is then possible to draw a comparison between threat appraisals and the situations evaluated as negative and as having an uncertain probability of occurrence according to Magda Arnold's conception (1960, cited in Reisenzein, 2006).

Past research has shown that CA are associated with more desirable and adaptive outcomes than TA, such as better coping expectations, performance, and positive emotions (Blascovich & Mendes, 2000; Lazarus, 1991, 1999; see Hase, O'Brien, Moore, & Freeman, 2019 and Meijen et al., 2020 for recent reviews). Overall, the positive link between CA and positive emotions has been generally supported by past research (e.g., Adie, Duda, & Ntoumanis, 2010; Cerin, 2003; Kavussanu, Dewar, & Boardley, 2014; Nicholls, Polman, & Levy, 2012; Rossato, Uphill, Swain, & Coleman, 2018; Skinner & Brewer, 2002) with some exceptions where no significant relationship has been found (e.g., Meijen, Jones, Mccarthy, Sheffield, & Allen, 2013, 2014). Similarly, the positive relationship between TA and negative emotions is generally supported by past research (e.g., Cerin, 2003; Kavussanu et al., 2014; Nicholls et al., 2012; Rossato et al., 2018; Skinner & Brewer, 2002), although some studies revealed a nonsignificant relationship (e.g., Adie et al., 2010; Meijen, Jones, Sheffield, & McCarthy, 2014).

It should also be noted that the crossover relationships between CA and negative emotions and between TA and positive emotions have yielded mixed findings. Specifically, CA has been shown to be negatively (e.g., Rossato et al., 2018; Skinner & Brewer, 2002), non-significantly (e.g., Kavussanu et al., 2014; Meijen et al., 2014; Nicholls et al., 2012), and even positively (Meijen et al., 2013) related to negative emotions. With regard to TA, it has been shown to be either negatively (e.g., Skinner & Brewer, 2002) or non-significantly (e.g., Adie et al., 2010; Cerin, 2003; Kavussanu et al., 2014; Meijen et al., 2014; Nicholls et al., 2012) related to positive emotions.

Another important issue dealing with cognitive appraisals concerns the study of their antecedents. Past research has shown that personal factors (or individual differences) can influence one's tendency to use CA and TA. For instance, past research has identified traits like neuroticism and lower emotional intelligence to be negatively related to CA, and positively related to TA (see Kilby, Sherman, & Wuthrich, 2018 for a review). The perceived level of physical and psychological security, familiarity, skills and knowledge of the situation, and the level of effort required by the situation (Blascovich, 2008; Seery, 2011) have also been shown to influence CA and TA. While past research has focused mainly on either situational (e.g., appraisal components, situational self-efficacy) or global variables (e.g., personality traits), the effects of contextual/domain-level variables, such as motivational processes (see Vallerand & Ratelle, 2002), have scarcely been investigated.

Only two studies have examined the relationship between passion and CA or TA (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013). The results indicated positive links between HP and CA, and OP and TA, respectively (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013). These authors have also shown that HP was negatively related to TA, but that OP was not related to CA. It should be noted that no research to date has been conducted specifically with athletes. As such, the Schellenberg, Bailis, and colleagues (2013) study was conducted with hockey fans and only assessed TA. The study from Schellenberg and Bailis (2016) did include measures of both CA and TA but focused on the passion that students had for their studies. Thus, the present research deepens the literature on passion and the literature on cognitive appraisals by examining the role of motivational processes as determinants of athletes' CA and TA and how these relate to emotional experiences in victory and defeat.

1.4. The present research

There were two main goals to this research. In line with past research, the first goal was to test an integrative model of passion, appraisals, and emotions in two studies conducted with athletes (Studies 1 and 2). The second purpose of the present research was to assess the validity of the model of passion, appraisals, and emotions in situations of victory and defeat (Study 2). In accordance with the results from Schellenberg and Bailis (2016), it was expected that HP would be mostly positively associated with CA, while OP would be mainly positively related to TA. Moreover, it was expected that HP would be negatively related to TA, but that OP would not be associated with CA. In line with past emotion theory and research (e.g., Jones et al., 2009; Moors et al., 2013; Rossato et al., 2018; Skinner & Brewer, 2002), CA were expected to be positively related to positive emotions, while TA were expected to be associated with negative emotions. Considering the inconsistent crossover relationships between CA and negative emotions and TA and positive emotions, no specific hypotheses specific were formulated.

2. Study 1

The purpose of Study 1 was to test an integrative model on the relationships among the passion, appraisals, and emotions constructs in athletes. The model specifies that HP should be positively associated with CA and negatively related to TA, whereas OP should be positively associated with TA and unrelated to CA. In turn, CA and TA should be related to positive and negative emotions, respectively.

2.1. Method

2.1.1. Participants and procedure

The sample for Study 1 was made up of 241 participants living in the United States and engaged in various sports. They were asked to complete an online questionnaire through the Mechanical Turk Online Participant Bank. Participants' consent was obtained by first reading a general summary of the research and then by providing an electronic signature attesting their awareness of their rights and the implications of their participation in the project. All questionnaires were completed in English. Inclusion criteria included being at least 18 years old and playing an organized sport. In addition, respondents were required to have completed at least 90% of the questions included in the questionnaire, which led to the exclusion of a total of 9 participants. Five participants failed at least one of the two attention check items embedded in the questionnaire (e.g., "Please select number 2") and were removed. The final sample was comprised of 227 participants. Calculations using the G*Power program (Faul, Erdfelder, Buchner, & Lang, 2009), revealed that our sample size allowed for a statistical power of .87, given the generally small to medium effect sizes reported in previous research (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013; Vallerand, 2015). Most participants (63%) played in a team sport (e.g., football, basketball, softball), while others (37%) practiced an individual sport (e.g., tennis, running, golf, swimming). Participants had been engaged in their sport for an average of 13 years and 9 months (SD = 10 years and 5 months). Participants indicated practicing their sport at a

moderately advanced level (5.67; SD = 1.73) on a scale going from 1 (Beginner) to 9 (Advanced). The average age of the sample was 34.88 years (SD = 10.05 years) and included 130 men, 89 women, and 8 individuals who did not report their gender.

2.1.2. Measures

2.1.2.1. Passion. Passion for sport was measured with the Passion Scale (Marsh et al., 2013; Vallerand et al., 2003). This scale demonstrates high levels of validity and reliability (Marsh et al., 2013; Vallerand, 2015; Vallerand et al., 2003; see also Vallerand et al., 2006 for validation in the sport context from athletes' perspective). Participants were asked to complete the harmonious and obsessive passion subscales. As with all the instruments used in this study, participants were asked to rate their level of agreement with all statements on a 7-point Likert scale from 1 ("Do not agree at all") to 7 ("Very strongly agree"). Both the HP (e.g., "My sport is in harmony with other activities in my life", α = .88) and OP (e.g., "I am having difficulty withdrawing from my sport", α = .87) subscales were comprised of 6 items.

2.1.2.2. Appraisals. Appraisals were assessed using the Challenge and Threat in Sport (CAT-Sport) Scale (Rossato et al., 2018). This scale was selected as it is a short and reliable scale well validated with athletes (Rossato et al., 2018). Further, this measure also subscribes to the multiple-item approach of measuring cognitive appraisals, in contrast with the single item/ratio tradition based on the work from Tomaka et al. (e.g., 1997). This measure of cognitive appraisals included two subscales; one including 5 items to measure CA (e.g., "I look forward to opportunities to test my skills and abilities", α = 0.92), and one with 7 items to measure TA (e.g., "I'm concerned about the idea that I will say or do the wrong thing", α = 0.93). Participants were asked to respond to the items by thinking about how they usually feel when they engage in a significant game or competition in their sport.

2.1.2.3. Emotions. The PANAS (Watson et al., 1988) was used to assess positive and negative emotions. This scale was selected for the good psychometric proprieties it shows, the large number of positive and negative emotions it assesses, and the fact that it has often been used in past research on passion and emotions. This scale comprises two 10-item subscales assessing positive (e.g., "enthusiastic", α = 0.92) and negative (e.g., "hostile", α = 0.92) emotions. Participants were asked to respond according to how they usually feel when they engage in a significant game in the context of their sport.

2.1.3. Statistical analyses

Participants with missing data missed a total of only 0.64% of the items. The analyses reported below were thus conducted on the full sample of 227 participants, using the default robust full information maximum likelihood procedure in Mplus to manage missing data. Of the 227 participants, none had a Z-score greater than the absolute value of 3.29 (which represents the scores that belong to the most extreme 0.1%) on any of the relevant variables, indicating an absence of univariate outliers (Field, 2018). As recommended by Tabachnick and Fidell (2007), the fit between the distribution of the variables and the assumptions underlying maximum likelihood procedures was examined prior to analyses. Because of the robustness to potential deviations in normality that characterize robust maximum likelihood estimation (MLR) procedures, all structural equation modeling analyses in the present study were performed with MPLUS 7.3 (Muthen & Muthen, 2012), using MLR on a raw data file. Additionally, since bootstrapping is unavailable using MLR estimation, indirect effects were tested using the maximum likelihood procedure (ML), along with the corrected for bias bootstrap method, using 10 000 samples with 95% bias-corrected confidence intervals (CIs). The evaluation of the model was therefore carried out by giving priority to the use of certain adjustment indices, namely the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR). For an acceptable model fit, the two former should reach values of 0.95 or higher, while the two latter should be 0.06 or lower (Kline, 2011; Tabachnick & Fidell, 2007).

2.2. Results

Descriptive statistics and bivariate correlations are displayed in Table 1.

2.2.1. Structural equation modeling

The model proposed that HP would be positively related to CA, which would in turn be associated with positive emotions, whereas OP would be related to TA which, in turn, would be positively related to the experience of negative emotions. The model also implied that HP would be negatively related to TA while OP would be unrelated to CA. Although the set of expected paths were significant, the fit indices of the model as hypothesized (Model 1) were not adequate: MLR χ^2 (df = 9, N = 227) = 32.607, $p < .001$, CFI = 0.911, TLI = 0.862, RMSEA = 0.107 (0.069, 0.148), SRMR = 0.072. Examination of the model modification indices revealed that optimal adjustment indices would be obtained by including a total of three additional relationships in the model, including a direct positive path between HP and positive emotions, a negative path between OP and CA, as well as a negative path between TA and positive emotions. The modified model (Model 2) presented adjustment indicators demonstrating adequate representation of the collected data: MLR χ^2 (df = 6, N = 227) = 6.451, p = .375, CFI = 0.998, TLI = 0.996, RMSEA = 0.018 (0.000, 0.090), SRMR = 0.024. Model 2 is shown in Fig. 1. It can be seen that HP was positively related to CA (β = 0.474, $p <$ .001), negatively related to TA (β = −0.266, $p < .001$), and also had a direct positive link to positive emotions (β = 0.200, p = .007). The results also showed that OP had a positive link to TA (β = 0.506, $p < .001$) and negative link to CA (β = −0.200, p = .003). Finally, CA were positively linked to positive emotions (β = 0.566, $p < .001$), while TA were positively linked to negative emotions (β = 0.620, $p < .001$) and negatively linked to positive emotions (β = −0.138, p = .007).

2.2.2. Indirect effects

Results from indirect effect analyses supported the mediating role of appraisals in the relationship between passion and emotions. Specifically, the results indicated a significant indirect effect of HP on positive emotions through CA (β = .268; 95%CI = 0.192 to 0.365, $p < .001$). The results also revealed that through TA, there was a positive and significant indirect effect of HP on positive emotions (β = 0.037; 95%CI = 0.012 to 0.073, p = .013), as well as a negative and significant indirect effect on negative emotions (β = −0.165; 95%CI = −0.245 to −0.088, $p < .001$). Conversely, results supported the indirect effect of OP on negative emotions through TA (β = 0.314; 95%CI = 0.225 to 0.398, $p <$ .001). In addition, the indirect links between OP and positive emotions through TA (β = −0.070; 95%CI = −0.128 to −0.020, p = .012) and CA (β = −0.113; 95%CI = −0.223 to −0.040, p = .014) were both negative and significant.

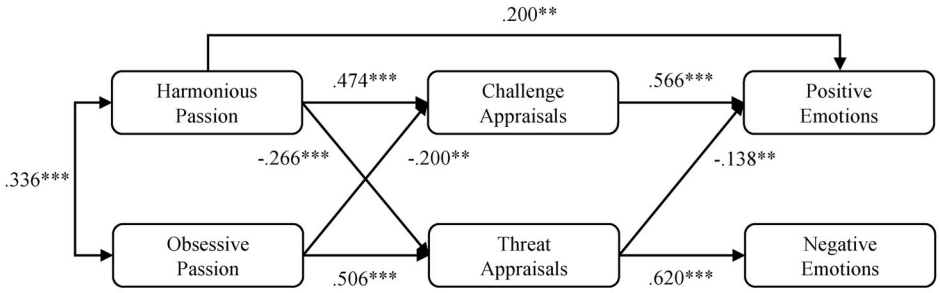
2.2.3. Alternative models

Finally, five alternative models were tested using the same procedure. These models corresponded to all possible permutations of the three types of variables in the model (passion, appraisals, and emotions). One of these models, in which appraisals led to passion, which in turn led to experienced emotions, showed fit indices that were not significantly different from the model presented above: MLR χ^2 (df = 6, N = 227) = 6.451, p = .375, CFI = 0.998, TLI = 0.996, RMSEA = 0.018 (0.000, 0.090), SRMR = 0.024. This was the only alternative model with acceptable fit indices. We did not retain this model as it implied that appraisals would be the antecedent of passion, while the latter is conceptualized as more general and stable (Vallerand, 2015) and has

Table 1
Means, standard deviations, and correlation coefficients among variables included in Study 1.

	Mean	SD	1	2	3	4	5	6
1. Harmonious Passion (HP)	4.96	1.02	–	.34***	.42***	-.10	.45***	-.13
2. Obsessive Passion (OP)	3.13	1.41		–	-.04	.42***	-.04	.31***
3. Challenge Appraisal	4.79	1.27			–	-.08	.66***	-.10
4. Threat Appraisal	2.66	1.31				–	-.19**	.62***
5. Positive Emotions	5.28	1.12					–	-.17*
6. Negative Emotions	1.83	0.99						–

Notes. n = 227, *p < .05, **p < .01, ***p < .001.



*Notes. * p < .05, ** p < .01, *** p < .001. N = 227. Standardized beta coefficients are presented.*

Fig. 1. Study 1. Results of the structural equation model on the relation between passion, cognitive appraisals, and emotions.
Notes. *p < .05, **p < .01, ***p < .001. N = 227. Standardized beta coefficients are presented.

been shown to lead to appraisals in past research (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013).

2.3. Brief discussion

The results from Study 1 supported all the expected paths. HP was positively related to CA and negatively related to TA, which were respectively positively linked to positive emotions and negative emotions. OP was positively associated to TA which, in turn, were positively linked to negative emotions. In addition, a direct path from HP to positive emotions, as well as negative paths between OP and CA and between TA and positive emotions, were also obtained. In line with previous research (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013), these findings suggest, as expected, that appraisals vary as a function of the type of passion. Furthermore, it appears that CA and TA are respectively associated with positive and negative emotions. These findings replicate past research results on this issue (e.g., Cerin, 2003; Kavussanu et al., 2014; Nicholls et al., 2012; Rossato et al., 2018; Skinner & Brewer, 2002). In sum, the proposed model was supported with some minor additions. However, the cross-sectional nature of Study 1 raised the issue of the order of relationships among the model measures. Further, the model was conducted in general and not in specific sports situations. Thus, it was deemed to replicate these findings in victory and defeat situations in Study 2.

3. Study 2

The purpose of Study 2 was twofold. First, we sought to replicate the model obtained in Study 1 in an actual sports situation by using a short prospective design with two measurement times, thereby allowing us to test whether passion assessed before the game can predict appraisals during the game, and appraisals predict emotions. Second, we wanted to test whether the model obtained in Study 1 could be replicated in situations of victory and defeat. In line with the results from Study 1, it was expected that the model obtained in Study 1 would be replicated in both victory and defeat conditions.

3.1. Method

3.1.1. Participants and procedures

This study was conducted in the context of 4 different collegiate sports tournaments (i.e., soccer, basketball, volleyball, and badminton). Participants were asked to complete two short questionnaires. The first survey was completed before one of their competitive matches (85 min before the game started on average) and contained the Passion Scale and demographic questions, along with a consent form. As soon as possible after their game was over (approximately 15 min after the game ended on average), all participants were asked to answer a second questionnaire assessing their appraisals and emotions as experienced during the game. A total of 194 completed questionnaires were collected on the premises. According to the G*Power program (Faul et al., 2009), our sample size allowed for a statistical power of more than 0.80, given the generally small to medium effect sizes reported in Study 1 and previous research (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013; Vallerand, 2015). The questionnaires were answered in English (n = 17) or French (n = 177) depending on the preference of each participant. The average age of the sample was 18.43 years (SD = 1.48) and included 38 men, 148 women, and 8 individuals who did not report their gender. The objective outcomes for the relevant games were confirmed using the statistics website of the regional organization hosting the competitions.

3.1.2. Measures

3.1.2.1. Passion. The same measure of passion as in Study 1 was used. As with all the instruments used in Study 2, participants were asked to rate their level of agreement with all items on a 7-point Likert scale from 1 ("Do not agree at all") to 7 ("Very strongly agree"). The reliability coefficients were adequate for both the HP (α = 0.78) and OP (α = 0.78) subscales.

3.1.2.2. Appraisals. The same scale as in Study 1 was used to measure appraisals, except that participants were instructed to answer according to how they felt during the specific game they have just played, instead of according to how they usually feel during an important game as in Study 1. The items were slightly reworded accordingly. Reliability coefficients were adequate for both the CA (α = 0.71) and TA (α = 0.91) subscales.

3.1.2.3. Emotions. Positive and negative emotions were measured using the same scale as in Study 1. Participants were asked to answer according to how they felt during the game they have just played in. The reliability coefficients were adequate for both the positive (α = 0.89) and negative emotions (α = 0.84) subscales.

3.1.3. Statistical analyses

Participants with missing data missed a total of only 0.59% of the items. The analyses reported below were thus conducted on the full sample of 194 participants. Of the 194 participants, none had a Z-score greater than the absolute value of 3.29 (which represents the scores that belong to the most extreme 0.1%) on any of the relevant variables, indicating an absence of univariate outliers (Field, 2018). The same methods as in Study 1 were used to analyze the data. This included an examination of the descriptive statistics and correlations among variables, structural equation modeling and indirect effect analyses.

3.2. Results

Descriptive statistics and correlations between variables are available in Table 2. Because measures of CA and TA were assessed after the end of games, an Independent Samples T-test using 95% confidence intervals and 10000 bootstrap samples was conducted to compare means for CA and TA between the victory and defeat groups. Results indicated no significant differences between groups for CA ($p = .653$) or TA ($p = .185$), indicating that the scores on reported CA and TA scales post-game were not significantly impacted by the game outcome.

3.2.1. Structural equation modeling

Using MPLUS for the structural equation modeling, we first tested the same model as resulting from Study 1. This first model (Model 1) implied that among all 194 participants from Study 2, HP would be positively related to CA and negatively related to TA, as well as positively related to positive emotions. It also implied that OP would be positively related to TA and negatively related to CA, and that CA would be positively related to positive emotions, whereas TA would be positively related to negative emotions and negatively related to positive emotions. Results from this first analysis revealed unsatisfactory fit indices for the Model 1: MLR χ^2 ($df = 6$, N = 194) = 17.569, $p = .007$, CFI = 0.919, TLI = 0.812, RMSEA = 0.100 (0.047, 0.155), SRMR = 0.048. Considering that participants experienced either a victory (n = 105) or a defeat (n = 89), a multi-group structural equation modeling was conducted based on game outcomes. Apart from this division of the sample in two groups, the second model tested (Model 2) was identical to the one tested in the first analysis. Results from the second analysis revealed that Model 2 still did not fit the data adequately, MLR χ^2 ($df = 12$, N = 194) = 28.255, $p = .005$, CFI = 0.892, TLI = 0.749, RMSEA = 0.118 (0.062, 0.175), SRMR = 0.061. Examination of the modification indices revealed that the inclusion of a direct link from OP to negative emotions in the defeat condition would allow attaining satisfying fit indices. The resulting model (Model 3) revealed an adequate fit to the data: MLR χ^2 ($df = 10$, N = 194) = 10.796, $p = .374$, CFI = 0.995, TLI = 0.985, RMSEA = 0.029 (0.000, 0.116), SRMR = 0.034.

Model 3 appears in Fig. 2. In the victory condition, HP was positively related to CA ($\beta = 0.434$, $p < .001$), and negatively related to TA ($\beta = -0.256$, $p = .016$), whereas OP did not show a significant link with TA ($\beta = 0.058$, $p = .573$) or CA ($\beta = 0.059$, $p = .522$). Next, CA were positively linked to positive emotions ($\beta = 0.423$, $p < .001$), whereas TA were positively linked to negative emotions ($\beta = 0.501$, $p < .001$). The negative link between TA and positive emotions, although in the expected direction, did not reach significance ($\beta = -0.086$, $p = .372$). Moreover, HP was directly and positively linked to positive emotions ($\beta = .217$, $p = .027$), while the link from OP to negative emotions did not reach significance ($\beta = .060$, $p = .559$).

In the defeat condition, HP also had a positive relation to CA ($\beta = 0.274$, $p = .004$). However, the negative link from HP to TA was not significant ($\beta = -0.054$, $p = .669$). Next, OP had a positive link with TA ($\beta = 0.246$, $p = .009$), but not with CA ($\beta = 0.068$, $p = .511$). Moreover, CA and TA respectively had a positive relation with positive emotions ($\beta = 0.298$, $p = .002$) and negative emotions ($\beta = 0.430$, $p < .001$), and the link between TA and positive emotions was not significant ($\beta = -0.013$, $p = .896$). Finally, HP was still directly linked to positive emotions ($\beta = .250$, $p = .017$), and OP had a significant link with negative emotions ($\beta = .360$, $p < .001$).

3.2.2. Indirect effects

Indirect effects were tested using the same method as in Study 1. The results indicated a significant indirect effect of HP on positive emotions through CA in the victory condition ($\beta = .184$; 95%CI = 0.091 to 0.308, $p = .001$) as well as in the defeat condition ($\beta = 0.082$; 95%CI = 0.016 to 0.199, $p = .050$). The results also revealed that through TA, there was a negative and significant indirect negative effect of HP on negative emotions ($\beta = -0.128$; 95%CI = −0.262 to −0.026, $p = .033$), only in the victory condition. Regarding OP, the results supported a significant indirect effect through TA in its relation to negative emotions ($\beta = .106$; 95%CI = 0.026 to 0.219, $p = .028$), only in the defeat condition. The direct link between OP and negative emotions was significant in the defeat condition.

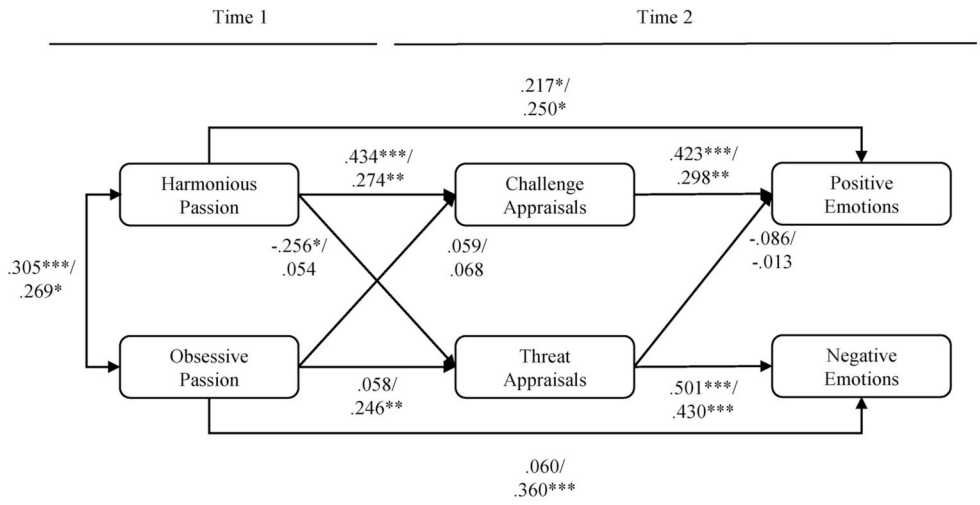
3.2.3. Alternative models

Considering the methodological design used, only one alternative model was possible. This alternative implied reversing the order between emotions and appraisals in the model, resulting in a model where passion (T1) was related to emotions (T2) which, in turn, were related to appraisals (T2). This alternative model showed fit indices that were not significantly different from the model presented above: MLR χ^2 ($df = 14$,

Table 2
Means, standard deviations, and correlation coefficients among variables included in Study 2.

	Mean (Defeat)	SD (Defeat)	1	2	3	4	5	6
1. Harmonious Passion (HP)	5.79	0.73	_	.28**	.29**	.02	.34***	.18*
2. Obsessive Passion (OP)	3.37	1.33	.36***	_	.15	.23*	.16	.46***
3.Challenge Appraisal	4.95	0,97	.45***	.21*	_	.01	.37***	-.07
4. Threat Appraisal	2.80	1.34	-.24*	-.03	-.11	_	-.01	.51***
5. Positive Emotions	4.88	1.19	.43***	.30**	.53***	-.18	_	.12
6. Negative Emotions	2.79	1.14	-.23*	-.16	-.16	.50***	-.06	_
Mean (Victory)	_	_	5.64	3.31	5.02	2.54	5.38	2.51
SD (Victory)	_	_	.78	1.11	1.17	1.28	1.08	.98

Notes. N = 194. The upper diagonal is for the defeat sample (n = 89) and the lower diagonal for the victory sample (n = 105). *$p < .05$, **$p < .01$, ***$p < .001$.



*Notes. * p < .05, ** p < .01, *** p < .001. N = 155. Standardized beta coefficients are presented. The upper side of the path is related to the coefficients for the victory group (n =105), and the lower part for the defeat group (n = 89).*

Fig. 2. Study 2. Results of the structural equation model on the relations between passion, cognitive appraisals, and emotions in the context of victory or defeat. Notes. *p < .05, **p < .01, ***p < .001. N = 155. Standardized beta coefficients are presented. The upper side of the path is related to the coefficients for the victory group (n = 105), and the lower part for the defeat group (n = 89).

N = 194) = 19.634, $p = .142$, CFI = 0.965, TLI = 0.931, RMSEA = 0.064 (0.000, 0.126), SRMR = 0.057. This model was not retained as the sequence from emotions to appraisals was inconsistent with theory and research on the role of appraisals in emotions (Meijen et al., 2020; Moors et al., 2013).

3.3. Brief discussion

The findings of Study 2 revealed that the basic model obtained in Study 1 involving passion, appraisals and negative emotions was largely replicated within the conditions of victory and defeat. These results are in line with past research on the relationship between passion and appraisals (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013), and between appraisals and emotions in sport (e.g., Cerin, 2003; Kavussanu et al., 2014; Nicholls et al., 2012; Rossato et al., 2018; Skinner & Brewer, 2002). The only link that was not replicated was that of OP with TA in the victory condition. Overall, these findings suggest that although HP may be associated with the same evaluative cognitive processes in both victory and defeat conditions, OP may relate to an assessment of the situation as less threatening when things go well (in the victory condition). These results yield a more nuanced understanding of the role of passion in cognitive appraisals and emotional experience in sports and lead to some implications that are discussed below.

4. General discussion

The purpose of this research was to test an integrative model involving passion, appraisals, and emotions. Specifically, it was expected that HP would be mostly positively linked to CA, while OP would be mainly positively linked to TA. Moreover, it was expected that HP would be negatively related to TA, but that OP would not be linked to CA. Finally, in line with past emotion research (e.g., Jones et al., 2009; Moors et al., 2013; Rossato et al., 2018; Skinner & Brewer, 2002), CA were expected to be positively related to positive emotions and TA to negative emotions. The results of two studies largely provided support for the model with some nuances. We discuss the implications of these findings below.

4.1. Passion and appraisals

A first implication is that the present findings underscore the association of passion with cognitive appraisals. These findings are in line with past research on the relationship between passion and appraisals (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013). However, the present research is the first to test and support the role of passion in appraisals with athletes. Past studies were conducted with students (Schellenberg & Bailis, 2016) and hockey fans (Schellenberg, Bailis, & Crocker, 2013). Results from the current studies were generally consistent with previous research (Schellenberg & Bailis, 2016; Schellenberg, Bailis, & Crocker, 2013), providing support for the positive links of HP with CA and of OP with TA. More precisely, as pertains to HP, results from Study 1 were in line with results from previous research from Schellenberg and Bailis (2016) as HP was positively related to CA, and negatively related to TA. Results from Study 2 in the victory condition replicated these findings. However, results from the defeat condition in Study 2 were slightly different. Specifically, the negative path between HP and TA did not reach significance. This finding, however, is consistent with that in the study from Schellenberg, Bailis, and colleagues (2013). Indeed, whereas Schellenberg and Bailis (2016) found a negative link between HP and TA, Schellenberg, Bailis, and colleagues (2013) did not. These results of Study 2 suggest that when defeat becomes the most likely outcome of an important sports game, HP might lose its protective effect on TA. This could occur because in such context certain situational cues may direct the focus of the athlete on the stakes of a potential loss, exerting a stronger influence on appraisal patterns than the more dispositional influence of HP (see Hanin, 2007; Lazarus, 1991, 1999; Reisenzein, 2006).

Regarding OP, the present findings generally replicate previous studies from Schellenberg and Bailis (2016) and Schellenberg, Bailis, and colleagues (2013), as the path between OP and TA was supported in both Study 1 and in the defeat condition of Study 2. However, this path was not replicated in the victory condition of Study 2. Thus, although athletes with OP may typically assess situations through a threat lens, such may not be the case when winning. This may be due to the fact that in the context of victory, athletes with a predominant OP are less likely to be exposed to ego-threatening external cues associated with losing

(see Hanin, 2007; Lazarus, 1991, 1999; Reisenzein, 2006). Thus, the OP-TA link becomes much less important. Future research on this issue is important.

The present findings provide additional support for tenets of the DMP (Vallerand, 2010, 2015) by demonstrating that HP and OP are related to different assessments of a specific situation. Specifically, the DMP suggests that HP leads to perceiving the demands of a given situation, such as an important game, as a positive challenge to be met rather than a threat to be avoided. This is in line with past research that has shown HP to be positively associated with non-defensiveness and mindfulness (St-Louis et al., 2018) as well as a secure and stable self-esteem (Mageau et al., 2011; Vallerand, 2010), mastery goals (Bonneville-Roussy, Lavigne, & Vallerand, 2011; Vallerand et al., 2007, 2008; Verner-Filion, Vallerand, Amiot, & Mocanu, 2017), and better task coping skills (Schellenberg, Gaudreau, & Crocker, 2013; Verner--Filion et al., 2014). Such characteristics would foster a commitment toward the activity where attention is directed primarily toward opportunities for gain, while generally protecting the individual from being distracted by the stakes of potential losses. However, findings in the defeat condition of Study 2 provide some nuance to this analysis.

On the other hand, the DMP posits that OP leads to a greater tendency to interpret demands as a threat. This is in line with the findings that show that OP is associated with lower mindfulness (St-Louis et al., 2018), contingent self-esteem (Mageau et al., 2011; Vallerand, 2010), performance-avoidance goals (Bonneville-Roussy et al., 2011; Vallerand et al., 2007, 2008; Verner-Filion et al., 2017), and avoidance coping skills (Schellenberg, Gaudreau, & Crocker, 2013; Verner-Filion et al., 2014). However, findings from the victory condition of Study 2 bring some nuance to this analysis. These findings are interesting as they suggest that the cognitive appraisals of passionate people may be relatively dynamic and depend on both the type of passion and the situation at hand (e.g., Moore, Freeman, Hase, Solomon-Moore, & Arnold, 2019). Future research on the passion-appraisals relationship in situations other than victory/defeat (e.g., being criticized by the coach) would appear important.

Results from Study 2 also suggested that in a context of victory, the indirect effect of TA in the relationship between OP and negative emotions was nonsignificant. It is possible that with OP winning is subjectively experienced as reassuring and non-threatening, allowing athletes to feel comfortable despite their fragile self-esteem and therefore lowering their experience of negative emotions (e.g., Verner-Filion et al., 2018). However, this finding should be replicated in future research. Additional research is also necessary to further investigate the potential protective effects of HP against TA and the harmful effects of OP on one's CA. Furthermore, future research should take a closer look at the effects of victory and defeat contexts on the passion-appraisals relationships to better understand the circumstances in which HP might not always protect against TA and in which OP does not necessarily lead to TA. Another interesting research avenue is to consider sports where victory and defeat do not consist of a binary outcome but rather of a form of ranking, as it is the case in cheerleading, powerlifting, or figure skating competitions. For instance, research by Medvec, Madey, and Gilovich (1995) has shown that bronze medalists at the 1992 Summer Olympics displayed *more* positive emotions than silver medalists. Thus, the dynamic role of cognitive appraisals in such context (see Uphill, Rossato, Swain, & O'Driscoll, 2019) may play a different role in emotions than in a victory/defeat situation and research on the issue is important.

4.2. Appraisals and emotions

A second implication of the present findings is the support they bring for the association between appraisals and emotions in sports. The two sets of paths linking CA with positive emotions and TA with negative emotions were in line with the hypotheses that rest on theory and research on the role of appraisals in emotions (e.g., Jones et al., 2009; Lazarus, 1999; Meijen et al., 2020; Moors et al., 2013; Rossato et al., 2018; Skinner & Brewer, 2002). These findings are in line with past findings that show that CA mainly contribute to positive emotions and TA to negative emotions in sports (e.g., Cerin, 2003; Kavussanu et al., 2014; Nicholls et al., 2012; Rossato et al., 2018; Skinner & Brewer, 2002). The present findings also find echo in the postulates of the TCTSA model (Jones et al., 2009), which stipulate that *"positive emotions will typically, but not exclusively, be associated with a challenge response and negative emotions will typically, but not exclusively, be associated with a threat response"* (Jones et al., 2009, p. 21). Overall, the present findings underscore the clear association between CA and positive emotional experiences and between TA and more negative emotional experiences in sport.

Although CA and TA were consistently related to positive and negative emotions respectively, the crossover relationships between appraisals and emotions deserve comment. First, the negative association of CA with negative emotions were not obtained in either study. Although not hypothesized, these findings are in line with some research (e.g., Kavussanu et al., 2014; Meijen et al., 2014; Nicholls et al., 2012). However, they are also contrary to the findings of other research that has found CA to be negatively related to negative emotions (e.g., Rossato et al., 2018; Skinner & Brewer, 2002). The discrepancy between these later findings and the results of the present research may be potentially attributable to two measurement features, namely the fact that emotions in the present research were assessed by recall (Study 1) and, in the case of Study 2, in a natural setting, rather than simply prior to a stressful event (Skinner & Brewer, 2002) or during a competition simulation (Rossato et al., 2018). Second, the negative link between TA and positive emotions was found in Study 1 but not in Study 2. Although not hypothesized, these findings are in line with past research, where the relationship was obtained in some studies (e.g., Skinner & Brewer, 2002) but not in others (e.g., Adie et al., 2010; Cerin, 2003; Kavussanu et al., 2014; Meijen et al., 2014; Nicholls et al., 2012). These findings await replication, and future research should investigate the potential existence of a detrimental effect of TA on positive emotions and of a protective effect of CA on negative emotions. Overall, future research should explore the relationship between appraisals and emotions using different measurement methods (i.e., scales, physiological measurements, etc.) and while also considering a variety of emotion scales, including discrete emotions of different activation levels (see Barrett & Russell, 1998; Lazarus, 2006).

4.3. Implications for theory and practice

The present research contributes to the literature on CA and TA in sports by identifying important contextual antecedents, namely HP and OP. For the passion literature, the present research provides at least two main contributions. First, it replicated some of the findings from Schellenberg and Bailis (2016) and Schellenberg, Bailis, and colleagues (2013) on passion and appraisals in the context of sport that had only been looked at with sports fans. As such, the present research clearly identifies cognitive appraisals as important mechanisms mediating the passion-emotions relationship with athletes (e.g., Philippe et al., 2010; Rousseau & Vallerand, 2008). Second, the present research also provides a better understanding of how the passion-appraisals-emotions interface takes place in actual sports settings within conditions of victory and defeat (see Vallerand & Verner-Filion, 2020).

The current findings also have practical implications. As such, the present research highlights the role of HP for sports as a resource promoting CA, and sometimes possibly protecting against TA. Coaches looking to promote CA in their athletes may thus try adopting an autonomy supportive approach to coaching, as research has shown that such a coaching style promotes the development of HP (Mageau et al., 2009). Moreover, the present findings also highlight that the controlling practices used by some coaches known to foster OP (Lafrenière et al., 2012) may, in turn, lead to TA thereby leading athletes to experience

negative emotions. For instance, techniques that involve imposing pressure on athletes (see Meijen et al., 2020), where the evaluative and ego-threatening aspects of certain tasks are brought forward by practitioners, could potentially backfire with athletes who hold a predominant OP for their sport (see Vallerand & Verner-Filion, 2020).

4.4. Limitations

The present research has several limitations. First, since all variables in this study were assessed using self-reported measures, the results are subject to certain biases such as social desirability or the simple mismatch between subjects' recall and actual states. Future research using a variety of objective measures such as physiological (e.g., blood pressure, hemodynamic measurements, cardiac output, and total peripheral resistance) and neuroendocrine (e.g., neuropeptide Y, cortisol, and oxytocin) indicators (see Meijen et al., 2020) as well as coaches' assessment are recommended. Second, only certain types of appraisals and emotions were measured in the present research, and the measure of appraisals used in this research (i.e., CAT-Sport) has a limited theoretical equivalence with the work of Lazarus (1991, 1999). As explained by Meijen et al. (2020), more comprehensive self-report measures of cognitive appraisals need to be developed and used in future research to better reflect the different relevant components of this complex process. A better account of the emotional experiences that relate to appraisals in sport could be obtained by examining the potential temporal dynamics of TA and CA (see Uphill et al., 2019) and by developing measurements that allow identifying states of high and low levels of threat as well as high and low levels of challenge (see Meijen et al., 2020). Finally, although Study 2 used a short prospective design, it was nevertheless correlational in nature and therefore does not allow for the inference of causality. Future research should use an experimental paradigm to assess the relationships between the variables at play in this research. Although past research experimentally inducing HP and OP has led to the same conclusions as research using the Passion Scale (e.g., Bélanger et al., 2013; Lafrenière, Vallerand, & Sedikides, 2013), such research did not involve cognitive appraisals and future research should do so.

5. Conclusion

The results from two studies supported the existence of the mediating role of appraisals in the relationship between passion and emotions. Specifically, HP leads to the adoption of CA that contributes to the experience of positive emotions, whereas OP leads to TA that overall leads to the experience more negative emotions (but not so in victory). Future research is needed to replicate these findings and to better understand how these processes operate in victory and defeat situations.

Author statement

Charles-Étienne Lavoie: Conceptualization, Formal analysis, Methodology, Investigation, Writing - Original Draft, Writing - Review & Editing, and Resubmission.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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