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How discrete emotions arise during the "heat" of sport competition: a naturalistic study in Roller Hockey

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ABSTRACT

Emotions have an undeniable influence on sports competition. Therefore, studies focused on their antecedents are essential for understanding emotions in sports. Within the Cognitive- motivational-relational theory framework, this study intended to explore cognitive appraisal processes and discrete emotions during Roller Hockey competitions. Five elite roller hockey players (M = 28.6 years) were interviewed about three different games using a self- confrontational approach. The players identified eleven discrete emotions: happiness, relief, discouragement, anxiety, confidence, anger, disgust, pride, tranquillity, sadness, and shame. Positive emotions were more likely to arise in situations that brought the players closer to their goals, whereas negative emotions were more frequent in situations that threatened their goals. Findings suggest that primary appraisals often precede positive emotions, whereas secondary appraisals are more associated with negative emotions. These findings support the link between cognitive appraisals and emotions and highlight the need for continuing this line of study.

KEYWORDS: discrete emotions; cognitive appraisals; cognitive-motivational-relational theory; sport competition; Roller Hockey.

INTRODUCTION

The undeniable role of emotions in sport has long been the focus of several studies across various contexts and theoretical backgrounds (e.g., Laborde et al., 2013). Despite the different approaches, studies agree that attaining the appropriate emotional state before and during competition is essential for athletes' success (Martinent & Ferrard, 2009; Martinent et al., 2012; Neil et al., 2016). In this sense, the study of cognitions (appraisals) that trigger and generate discrete emotions is particularly relevant, not only for increasing knowledge about how discrete emotions unfold during sports competition (e.g., Martinent & Ferrard, 2015a, 2015b; Uphill & Jones, 2007) but also to provide essential cues for interventions aimed at improving athletes' wellbeing and performance (e.g., Laborde, Dosseville, & Allen, 2016; Martinent et al., 2015).

One of the most widely studied perspectives on emotions in sport is the cognitive- motivational-relational theory (CMRT) proposed by Lazarus (1991, 2000) (Martinent et al., 2015; Uphill & Jones, 2007), which has been helpful in explaining the cognition-emotion relationship (Martinent & Ferrard, 2015a). According to this theory, discrete emotions arise from a process of cognitive appraisal, which reflects the individual's meaning of a situation. Emotions are organised psychophysiological reactions towards ongoing relationships with the environment, including subjective experience, physiological changes, and cognitive processing (Lazarus, 1991). Therefore, it is not the situation that leads to an emotion but rather the individual's evaluation of a situation (Lazarus, 2000; Smith & Lazarus, 1993). Thus, each emotion has a distinctive core relational meaning that reflects a summary of six appraisal processes, including primary (goal relevance, goal congruence, type of ego involvement) and/or secondary appraisals (blame or credit, coping potential, future expectations) (Lazarus, 1991). Primary appraisals are an evaluation of the situation considering

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its relevance to the individual's goal commitments, situational intentions, and beliefs about self and world. More specifically, goal relevance is critical to the experience of stress, as individuals will strive to attain their goals even in the face of adversity or discouragement. Conversely, a situation may be evaluated as irrelevant if the individual's wellbeing and goals are not at stake (Lazarus, 1991, 2000; Lazarus & Folkam, 1984). For instance, a player may want to have fun during a game, and thus winning may not be relevant. In turn, goal congruence refers to the extent to which the encounter is considered to be in line with the individual's goals, i.e., whether the situation facilitates or undermines the attainment of personal goals (Lazarus, 1991, 2000; Lazarus & Folkam, 1984). For instance, these can include good personal performance or the absence of mistakes (Martinent & Ferrard, 2015a). Lastly, the type of ego involvement includes aspects of ego-identity, such as moral values, self- and social-esteem, other individuals and their wellbeing, meanings and ideas, ego-ideals and life goals, and how these shape emotions (Lazarus, 1991). Ego involvement refers to goals within the scope of ego identity, such as self- esteem (Lazarus, 1991; Martinent & Ferrard, 2015a). For instance, failing to play according to one's personal standards may affect a player's self-esteem.

Besides appraising whether the situation affects their wellbeing (primary appraisals), individuals also appraise what can be done. Secondary appraisals also have three components: Blame or credit (accountability), coping potential, and future expectancy. Accountability can be internal, when directed towards oneself, or external, when directed towards another individual (Lazarus, 1991, 2000). Thus, players can take blame or credit themselves or others for their performance in a given situation. Indeed, Martinent and Ferrard (2015a) demonstrated that the perception of credit for one's performance was associated with pride, whereas blame was associated with the experience of anger.

Furthermore, the appraisal of coping potential reflects how and whether the individual would deal with the demands of the situation. This appraisal reflects players' perceptions of their ability to handle the situation. In its turn, future expectancy is associated with the potential changes that might occur in the situation that could be motivationally congruent (Smith & Lazarus, 1993). Martinent and Ferrand (2015) observed that when secondary appraisals are favourable, positive emotions are more likely to be intensified, whereas perceptions of less favourable secondary appraisals lead to the intensification of negative emotions (Lazarus, 1991, 2000; Martinent & Ferrard, 2015a).

Cognitive appraisals in the context of sport

Despite the importance of understanding the appraisal processes underlying the generation of different discrete emotions, few studies have focused on these cognitive appraisals in sports (e.g., Martinent & Ferrand, 2015a; Uphill & Jones, 2007). Graham et al. (2002) did not observe a consistent link between goal importance, goal-performance discrepancy, and emotions but highlighted potential measurement issues. Nevertheless, Herrald and Tomaka (2002) confirmed that goal congruence, future expectancy, and coping potential are associated with subsequent emotional experiences, such as shame, anger, and pride. In a similar vein, a qualitative study by Uphill and Jones (2007) also provided evidence for the relevance of primary (goal relevance, goal congruence, ego-involvement) and secondary (accountability, coping potential, future expectations) cognitive appraisals in the generation of a wide range of discrete emotions, including shame, pride, relief, sadness, happiness, guilt, anger, and anxiety. Nonetheless, other discrete emotions not initially proposed by Lazarus (2000) were also identified, such as satisfaction, excitement, regret, embarrassment, and discouragement.

Using self-confrontation interviews, Sève et al. (2007) found that the emotional experiences of table tennis players were influenced by set results and by players' interpretations of the specific match situation. Players also reported a wide range of discrete emotions, including 'pleasant', such as pleasure, relief, satisfaction, and confidence, and 'unpleasant', including worry, irritation, discouragement, and displeasure. More importantly, this study provided evidence of bidirectionality in the emotion–performance relationship, in that discrete emotions simultaneously influence and are influenced by match outcomes. In a more recent study, Martinent and Ferrand (2015a) also used a qualitative self-confrontation video-assisted interview to explore appraisals associated with emotions during competition among table tennis players. Overall, and consistent with previous studies, results revealed that athletes reported the discrete emotions suggested by Lazarus (2000), such as joy, relief, hope, pride, anger, and disgust, as well as others that were not initially proposed, such as discouragement and serenity. Specifically, this study also distinguished between self-, other-, and environmental-oriented anger, each with different appraisal patterns. Findings also contributed to the evidence of the association between primary and secondary appraisals and discrete emotions experienced by table tennis players during competition (Martinent & Ferrand, 2015a). More recently, Lewis et al. (2017) examined the emotional experiences of adolescent tennis players and found that these were mainly influenced

by athletes' perceptions of their own performance and match outcomes. More specifically, the players reported experiencing distinct emotions depending on how they appraised their performance, the opponent's behaviours, and the evolving scoreline in relation to their competitive goals.

The current study

Within the theoretical background of the CMRT perspective (Lazarus, 1991, 2000), which posits that primary and secondary appraisal shape discrete emotions, and in line with previous naturalistic investigations in sport settings (Lewis et al., 2017; Martinent & Ferrand, 2015a; Martinent et al., 2012; Séve et al., 2007), the present study focuses on emotions experienced in vivo during competition rather than on pre-competitive states that have dominated the literature (e.g., Nogueira et al., 2025). Recent conceptual and empirical developments have further emphasised the need to examine how specific game contexts and evolving appraisals jointly shape the dynamic unfolding of athletes' emotion trajectories and their consequences for performance (e.g., Cece et al., 2019; Levillain et al., 2022).

Against this backdrop, and within the CMRT framework, two main goals guided this investigation, namely (a) to explore which discrete emotions are experienced during competition within specific situations and moments of the game (attack, defence, dead balls, and environment), and (b) to analyse the relevance of all six appraisal processes proposed by Lazarus (1991, 2000) in association with different discrete emotions.

METHOD

Philosophical orientation

This study followed a relativist ontology and a constructivist epistemology within an interpretivist perspective (Bloomberg & Volpe, 2018; Smith et al., 2014). Within a constructivist epistemology, the researcher/interviewer and the participants are entangled, and the data arises from their interaction (Smith et al., 2014). Additionally, because the relativist ontology contends that reality can be accessed in the form of mental constructions (Smith et al., 2014) and focuses on understanding the subjective experience of reality (Levers, 2013), this approach was considered the most adequate for studying athletes' subjective cognitive appraisals and discrete emotions during competition through their interpretations (Smith et al., 2014). Therefore, this study relied on a relativist ontology and a constructivist epistemology to assess athletes' subjective cognitive appraisals and discrete emotions (Bloomberg & Volpe, 2018; Smith et al., 2014).

Participants

The participants in this study were a convenience sample, selected based on their availability and accessibility at the time of data collection. This type of sampling is characterised as a non-probabilistic technique, in which individuals are included in the study based on criteria of ease of access and willingness to participate, without ensuring that all members of the target population have the same probability of being selected (Creswell & Poth, 2014; Marconi & Lakatos, 2021). Additionally, participants were selected according to criteria that ensured the sample reflected elite roller hockey athletes competing at the highest international levels. Eligible players were required to belong to top-tier teams participating in major national and international competitions, including the First National Division, the Portuguese Cup, and the European League. Only athletes actively involved in internationally regulated tournaments and regularly participating in official matches during the season were invited to take part. In addition, players needed to be available for three post-match interviews after games in which their team won. Conversely, players were excluded if their competitive context or playing conditions did not align with the objectives of studying performance within elite international roller hockey environments. Players who were not engaged in consistent participation within formally sanctioned competitions, or whose competitive exposure was limited to regional or lower-tier tournaments, were not considered. Individuals whose availability did not allow for repeated post-match interviews, or whose competitive schedule lacked the continuity required for systematic data collection, were also excluded. Additionally, athletes recovering from injury, undergoing restricted training routines, or experiencing temporary interruptions in their competitive activity were not eligible for inclusion. Accordingly, the sample consisted of five male roller hockey players aged 23–37 years (M = 28.6 years), representing different nationalities (Portuguese, Spanish, Italian, French, and Argentine). All participants were actively competing in national and international tournaments, including the First National Division, the Portuguese Cup, and the European League. Their experience in roller hockey ranged from 11 to 30 years (M = 24 years), and each athlete had participated in 20 or more official games during the season in which the study was conducted. A total of 15 semi-structured interviews were carried out, with each participant being interviewed after three different games, all of which resulted in a victory for their team.

Instruments

Following a similar procedure as in Martinent and colleagues' studies (Martinent et al., 2012; Martinent & Ferrand,

2015a, 2015b; Sève et al., 2007; Uphill & Jones, 2007), a semi- structured interview guide directly provided by these authors was used to confront the players in each specific situation. Overall, the interview guide was consistently and systematically applied to all the players. The guide focused on obtaining details about the discrete emotions experienced in the specific moment of the game, such as "How did you feel at that moment? Can you describe what you were feeling?" as well as questions focused on how players appraised the situation, including "Tell more about how you felt? Was this situation important for you and your aims for the game?". It is important to note that during the interview, players were not informed that this study analysed their discrete emotions and cognitive appraisals. Consistent with previous studies (e.g., Martinent & Ferrand, 2015a, 2015b), this ensured that the players' cognitive appraisals reflected their own experiences. However, questions were asked openly and flexibly to allow a deeper discussion of players' discrete emotions, and the order and probes were adjusted based on players' responses.

Procedures

This study focused on a naturalistic ecological video-assisted approach (Martinent et al., 2012; Martinent & Ferrand, 2015a, 2015b; Sève et al., 2007; Uphill & Jones, 2007). Therefore, self-confrontation interviews were used, which consist of a precise research protocol that allows access to the participants' experiences by confronting them with an audiovisual recording of their activity (Poizat et al., 2013). In this process, participants are encouraged to provide descriptions and comments about the moments portrayed in an activity previously recorded (Poizat et al., 2013). Thus, as participants viewed a video of their performance, they were asked to comment on what was happening at that moment, such as what they felt, thought, and did (Sève et al., 2013). The videos aimed to bring the players as close as possible to their experiences with the game situation (Martinent et al., 2012). This process also aimed to facilitate the recall of specific situations and to explore discrete emotions and appraisal processes (Martinent & Ferrard, 2015a; Uphill & Jones, 2007).

Therefore, self-confrontation interviews were conducted after three matches at a time more convenient for the players. In addition to players' availability, only games with high competitive stakes were selected. Indeed, previous research has suggested that emotions tend to be more intense when important goals are at stake (Lazarus, 1991, 2000; Martinent & Ferrand, 2009, 2015a). All three games were already recorded, as this is standard procedure for all important games in roller hockey.

Afterwards, specific situations and moments from the game were selected to guide participants' recall of their emotional experiences during the competition. These situations were obtained using a preliminary survey administered to a panel of experts in the field of roller hockey. These included players and coaches competing at the same level as participants. Experts were asked to report 10 situations during a roller hockey game that might be associated with positive or negative emotions. Qualitative analysis of the survey suggested four main general dimensions: attack, defence, dead ball, and relationships. Each general situation included specific situations of the game. Therefore, video recordings of three games were edited to select specific situations, including all general and specific game situations. Therefore, each player was interviewed for these specific game situations.

All the interviews were conducted in person by the first author of this study, who has appropriate training and several years of practice as a sport psychologist in roller hockey. Players were asked whether the interview could be recorded, and all five participants consented.

All procedures adhered to ethical standards for research involving human participants. Participants were fully informed about the study's aims and procedures, provided written informed consent, and were assured confidentiality and the right to withdraw at any time. Data collection and storage complied with accepted ethical and data protection principles. Therefore, all participants provided written consent, participated voluntarily in the study, and had their interviews recorded.

Overall, 15 interviews were performed, wherein each participant was interviewed at three different moments for the three different games. Additionally, participants won all three games. Each interview lasted an average of 40 minutes, ranging from a minimum of 27 to 52 minutes.

Data analysis

All the interviews were transcribed verbatim, which resulted in a total of 126 single- spaced pages. First, all the transcripts were read and re-read to ensure familiarity with the data. Following the procedures described in similar studies (Martinent & Ferrand, 2009, 2015a), the videos of the matches were viewed while also listening to the audiotape of the corresponding interview. This process aimed to identify and note potentially essential details, such as nonverbal cues that might not be apparent in the transcriptions (Jones et al., 2012).

This study followed a qualitative content analysis, "a research method for subjective interpretation of the content of text

data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). More specifically, content analysis involves classifying different materials into categories that share a common or similar meaning. This method was selected because it allowed an in-depth analysis of cognitive appraisals and emotions during sports competition.

Therefore, for each specific game situation, the first author carefully read the interviews, identified, and coded Elementary Units of Meaning (EUMs). EUMs consist of words, phrases, and sentences of the players' speech, representing their experiences (Martinent & Ferrand, 2009, 2015a, 2015b). Afterwards, the analysis was conducted for each emotion identified in the players' speech. A coding protocol was initially developed based on Lazarus's (2000) CMRT and previous studies on emotions and appraisals in sports. The coding protocol involved the emotions proposed by Lazarus (2000): anger, anxiety, fright, guilt, shame, sadness, envy, jealousy, happiness, pride, relief, hope, love, gratitude and compassion. For each discrete emotion identified, a set of categories was considered deductively, including all primary (goal relevance, goal congruence, ego-involvement) and secondary (accountability, coping potential, future expectations) appraisals (Lazarus, 1991, 2000). However, categories that emerged during the analysis were also included. Accordingly, data analysis followed a deductive approach, reflecting the categories considered in the initial coding protocol, and an inductive approach, in which new categories that emerged from the players' speeches were included. This process resulted in a constant and systematic rearrangement of the coding protocol throughout the data analysis (Schilling, 2006).

More specifically, after identifying the emotion involved, each EUM was clustered into categories and subcategories with similar meanings while separating categories with different meanings (Patton, 2002). Categories and subcategories were constantly revised until a final version was reached and organised according to their meaning (Martinent & Ferrand, 2009, 2015a, 2015b; Patton, 2002). Some EUMs were coded into two or more categories during this process. Therefore, because human experiences are intertwined, the categories obtained in this study were not mutually exclusive (Graneheim & Lundman, 2004).

Trustworthiness

During the coding process, some steps were taken to ensure the reliability and trustworthiness of the data. Agreement during the coding process was ensured through multiple debriefing meetings with the study's authors and members of the research team (Creswell & Poth, 2014). These meetings allowed each member to serve as a devil's advocate, constantly challenging the coding process and interpretation (Krane et al., 1997). As an additional step to ensure trustworthiness, inter-rater agreement was assessed using Cohen's kappa. For this purpose, the second author of the study independently coded a randomly selected interview. This analysis revealed a coefficient of .69, which suggests a "good" degree of agreement.

RESULTS

Overall, 96 reports of discrete emotions were mentioned during the analysed games, including 11: happiness, relief, discouragement, anxiety, anger, disgust, confidence, pride, tranquillity, sadness, and shame. Anger was the most frequently reported discrete emotion among these roller hockey players, followed by happiness, confidence, and relief. Conversely, anxiety, disgust, discouragement, and shame were less frequently reported. Nonetheless, players often reported the co-occurrence of different emotional states simultaneously (e.g., happiness and anger after scoring a goal) and the difficulty in identifying which discrete emotion they were feeling.

The following sections present general game moments, the corresponding specific situations, the discrete emotions that arose, and the associated appraisal processes (Appendix 1 provides the tables of each section).

Attack

The general game dimension of attack included the specific game situations of scoring a goal, ball lost, assistance, shot, organised attack, annulled goal and foul suffered (Table 1). In the specific situation of scoring a goal, these players reported happiness more frequently. Goal relevance was particularly important for its generation, as was described by an athlete who highlighted that scoring a goal was part of his objectives for that game.

> *….scoring was one of my personal aims. After being unable to win in the "X game"…. Because it was a game in which I couldn't score but had many opportunities. Yes, this [scoring] was a personal aim for the game* # Athlete D

Interestingly, the co-occurrence of sadness and happiness was also reported in the same specific game situation. An athlete described his happiness at scoring a goal, but at the same time, sadness because he felt the current situation was inconsistent with the aims he considered necessary.

Table 1. Specific game situations, discrete emotions and cognitive appraisals in the general game situation of attack.

Specific game situations	Emotions	Cognitive appraisals
Scored goal	Happiness	Goal relevance Goal congruence Ego involvement Coping potential Accountability Future expectations
	Relief	Goal relevance Goal congruence Ego involvement Accountability
	Happiness and anger	Goal relevance Ego involvement
	Happiness and sadness	Ego involvement
Ball lost	Anger	Goal relevance Goal congruence Ego involvement Coping potential Accountability
	Anxiety	Ego involvement
	Sadness	Coping potential Future expectations
	Discouragement	Goal relevance Goal congruence Ego involvement Coping potential Future expectations
	Anxiety and anger	Ego involvement Coping potential
	Not identified	Coping potential Accountability Future expectations
Assistance for goal	Happiness	Goal relevance Goal congruence Ego involvement
	Happiness e relief	Goal relevance Goal congruence Future expectations
Shot	Confidence	Goal relevance Ego involvement
	Anxiety	Goal relevance Coping potential
	Not identified	Future expectations
Organized attack	Tranquility	Goal relevance Goal congruence Ego involvement Coping potential Future expectations
	Happiness	Goal relevance Goal congruence Accountability
	Confidence	Goal relevance Goal congruence
Annulled goal	Anger	Goal congruence Ego involvement Coping potential
Foul suffered	Shame	Goal congruence

> *I was happy to score, but I was still thinking at the same time that I was feeling sad. Although I was winning by many, we needed to play better to keep growing or improving as a team. Or we were playing well. As I watched the game, perhaps we played well in some moments (…). However, I didn't feel it* # Athlete B

The specific situation of losing the ball included actions such as an intercepted pass, recovery, or interception of the ball by the opponent, resulting from an offensive moment to a defensive phase of the game. The discrete emotions reported by players in this situation were mostly negatively-toned, with anger being reported more frequently. Several players reported secondary cognitive appraisals, more specifically, coping potential. Thus, it seems clear that, in a sense, the participants tried to understand how they could handle losing the ball.

Assistance for goals refers to the last pass from an athlete to his teammate before scoring a goal. Discrete emotions reported in this situation were positive, with happiness being the most frequent. All primary cognitive appraisals were present in this game situation (i.e., goal relevance, goal congruence, and type of ego involvement).

Players also reported that when experiencing the discrete emotion of happiness, the secondary cognitive appraisal of accountability was often associated with valuing their contribution (credit) towards achieving the goal through assistance:

> *Yes, how I acted in the play was critical. The way I simulated the shot and assisted the goal of my teammate was an essential moment in this play and with a direct contribution. It was not decisive in scoring the goal but critical in helping my teammate.* # Athlete A

Another specific situation part of the attack was a shot, which included all shots on goal that did not result in a goal, as well as shots defended by the opposing goalkeeper and shots out of the goal. Among the discrete emotions reported, anxiety was the most frequent. The primary cognitive appraisal of the type of ego involvement was also highlighted, suggesting the importance of the game to the participants.

> *The anxiety of wanting to "knock them down" (...) Because, maybe, especially in the second shot (…) I don't know, but maybe in another game, instead of having struck, I should have stopped the ball and continued the play. These are decisions we make at the moment. However, it's a bit of*

anxiety. (…) We recovered the ball and shot for the goal. There was also time for that, but there it was (…). We wanted to score the second goal and secure our victory. # Athlete B

In the organised attack, images associated with the team's offensive dynamics were shown when they had the ball. This possession corresponded to standard actions previously trained and integrated into the available time for attack (45 seconds). Discrete emotions reported in this specific game situation, which were generally positively toned: tranquility, happiness, and confidence. Cognitive appraisals were associated with the individual's and the team's game goals, including the primary cognitive appraisals of goal relevance and congruence.

During the 15 interviews, the athletes were confronted several times with the fouls they had suffered. All situations regarding this specific dimension were considered normal in the game. However, most players did not report any emotions. Interestingly, the only emotion identified was shame when the referee pointed out a simulated foul to the player.

Here, I don't know if I will be penalised or if I ruined it. Here I felt shame (…) I had a bad game against "X" in which I was 14-14, and I simulated in such a way (…). The "opponent X" didn't hit me with the stick, and I threw myself. Then I thought: "I made a fool of myself" # Athlete A

Defence

The defence included the specific game situations of defence recovery, suffered goal, opponent shot, intersection, ball recovery, goalkeeper defence, and committed foul. Specifically, defensive recuperation refers to the moment after the loss of the ball in which the team intends to block the opponent. Athletes often reported confidence as the main discrete emotion (Table 2). Cognitive appraisals were primarily associated with the type of ego involvement, which was observed in the two identified emotions (confidence and pride). This moment appeared to be associated with the values and ego identity of the players.

This is very important to me. It gives me much confidence and makes me feel good in the game. Because these are my values, I must either run forward or run backwards. For me, I cannot rest. We go on a counterattack to try to score (…), lose the ball and recover defensively (…). Even more, to be able to block the ball that could go into our goal is, for me, very important. # Athlete C

Table 2. Specific game situations, discrete emotions and cognitive appraisals in the general game situation of defence.

Game situation	Emotions	Cognitive appraisals
Defensive recuperation	Confidence	Goal relevance Ego involvement Coping potential Accountability
	Pride	Ego involvement
Opponent goal	Anxiety	Coping potential Accountability
	Anger	Goal relevance Goal congruence Accountability
	Anxiety e sadness	Goal relevance Ego involvement Coping potential Accountability
	Not identified	Goal relevance Goal congruence Coping potential Accountability Future expectations
Opponent shot	Anger	Ego involvement Coping potential Accountability
	Confidence	Goal congruence Accountability
	Sadness	Goal relevance Coping potential
	Relief	Goal congruence Ego involvement Coping potential Accountability
Intersection	Happiness	Goal congruence
	Happiness e pride	Goal congruence Ego involvement Coping potential Future expectations
Ball recovery	Confidence	Goal relevance Ego involvement Accountability
	Sadness	Goal relevance Ego involvement Coping potential Accountability
	Happiness	Goal relevance Goal congruence Accountability
Goalkeeper defence	Anxiety	Goal relevance
	Tranquility	Goal congruence Coping potential Accountability
	Anger	Goal congruence Ego involvement Coping potential Accountability
	Relief	Goal relevance Goal congruence Coping potential Accountability
	Confidence	Goal relevance Goal congruence Coping potential Accountability
	Anger and happiness	Goal relevance Goal congruence Accountability
Committed foul	Anger	Ego involvement Coping potential

The suffered goal is one of the game situations seen by the players of the present study as a moment that could threaten the achievement of individual and collective aims - goal relevance. In terms of discrete emotions, this situation was mainly associated with negative discrete emotions, namely anxiety and anger. Nonetheless, several reports of secondary cognitive appraisals were identified in this situation, in which accountability was the most frequently reported, often linked to goals the team had suffered.

> *(…) maybe I could have done more and better. We were maybe organising the team more (…) because we could not control the game. We needed to turn the game to our advantage and manage to enforce our game. I could have done more.* # Athlete B

> *Relief was the most frequently reported emotion in the specific situation of the opponent shot. For instance, a player suggested that defence mistakes compromised his personal and the teams' aims, but the goalkeeper was able to defend the goal (goal congruency, ("I was relieved, because you know it is a (….) Our tactic was not the most correct and had a negative influence on the team's game, but I am relieved that we were able to defend this ball".* # Athlete A

Moreover, intersecting a ball when facing a shot may not lead the players to recover the ball. Athlete C describes this situation: despite being happy to intersect the ball, he still needed to be careful because the opponent still had the ball ("I felt happiness (…) Happy to stop this ball. This was a thought in a microsecond: "Okay". But I knew that this situation meant nothing. I still had to pay attention to the game", Athlete C). Besides happiness, this situation has also generated the co-occurrence of happiness and pride as an essential moment for achieving an objective.

Besides confidence and happiness, this situation was also associated with sadness when considering ball recovery. Despite the underlying positive nature of the situation for the game, other factors were related to the generation of sadness, such as the results of a previous game.

> *At that moment, I basically helped achieve our aims and (…) it was a good move for the team towards our aims. However, these situations are always positive, and I value my action. However, even so (…) I was still sad inside. I felt that way the whole game, with negativity (...). We were winning, and I think that, in my view, we had plans that were not being executed. # Athlete D*

The specific situation of fouls includes situations in which players committed fouls without the consequence of cards or a dead ball. Considering the referee's decision, anger was the most frequently experienced emotion in this situation, mostly associated with the secondary cognitive appraisal of coping potential.

> *A bit angry because I knew it wasn't a penalty. (…) I thought it was not a penalty and that he only blew the whistle for a penalty to balance the game a bit (…). First, he blew the whistle for us, and now he blows it for them.* # Athlete D

Nonetheless, anger seems to have been experienced at a lower intensity because the players' aims were not at risk ("The game was already in our favour. If the result was different, I could have felt anger or something (…). I don't think so (…) because of the result. If the result was not so good, it might have been important", Athlete D).

However, in most confrontations with this situation, players did not identify any emotion. Players mentioned that these were regular moments of the game, considered unimportant ("I don't think there is much emotion here either because it's not a violent foul. It is more a lack of defence, Athlete D).

Considering the specific characteristics of the goalkeeper, it was important to explore his role within the competition, intending to deepen the knowledge about the emotional experiences in this field position. Indeed, the goalkeeper seemed to have his perspective on the game. However, it is true that in a hockey or football team, when you lose, the whole team loses. However, in the end, the goalkeeper is the one who suffers the goals and the one who gets the most attention. Because in the end, the players lose…okay, but it's different. They are not the ones who suffer the six goals of "opponent X". They do not carry the six goals on their back. " (Athlete E).

In the game situation of goalkeeper defences, he often reports goal congruence, as this situation was considered essential for achieving his aims.

> *I aim to defend as many shots as possible and not let the ball in. It turns out to be an individual sport within team sports (…) that of the goalkeepers. We try not to, but sometimes it is. My aim is to defend balls, and that's it!* # Athlete E

Additionally, the goalkeeper also experienced anxiety in this specific dimension, which was associated with the previous game and the importance of this game for his objectives.

> *In the first two or three minutes, we all expected to know what would happen and what we could do. That was the feeling I got (…) anxiety (…) because I thought about what could happen there. The thought was: "We can't lose. We have to be calm", but after the previous game, we had doubts.*
> # Athlete E

Anger was another emotion experienced by the goalkeeper. In this case, after the defence, the player also mentioned sharing this emotion with his teammate.

> *At this moment, I paused a little bit (…) because we agreed, during the week, that the "opponent X" often does this: Lock and shoot. So we said we would cover his shot, but the ball went through. At that moment, I felt anger because we knew what the "opponent X" would do, and he managed to do it."*

Dead ball

The dead ball situation includes defended and suffered penalties and direct free kicks (defended, scored and failed). Overall, results suggested that positive emotions were associated with situations of success (direct free-kick scored or defended) and negative emotions with failure (direct free kick or penalty suffered) (Table 3). For example, in the direct free kick, players were proud on two occasions. Conversely, in a direct free kick suffered, the most experienced emotions were sadness and anger. Consistently, the cognitive appraisal of coping potential and accountability emerged more frequently in this situation. For example, a player who felt proud after a goal in the direct free kick highlighted the importance of preparation for these types of moments, making this encounter less threatening.

> *I already knew what I was going to do. That's what we talked about before. When you have worked on these moments many times, repeat it many times. When you get there, you are not worried because you have "seen" and worked for this many times. You go there, and you know what you have to do if one situation or another happens, and I was calm.*
> # Athlete C

In terms of appraisals of accountability, reports are mixed. On the one hand, a player felt happiness after defending a direct free-kick and attributed the responsibility for this action to himself.

Table 3. Specific game situations, discrete emotions and cognitive appraisals in the general game situation of dead ball.

Specific game situations	Emotions	Cognitive appraisals
Defended penalty	Happiness	Goal congruence
Opponent penalty score	Sadness	Coping potential Accountability
	Anger	Goal congruence Ego involvement Accountability
Direct free kick defended	Happiness	Goal relevance Ego involvement Coping potential Accountability
Direct free kick scored	Pride	Goal relevance Coping potential
Direct free kick failed	Anger	Ego involvement Coping potential Accountability Future expectations

> *Of course, I feel responsible because you always have a little more pressure. I studied a lot, and sometimes you can make a mistake and say, "We knew he was going to do it, and I didn't do what I had to do". I just thought he couldn't succeed in what we had prepared.*
> # Athlete E

Conversely, after a suffered penalty, the same participant felt angry but did not attribute accountability to himself. He argued that his game actions were the result of others' decisions.

> *I felt angry. In this penalty, I was very angry after the ball got in because I knew he could take action. We studied and knew that he could shoot the other way. At the time, I was told that I should shoot in another direction, and he ended up shooting to the side that I had said. (…) Here I don't feel much [responsibility] because I did what I was told to do.*
> # Athlete E

Relationships

Although not part of the moments directly linked to the game, the relationships that players and other agents establish with each other during competition can influence discrete emotions. Therefore, three specific situations/types of relationships were identified (arbitration, players-opponent relationship, and players-teammate relationship) (Table 4).

Table 4. Specific game situations, discrete emotions and cognitive appraisals in the general game situation of relationships.

Specific game situations	Emotions	Cognitive appraisals
Arbitration	Anger	Goal relevance Goal congruence Ego involvement Coping potential Accountability
	Sadness	Goal relevance Accountability
	Tranquility	Goal congruence Ego involvement
	Anger and sadness	Goal relevance Goal congruence Ego involvement Coping potential Future expectations
	Not identified	Goal relevance Goal congruence
Player-opponent relationship	Anger	Goal congruence Ego involvement Coping potential
	Tranquility	Goal congruence Ego involvement
	Disgust	Goal congruence Ego involvement Coping potential Accountability
	Not identified	Ego involvement Coping potential
Player-teammate relationship	Pride	Goal relevance
	Happiness	Goal relevance Goal congruence
	Anger	Goal congruence Ego involvement Coping potential Accountability

Arbitration was mainly related to the experience of negatively-toned emotions, with anger oriented towards arbitration arising in three situations. For instance, a player seemed to have felt anger due to both an obstruction to his aims (goal congruence) and blaming the referee.

> *…a lot of anger. It is unbelievable that this happened, which is the referee's fault. This game was 9–2, and you're working to keep these things from happening. You want to keep playing!*
> # Athlete E

Tranquillity was another emotion felt in the face of arbitration, which seemed to be associated with goal congruence since this action was close to the aims the athlete and team proposed. When considering the player-opponent relationship, anger and disgust were most frequently identified. These emotions mostly resulted from previous interactions with the same opponents, as one player mentioned:

> *This emotion resulted from the past, and it comes from other games. In both situations, I tackled them on purpose. In the other games, they did everything to us and used all the weapons. I felt anger, and maybe I was giving back what they did to me before.*
> # Athlete B

Additionally, players also described the emotion of disgust, which often results from the opponents' consecutive fouls and aggressive behaviour.

> *These situations started to make me "sick" (…) What bothers me here is that he put his hand in my face so I fell (…) three minutes to go, and I said: "Now is not the time to do this" (…) I was upset because the game was already solved, and he just went there to give it to me. (…). I felt disgusted by him. I was disgusted by his action because it was something that made no sense.*
> # Athlete E

Moreover, in the relationship between player-teammates, emotions were primarily positive, including pride and happiness. Regarding cognitive appraisals, these emotions appear to result from goal congruence, as the situations were essential for the athletes and the team.

> *His game wasn't going well even though he had already scored a goal. And I said, "Take it easy because you will do well in the second half". And then, after three minutes, he managed to score the goal. I was very proud of him. Because I know it's also very important for him and us.*
> # Athlete C

However, results also highlight anger. This emotion was associated with moments that distanced the team from reaching its objectives.

> *I thought to myself: "You just said something, and now you are doing the opposite". On top of that, they scored. A simple move, which may not have much relevance, but it was something we had decided to improve. He said one thing and did another. Maybe I was angry about it.*
> # Athlete B

DISCUSSION

The present study examined the discrete emotions experienced by elite roller hockey players during competition and explored their underlying cognitive appraisal processes.

By using self-confrontation interviews supported by video recall, the study accessed athletes' emotional experiences in a naturalistic and situation-specific way, allowing for a more accurate reconstruction of how emotions emerge in real competitive contexts.

In line with the CMRT (Lazarus, 1991, 2000), athletes reported a broad range of discrete emotions that reflected their moment-to-moment appraisals of personal goals, situational demands and contextual meaning. While core emotions traditionally highlighted in CMRT, such as anxiety, anger, relief, pride and happiness, were evident, athletes also described emotions such as confidence and tranquillity. These additional emotions have been observed in previous naturalistic studies in sport (e.g., Cece et al., 2019; Martinent et al., 2012; Martinent & Ferrand, 2015a) and illustrate the richness of athletes' emotional vocabulary, which may include fine-grained distinctions in intensity and meaning (Jackson et al., 2019). The frequent reports of confidence, often described as a preparatory positive state preceding specific actions, reinforce the idea that emotional experiences in competition may extend beyond classical CMRT categories.

The co-occurrence or rapid succession of emotions observed in this study is consistent with findings showing that emotional episodes in sport are dynamic, layered and rarely experienced in isolation. Previous research has demonstrated similar patterns of blended or sequential emotional experiences (Martinent et al., 2012), which contrasts with more unidimensional perspectives of emotional activation (e.g., Brehm & Miron, 2006). Some athletes also struggled to label their emotions precisely, suggesting that emotional awareness and emotion semantics warrant further investigation, especially given the influence of linguistic and cultural factors on emotion descriptions.

A key finding of the present study concerns the way specific game situations were associated with particular emotional responses. Situations perceived as conducive to goal attainment tended to elicit positive emotions, while situations threatening performance goals or team objectives were primarily associated with negative emotions. This goal-dependent emotional reactivity is central to CMRT and has been consistently documented in sport emotion research (Martinent et al., 2012; Martinent & Ferrand, 2009, 2015a). Interpersonal and social-relational factors also played a substantial role. Referee decisions, opponent behaviours, and interactions with teammates elicited emotions such as anger, sadness or pride, echoing contemporary perspectives that view emotions in sport as socially embedded processes shaped by interpersonal cues, feedback and shared affective states (Campo et al., 2019; Tamminen & Crocker, 2013). The relevance of emotional contagion, previously identified in sport contexts (Moll et al., 2010; Schoenewolf, 1990), is evident in the reports of athletes whose emotions were influenced by teammates' successes, frustrations or expressive behaviours.

Specifically regarding cognitive appraisal processes, athletes reported all six appraisal components defined within CMRT. However, not all appraisals were present for each emotion, a pattern also noted in previous work (Martinent & Ferrand, 2015a). This reinforces Lazarus's proposition that emotions arise from flexible and individualised configurations of appraisals rather than rigid or sequential structures (Lazarus, 1991; Smith & Lazarus, 1993). Similar appraisal patterns sometimes produced emotions of opposite valence, highlighting the importance of personal goals, expectations and interpretations in shaping emotional responses. These findings align with more recent theoretical refinements, such as those proposed by Jekauc et al. (2021), which emphasise that emotional experiences in competitive sport reflect the dynamic interplay between appraisals, motivational states and situational meaning. Recent research in sport psychology also shows that emotions fluctuate over time in identifiable trajectories rather than as isolated reactions. Longitudinal studies have provided important insights into how athletes' emotions fluctuate over extended periods and are influenced by athletes' appraisals. Cece et al. (2019) showed that young athletes experienced distinct emotional experience trajectories over the competitive season (beginning, middle and end of the sports season). These trajectories varied systematically according to athletes' emotional intelligence and emotion regulation abilities. Athletes with higher emotional intelligence tended to maintain more stable and adaptive emotional profiles, while those with lower emotional competencies displayed greater volatility and more pronounced negative emotional patterns during demanding training cycles. In a similar study, Levillain et al. (2022) examined emotional trajectories during the competitive season and found substantial intraindividual variability, demonstrating that athletes displayed different appraisals of the competition, which led to different emotional trajectories. The study also reinforced the importance of emotional intelligence, demonstrating that athletes with more adaptive longitudinal emotional trajectories tended to score higher on emotional intelligence assessed at the beginning of the season. Levillain et al. (2025) further expanded this work by showing that not only the intensity but also the direction of emotional experiences fluctuates over time. Integrating this evidence with the present findings indicates that the discrete emotions reported in roller hockey competition are

likely embedded within longer-term emotional patterns influenced by athletes' regulatory strategies, resilience and evolving goal appraisals throughout the season. This broader temporal perspective complements CMRT by showing that immediate appraisal-driven emotional responses interact with longer-term emotional fluctuations that unfold across a competitive season.

Finally, the methodology used in this study proved effective for eliciting vivid, contextualised emotional accounts. Nevertheless, future research would benefit from extended longitudinal designs that capture emotional variation across multiple competitive phases and seasonal cycles, thereby connecting situational emotional reactions to longer-term trajectories. Studies should also explore different sports and populations, given that emotional demands and regulatory processes differ notably between team and individual sports (Laborde, Guillén, & Mosley, 2016.

From a more practical standpoint, psychological sports interventions should promote emotion regulation abilities and emotional intelligence (Laborde, Dosseville, & Allen, 2016). Wagstaff et al. (2013) found that one-to-one coaching sessions improved emotional intelligence ability in different members of sports organizations. Reports also highlight the importance of cognitive appraisals in shaping emotional experiences in sports. Therefore, interventions should also focus on cognitive emotion regulation strategies, such as cognitive- behavioral intervention. Additionally, as appraisals seem to influence the generation of discrete emotions to a large extent (Lazarus, 1991, 2000), helping athletes reappraise the situation could promote more effective emotion regulation strategies (Beatty et al., 2020). Moreover, self-confrontational interviews and reflective practice would also be valuable tools for intervention (e.g., Neil et al., 2013), which would help develop new and more adjusted ways to deal with competitive stressors. Indeed, psychological interventions should strive to "wear the uniform" and be as close as possible to the actual sport context.

CONCLUSIONS

Overall, this study showed that elite roller hockey players experience a wide range of discrete emotions during competition, many of which align with those proposed by CMRT (Lazarus, 1991, 2000), while also confirming additional emotions frequently observed in naturalistic sport settings (e.g., confidence, tranquillity). The findings highlight the multiplicity and co-occurrence of emotions, supporting previous evidence that athletes often experience blended or rapidly shifting emotional states (Martinent et al., 2012). The study also demonstrated that specific game situations elicit distinct emotional responses depending on their relevance to athletes' goals. Positively valenced emotions tended to emerge in goal- congruent situations, whereas threatening or goal-incongruent situations were mostly associated with negatively toned emotions. Interpersonal interactions, including refereeing decisions or teammate behaviours, also played a meaningful role, reinforcing the importance of social and relational factors in emotion generation (Campo et al., 2019; Tamminen & Crocker, 2013).

In line with CMRT, players reported the six primary and secondary cognitive appraisals, although not all appraisals were present for each emotion. The findings confirm that unique configurations of appraisals shape emotional responses (Martinent & Ferrand, 2015a; Smith & Lazarus, 1993) and that appraisal patterns vary across situations. Moreover, the presence of different emotions associated with the same appraisal process underscores the importance of individual goal orientations and personal meanings during competition. Together, these results contribute to a deeper understanding of the dynamic, context-specific, and appraisal-driven nature of discrete emotions in high-performance sport.

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