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Aggression in team sports
A quantitative investigation of reversal theory motives

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INTRODUCTION: *Two quantitative studies examined the structure of motives for aggression among players practising team sports (rink-hockey, handball, football, rugby, and basketball).*

METHOD: *In both studies, the participants filled in a 48-item questionnaire that was created from all eight dimensions suggested by reversal theory. In study 1, Exploratory Factor Analysis was conducted. In study 2, Confirmatory Factor Analysis was performed.*

RESULTS: *In the first study, a three-factor structure of motives was found: A Motives Related to Egocentrism factor, a Motives Related to Negativistic Reaction factor, and a Motives Related to Game Purpose factor. The second study confirmed the three-factor structure of motives for aggression in team sport. The mean scores observed for the Motives Related to* Negativistic *factor and the Motives Related to Game Purpose factor were higher than the Motives Related to Egocentrism factor.*

CONCLUSION: *The results partially supported reversal theory-based predictions about multiple motives for aggression in sport.*

KEY WORDS: Aggression; Team Sports, Quantitative Method; Motives; Reversal Theory.

Various psychological theories have been applied to understand why individuals behave aggressively in everyday life (for a review, DeWall, Anderson, & Bushman, 2011). Most of these theories considered the individual's relationships with others and attempted to explain the causes of aggression

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between individuals. Sports psychology has applied these mainstream psychology theories to understand and to define aggressive behaviour in sport. The aim of our research was to make a quantitative investigation in order to identify the structure of the motives for aggression in team sport. This research used Apter's reversal theory (1997). It consisted of two studies: the first one was exploratory character and the second one was confirmatory character.

Husman and Silva (1984, p. 247) defined aggression as "an overt verbal or physical act that can psychologically or physically injure another person or oneself". For LeUnes and Nation (1989, p. 193), it is "the infliction of an aversive stimulus upon one person by another, an act committed with intent to harm, one perpetrated against an unwilling". Geen (2001) showed that aggression is "the delivery of an aversive stimulus from one person to another, with intent to harm and with an expectation of causing harm, when the other person is motivated to escape or avoid the stimulus". Bushman and Anderson (2001)'s study highlighted that aggression is a "behavior directed toward another individual that is carried out with the proximate (immediate) intent to cause harm. In addition, the perpetrator must believe that the target is motivated to avoid the behavior".

Hostile aggression is an act of aggression stemming from a feeling of anger and intends to cause pain or injury. Hostile aggression is "mainly" motivated by a desire to hurt someone. For example, if an athlete believes his opponent has been playing dirty, he might become angry and go out of his way to hurt his opponent, even if doing so does not increase his opportunity to get the ball. Instrumental aggression could reflect any goal-directed activity by the way it is described (e.g., shooting at goal). Instrumental aggression is a result of pursuing a game objective (e.g., elbowing another in the ribs while grabbing a rebound in basketball). It is "mainly" motivated by a desire to achieve a goal. For example, in football, a player may commit an aggressive act in order to prevent an opponent from scoring and win the match. Some scholars argue (e.g., Bushman & Anderson, 2001; Husman & Silva, 1984) that hostile and instrumental aggression both involve an intent to harm, but that hostile aggression is more reactive and typically involves provocation/anger whereas instrumental does not involve anger but is committed as means to an end or a goal (e.g., aiming to hurt the other teams' best player to improve their chances of winning). The concept of intent to injure is central in these definitions and in the difference between hostile and instrumental aggression (e.g., Tenenbaum, Stewart, Singer, & Duda, 1997; Wann, Waddill, Bono, Scheuchner, & Ruga, 2017).

Yet, it is not easy to apply these definitions in a sports context. For

instance, an aggressive behaviour may be illegal outside a sports ground, in non-contact sports (e.g., badminton) or in contact sport (e.g., soccer) and may be considered to be legal and sanctioned in team collision sports (e.g., rugby). In view of this, Kerr (2005) advocated that to define aggression in team contact sports, one needs to make a distinction between sanctioned aggression and unsanctioned aggression. Sanctioned aggression is defined as aggression within the written rules and laws of sports or informal players' norms (Kerr, 2002). Unsanctioned aggressive acts are forms of aggression that fall outside the written and unwritten rules or laws and players' norms. Therefore, aggression in team contact sports is intrinsic and sanctioned within a set of rules that may be assimilated to a kind of contract in the pursuit of aggression between consenting athletes (Kerr, 2005).

This approach is a response to the non-flexibility of the previous definition and to the dichotomy between hostile and instrumental aggression that excludes aggressive acts based on multiple motives (Bushman & Anderson, 2001). Different motives can drive the same aggressive behaviour which can be mixtures of hostile and instrumental aggression. In recent years, certain researchers questioned the efficacy of this distinction between hostile and instrumental aggressive behaviour in the sports domain (e.g., Grange & Kerr, 2010). These researchers consider that all aggressive acts may be defined as instrumental because they have some goal in mind (Smith, 1983). They extended the Bushman and Anderson (2001) discussion by applying reversal theory to investigate the multiple motives for aggression in sport.

Reversal theory is a theory of motivation, personality, and emotion (Apter, 2001). It is a theoretical framework that uses a structural phenomenological approach. It is focused on the subjective experience of individuals and its structure provides framework in which individuals' motives are organised. So, one type of question ensuing from the reversal theory is what are the motives for engaging in a specific type of activity? The theory posits that human motives are conceived of metamotivational states which involve different manners of interpreting motivational variables. Metamotivational states are mental states which are concerned how persons experience their motives (Kerr, 2005). They govern the way an individual interprets his or her motives at a certain time. The dynamic approach refers to individuals who move between these metamotivational states in the course of everyday life and under a variety of conditions: contingency, frustration, and satiation.

The reversal theory postulates that there are eight metamotivational states (Apter, 2001). The values they represent go in four pairs of opposites, and may rapidly change over time. The first two pairs of metamotivational states form the somatic states: the telic and paratelic states, and the con-

formist and negativistic states. They refer to the way in which individuals experience their own bodily arousal. The two other pairs of metamotivational states form the transactional states: the mastery and sympathy states, and the autic and alloic states. They refer to interactions with other individuals or objects. Table 1 presents the major characteristics of the somatic and transactional metamotivational states. In many cases, the mastery-sympathy states and the autic-alloic states combine to form four pairs of states: autic-mastery, alloic-mastery, autic-sympathy, and alloic-sympathy.

Instead of considering the transactional states independently, O'Connell and Apter (1993) encouraged combining them. The choice to combine the two transactional pairs was based on the fact that the meaning of the pair mastery/sympathy changes when it is paired with autic/alloic and it is very difficult to think of pure autic items or mastery items. This is because mastery, for instance, is always over somebody, the self or the group. For example, in sports aggression, wanting to commit an aggressive act to win respect (autic-mastery) is qualitatively different from wanting to commit an aggressive act because it is a way to assert rapidly a team's domination (alloic-mastery). Mastery and sympathy are by essence dyadic constructs with a rela-

TABLE I
Characteristics of the Somatic And Transactional Pairs Of Metamotivational States

Somatic States	Telic	↔	Paratelic
	Arousal-avoiding		Arousal-seeking
	Goal-orientated		Sensation-orientated
	Serious-minded		Playful
	Future-orientated		Presented-orientated
	Planning-head		Spontaneous
	Prefer important activity		Prefer unimportant activity
	Attempt to complete activity		Attempt to prolong activity
	Conformist		*Negativistic*
	Desire to comply with rules		Desire to break rules
	Compliant		Rebellious
	Cooperative		Stubborn
	Agreeable		Angry
Transactional States	*Mastery*	↔	*Sympathy*
	Willingness to compete		Willingness to cooperate
	Desire of control		desire for harmony/unity
	Focus on toughness and strength		focus on tenderness and sensitivity
	Autic	↔	*Alloic*
	Self-concern		Concern for others
	Desire to gain		Desire to give
	Suffering loss is unpleasant		Suffering loss is pleasant
	Not identifying with others		Identifying with others
	Egoistic		Altruistic
	Focus on own feelings		Focus on the feelings of others

tionship to someone, the self, or others persons (Mullet, Kpanake, Zounon, Guedj, & Munõz-Sastre, 2014). This combination enhances the precision with which the state of mind is measured and it has already been applied in several studies for identifying the structure of motives in various domains (e.g., Giraudeau, Chasseigne, Apter, & Mullet, 2007; Lakhdar, Vinsonneau, Apter, & Mullet, 2007).

Reversal theory proposes an effective framework to understand aggressive acts in a sports context. It has the advantage to show how changes in metamotivational states can modify the nature of the aggressive act. From the eight metamotivational states, Apter (1997) proposed that aggressive acts are based on certain combinations of only four metamotivational states (negativistic, mastery, telic, and paratelic states) and that reversals may happen between them. This approach is useful for explaining an aggressive act in terms of athletes' motives for aggression, and to demonstrate the dynamic nature of them (Grange & Kerr, 2010). This theoretical framework has been applied to sport to explain an aggressive act in qualitative research (see Grange & Kerr, 2010; Kerr, 2005; Kerr & Males 2011).

The main finding of these qualitative studies was that they confirmed the four state combinations (negativistic, mastery, telic, and paratelic states) associated with the four types of aggression in contact sport (see Kerr, 2005). Athletes engage in play aggression when they take part in team contact sports. Play aggression (mastery state + paratelic state) is sanctioned aggression and is concerned with players enjoying the hard-physical contact and trying to dominate each other. Kerr (2002) defined sanctioned aggression as aggression within the written rules or laws of sport. Power aggression (mastery state + telic state) in sport is a form of aggression aimed at dominating an opponent or opposing team. It can be calculated intimidation which has the purpose of distracting opponents who lose their concentration on the game. Anger aggression (negativistic state + telic state) often occurs as an aggressive reaction to an opposing player's unfair or unsanctioned act. Finally, thrill aggression (negativistic state + paratelic state) is a provocative form of aggression in sport. It is gratuitous and has no real purpose. It occurs only when the perpetrators have the confidence to engage in the acts and the feeling that they will go undetected (Grange & Kerr, 2010). Power, anger, and thrill aggression are forms of aggression that generally fall outside the written and unwritten rules or laws and player norms and are therefore unsanctioned in the sports context (Kerr, 2002).

Previous studies about the motives for aggression in sport from reversal theory have also used qualitative methods. The following studies showed that motives for aggression were not exactly identical according to the considered

contact sports. Grange and Kerr (2010) have explored the athletes' perception and experience of aggressive play in Australian football. They collected qualitative data with semi-structured interviews conducted with eight participants. The results were categorized as a function of Apter's four types of aggression and as sanctioned versus unsanctioned acts. The interview material clarified the difference between sanctioned and unsanctioned aggression and the way that acts of intimidation and retaliation occur. Reversal theory opened a novel way of interpreting athletes' interview responses and that provided new insights into the motives underlying aggressive behaviour in sport.

Another study analyzed interviews of athletes about their experience of aggression during a match in a World Lacrosse Championship tournament (Kerr & Males, 2011). Lacrosse is a contact game and, as such, is characterized by both sanctioned and unsanctioned physical aggression. Interviews were conducted with four volunteer elite male national lacrosse players. The interview statement included descriptions of acts that could be classified as retaliatory anger aggression and intimidatory power aggression. The results showed that both sanctioned and unsanctioned aggressive acts play a role in lacrosse competition at the elite level. The authors concluded that further studies have to be done to analyze the motives behind aggression behaviour in sport.

In the same manner, Rosario, Kerr, and Rhodius (2014) explored the nature and experience of aggression among Mixed Martial Arts (MMA) athletes through reversal theory. MMA fighting is replete with aggression generally of the sanctioned type because of the strong code of honor and respect between opponents. Six MMA professional athletes took part in semi-structured interviews. The results highlighted that there was general agreement that an MMA fighter had to be aggressive to be successful, including knowing when to be aggressive during a fight. The major factor influencing aggression was maintaining emotional control and the necessity of controlling anxiety and anger when fighting. MMA aggression was found to be predominantly telic and mastery-oriented.

Recently, Kerr (2017) studied a former elite player's perception of, and personal involvement in, rugby aggression with a -qualitative approach using reversal theory. The results from a semi-structured interview supported previous reversal theory-based research findings related to the motives behind anger aggression in sport. One incident described in the interview illustrated a type of violence not previously identified in reversal theory-based sport research. It was termed "protective" or "supportive" aggression, where an athlete comes to the aid, rescue or defence of a team-mate.

The purpose of the present investigation was to make a quantitative investigation of the motives for aggression in team sport through looking at the metamotivational states of reversal theory (Apter, 2001). In theoretical perspective, we aimed to overcome the main limitation of these qualitative researches, i.e., they were exploratory studies with very small samples of athletes which limit the generalization of their findings (e.g., Rosario et al., 2014). We proposed to directly test reversal theory arguments about the multiple motives associated with aggression in sport by using a quantitative approach: what are the motives for aggression in team sport? In practical perspective, knowing which set of motives lies behind aggression in team sport is an important issue for educators or trainers in sport (Kerr, 2005). Our investigation might offer a comprehensive range of such motives and might allow the setting up of program of prevention (e.g., Rodríguez, Esquivel, Rodríguez, & Fonseca, 2016).

Two studies were carried out successively. Study 1 was conducted to explore the possible structure of motives for aggression among team sport players. We expected that the metamotivational states identified by Apter (1997) and Kerr (2005), (i.e., negativistic, mastery, telic, and paratelic states) would be associated with motives for aggression. The population of this first study participated in an exploratory factorial analysis. Study 2 was conducted to test the fit of the identified model (Hu & Bentler, 1998, 1999). The participants of the second study took part in a confirmatory factorial analysis. The set of participants (study 1 and study 2) were divided so as to obtain approximately the same percentage of males and females and the same percentage of participants practising the different types of sport in each study.

Study 1

Study 1 was exploratory in character. It was aimed at defining the main motives to aggression in team sport, and delineating their structure in a sample of team sport participants.

Method

Participants

The participants were 246 French amateur team sport players (208 men and 38 women): 31 rink-hockey players, 95 soccer players, 35 handball players, 48 basketball players, and 37 rugby players. The participants were sixteen to thirty-one years old (M_{age} = 22.39; SD = 6.00).

They were contacted in the place where they practised their sport. They were all unpaid volunteers.

Material

The material was composed of a 48-item questionnaire. The language of the questionnaire was French. The translation in English was conducted to a standardised back-translation procedure. The items were created in order to cover all eight dimensions suggested by the reversal theory (6 potential items for each metamotivational state; see Appendix). A 10-point Likert scale was printed following each sentence. The two extremes of the scale were named "*Completely Disagree*" and "*Completely Agree*". This response format is one way of measuring the metamotivational states of Apter (2001) and has already been used to study the structure of reversal theory motives in other domains (e.g., Giraudeau et al., 2007). Additional questions referred to the demographic data (age, gender, and team sports practice).

A Delphi technique was used to determine content validity of the questionnaire (Barnett, Hardy, Brian, & Robertson, 2015). Content validity refers to elements within a measurement procedure representing the construct for which it is intended to measure (Lomax & Hahs-Vaughn, 2012). A panel of experts was contacted via e-mail or by phone to determine their interest in participating in a Delphi consultation.

There were two categories of experts: experts comprised two categories: (a) researchers who actively publish studies focusing on reversal theory, (b) professional athletes with a high level of experience in various sports (contact and collision sports). In order to be considered an expert and qualify for this study, one must be a professor of psychology or an athlete with intensive experience in the world of professional sport.

In the first phase, the evaluation of content validity started with an expert group of 5 scientific experts experienced in reversal theory, who answered questions about the clarity of the sentence that describes the sports situation and the items. Scientific experts were asked to complete on a scale the extent to which each item was representative of the definition for each respective motivational state (e.g., from -3 to +3), as well as the extent to which the items reflected reality of sporting situations in the sports experts. In their feedback, these experts suggested that changes needed to be made to certain words and even whole sentences to make them easier to understand. Also, their feedback led us to remove 12 items. In the second phase, the 10 sports experts who were contacted, answered questions about the reality of the different sports situations. One hundred per cent of the items have been validated by the athletes. In the third phase, a pre-test with 30 team sport players as a representative sample of the target population was done in order to valid the test. No change was necessary. Therefore, the content validity process validated a questionnaire including 48 items.

Procedure

The procedure performed in this study 1 involving human participants was in accordance with the ethical standards of the institutional research committee. For the experimentation, the adolescents' parents and the coaches gave their consent and their approval. The players were tested individually in a quiet room in the club house. The researcher explained to the participants that they had to read a set of sentences expressing one of the many poten-

tial motives for which they might commit an aggressive act and that they had to rate their degree of agreement with the content of each sentence. Two versions of the questionnaire that differed in the order of the items (direct or reverse order) were used to avoid the influence of the order of the items. Participants were then presented with the series of items. Each participant had to read each of the sentences and they had to rate their degree of agreement individually by putting marks on the response scale at the location they felt appropriate between the two anchors. No responses were rounded to the nearest number.

The researcher was present when the participants filled in the questionnaires. The test lasted approximately 30 minutes.

Data analyses

Each rating by each participant was converted into a numerical value expressing the distance (number of points, from 1 to 10) between the point on the response scale and the left anchor, serving as the origin. These numerical values were then subjected to statistical analyses.

Exploratory Factor Analysis (EFA) was used to discover the factor structure of motives for aggression in team sports and to verify the identification of negativistic, mastery, telic, and paratelic metamotivational states in our structure (Kerr, 2005). We used a Principal Components Analysis, the scree test, the eigenvalues, and a VARIMAX rotation to determine factor extraction arising from this analysis.

Results

As all items showed variance, they were all included in the subsequent analysis. From this analysis it appeared that three interpretable factors emerged which accounted for 59% of the variance. Each factor had an eigenvalue higher than 1. This three-factor solution was retained and subjected to VARIMAX rotation. The significance of Bartlett's test of sphericity (χ^2 =1776.28, $p < .001$) and the size of the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = .85) revealed that the items had more than adequate common variance for factor analysis.

The first factor explained 32% of the variance. It was named "Motives Related to Egocentrism" because it refers to individuality and self-orientation. Three items loaded positively on this factor expressing the self and the desire for self-recognition within the team ("During a match, I might commit an aggressive act because I want to be flattered by my teammates."; "During a match, I might commit an aggressive act because it is a way to be noticed."; "During a match, I might commit an aggressive act in order to keep my place in the team."). Two items loaded positively on this factor expressing the idea that the individual seeks fun or is playful and focuses on own emotion, feelings ("During a match, I might commit an aggressive act out of amusement."; "During a match, I might commit an aggressive act because it is a way to pursue excitement."). One item loaded positively expressing the self and the focus on strength ("During a match, I might commit an aggressive act because it is a way to show that I am the strongest player.").

The second factor explained 16% of the variance. This factor was called "Motives Related to Negativistic Reaction" because it refers to players' stubborn and angry character. Three items loaded positively on this factor expressing negativism ("During a match, I might

commit an aggressive act because I have reacted to a provocation"; "During a match, I might commit an aggressive act because I was cheesed off."; "During a match, I might commit an aggressive act because I am an impulsive person.").

The third factor explained 11% of the variance. It was called "Motives Related to Game Purpose" because it refers to a purpose-oriented reaction towards the game or play during the match. Three items loaded positively on this factor concerning the purpose of game ("During a match, I might commit an aggressive act to stop the impetus of the opposing team's attacking game."; "During a match, I might commit an aggressive act in order to retain a winning score."; "During a match, I might commit an aggressive act to avoid a counter-attack.").

Study 2

Study 2 was confirmatory in character. It was aimed mainly at testing a full model of aggressive-related motives in team sport. This model was a three-factor model composed of three-related motives (motives related to egocentrism, motives related ton negativistic reaction, and motives related to game purpose) that were found to be the most highly endorsed by the participants in Study 1.

Method

Participants

The participants were 149 French amateur team sport players (127 men and 22 women): 19 rink-hockey players, 58 soccer players, 21 handball players, 29 basketball players, and 22 rugby players. The participants were sixteen to thirty-one years old (M_{age} = 22.08; SD = 4.51). They were contacted in the place where they practised their sport. They were all unpaid volunteers.

Material

The material was identical to the material used in Study 1. It was composed of the same French 48-item questionnaire, the same response format, and the same additional questions referred to the demographic data (age, gender, and team sports practice).

Procedure. The procedure performed was identical of the study 1's procedure. It was in accordance with the ethical standards of the institutional research committee. For the experimentation, the adolescents' parents and the coaches gave their consent and their approval. The players were tested individually in a quiet room in the club house.

Data analyses

After having converted the participants' responses into numerical values, Confirmatory Factor Analysis (CFA) was used to test the model suggested by the EFA in study 1. CFA was

conducted using the SEPATH software. Various indices were used to test the fit of the identified model (Hu & Bentler, 1998, 1999): the ratio of chi-square to degrees of freedom (acceptable for Chi^2/df value between 2 and 3); the Goodness of Fit Index (acceptable for GFI value .90); the Bentler Comparative Fit Index (acceptable for CFI value .90); the Tucker-Lewis Index (acceptable for TLI value .95); the Root Mean Square Error of Approximation (acceptable for RMSEA value .80); the Standardized Root Mean square Residual (acceptable for SRMR value < 0.10). Cronbach's alpha value for each factor was measured to provide evidence for internal consistency ($\alpha > .70$; Nunally, 1978).

Results

In order to directly compare the fit of this model with the fit of the three factor model that emerged from the exploratory factor analysis, a confirmatory factor analysis was conducted. The model tested was the correlated three-factor model suggested by the exploratory factor analysis. Only items with loadings higher than .50 in the exploratory analysis were included in the model (Fabrigar, Wegener, MacCallum, & Strahan, 1999). This model is shown in Table 2. All factor loadings were significant (2 (51) = 105.17, p < .001; 2//df = 2.06, GFI = 0.90, CFI = 0.92, TLI = 0.95, RMSEA = 0.08, SRMR = 0.07). Table 2 shows the coefficients estimated on the overall set of data. Inter-correlations between factors were 0.48 for the Motives Related to Egocentrism factor, 0.44 for the Motives Related to the Negativistic Reaction factor, and 0.50 for the Motives Related to Game Purpose factor.

TABLE II
Results of The Confirmatory Factor Analysis Conducted in Study 2

Items: During a match, I might commit an aggressive act	Motives Related to Egocentrism	Motives Related to Negativistic Reaction	Motives Related to Game Purpose
because I want to be flattered by my team-mates.[e]	.803		
because it is a way to be noticed.[e]	.738		
out of amusement.[a]	.730		
because it is a way to pursue excitement.[a]	.666		
because it is a way to show that I am the strongest player.[d]	.602		
in order to keep my place in my team.[e]	.597		
because I react to a provocation.[c]		.729	
because I am an impulsive person.[c]		.708	
because I am cheesed off.[c]		.695	
to stop the impetus of the opposing team attacking game.[b]			.759
in order to retain a winning score.[b]			.754
to avoid a counter-attack.[b]			.731
Alpha	0.85	0.71	0.75
Mean	3.00	4.63	5.72
SD	2.65	2.98	3.08

Notes. (a), (b), (c), (d), (e), and (f) correspond to "probable" metamotivational states: (a) for paratelic items; (b) for telic items; (c) for negativistic items; (d) for autic-mastery items; (e) for autic-sympathy

Discussion

The objective of the present investigation was to apply a quantitative method to identify the structure of motives for aggression in team sport from the eight metamotivational states of reversal theory (Apter, 2001). Two studies were conducted. Aggression in team sport appeared to be fuelled mainly by three largely independent types of motives: motives related to egocentrism, motives related to negativistic reaction, and motives related to game purpose.

In study 1, an exploratory factor analysis conducted on the set of data from a first group of team players produced evidence of three factors. Two of three factors (the "Motives Related to the Negativistic Reaction" factor and the "Motives Related to Game Purpose" factor) were easily interpretable in the framework of reversal theory by considering the states independently. One factor, i.e., the "Motives Related to Egocentrism" factor, was interpreted with greater difficulty and required a collective brainstorming by considering the whole set of items in conjunction (Mullet et al., 2014).

The hypothesis of the study 1 was that the metamotivational states identified by Kerr (2005), (i.e., negativistic, mastery, telic, and paratelic) would be discovered in our structure of motives for aggression. This hypothesis was not supported by the data. Our findings presented a three factor structure that was built from certain metamotivational states of Apter (2001). The first factor was named the "Motives Related to Egocentrism" factor. This factor concerns the motives for aggression in direct relation with oneself and, for this reason, corresponds to the autic metamotivational state of Apter (2001). Focused on him or herself, a player is motivated to commit an aggressive act in order to satisfy an emotional need to be, for example, acknowledged by others and considered to be the best player.

The negativistic state was identified in the second factor that was called the "Motives Related to the Negativistic Reaction" factor. It refers to the motives for aggression that come from the difficulty to escape from the situation in which a player finds himself. So, he/she may be motivated to commit an aggressive act because he/she is an impulsive person, to react to a provocation, and because he/she is cheesed off.

The telic state was evident in the third factor entitled the "Motives Related to Game Purpose" factor. It refers to the motives for aggression that are guided by achieving a goal directly connected with the play or action of play such as stopping the other team from scoring, avoiding a counter-attack, or stopping the advantage of an attacking play by the opposing team.

Study 2 confirmed the three-factor model that was found in Study 1. A model derived from the exploratory analysis (study 1) was successfully tested by confirmatory factor analysis on a data from a second group of team players. Our structure of motives of aggression was made up of three factors. Two factors corresponded to two metamotivational states, previously found using qualitative methods, i.e., negativistic and telic states (e.g., Grange & Kerr, 2010; Kerr, 2005, 2017; Kerr & Males, 2011; Rosario et al., 2014). One factor, not previously identified from qualitative methods, was made up of motives for aggression related to self associated with the autic metamotivational state (Apter, 2001). What is perhaps more interesting in our study, is that this third factor related to the self-focused autic state was found. This was a novel result not found in previous studies using reversal theory. It is perhaps surprising in a study of team sport athletes where cooperation between team members rather than a focus on one-self with the other-focused alloic state influential might have been expected. Previous qualitative studies (e.g., Grange & Kerr, 2010) found the mastery and paratelic state combination important for explaining play aggression, but these two states did not appear in our structure of motives. These findings partially confirmed reversal theory-based predictions about multiple motives for aggression in sport and confirmed the results of previous qualitative studies.

With all participants included in study 2, the mean scores observed for the Motives Related to the Negativistic Reaction factor ($M = 4.63$; $SD = 2.98$) and the Motives Related to Game Purpose factor ($M = 5.72$; $SD = 3.08$) were higher than the Motives Related to Egocentrism factor ($M = 3.00$; $SD = 2.65$). The mean score observed for the Motives Related to Egocentrism factor was clearly below the mid-point of the scale. The mean score observed for the Motives Related to the Negativistic Reaction factor was close to the mid-point of the scale. The mean score observed for the Motives Related to Game Purpose factor was above the mid-point of the scale. This finding showed that the team players agreed that the Motives Related to the Negativistic Reaction factor and the Motives Related to Game Purpose factor were the two main motives for aggression, unlike the Motives Related to Egocentrism factor. This result completes the qualitative findings related to the motives for aggression negativistic and telic-oriented in team sport (Kerr, 2005, 2017).

This quantitative work has three limitations. The first one resides in the way the sample was constituted. Participants were volunteers, and as a result, we are unsure about the representativeness of our sample. The second one is that we have measured previous aggression motives or possible future

aggression motives, and not actual aggression motives. It may be that in remembering past or imagining future motives, some distortion may have occurred (Giraudeau et al., 2007). The third one is that we did not include gender as a factor in our analyses. We considered that the sample size of women was not large enough when compared to the sample size of men to take into consideration this factor (only 60 women participants against 335 male participants in studies 1 and 2). In a future research, we could focus on gender difference which is one of the most consistent findings in the aggression literature in team sport (e.g., Kerr, 2016).

The main implication of this work is that sports psychologists, coaches, and sports administrators need to recognise that the motives for committing aggressive acts in sport may differ from player to player. The results of this investigation show that the participants' agreement with aggression motives is related to the egocentric nature of players, the desire for their teams to be successful during games, and how they maintain control by, for example, not responding to provocation during play. Intervention, program or other techniques need to be geared to individual players and not applied routinely to all players (e.g., Ridhwan & Singh, 2014; Rodríguez, Esquivel, Rodríguez, & Fonseca, 2016).

Our quantitative approach partially confirmed reversal theory-based predictions about multiple motives for aggression in team sport. Reversal theory does not claim that all eight metamotivational states should be discernible in every context of aggression, including sport, but rather that whichever types of aggression are found in some area (e.g., education, therapy), they will fall somewhere within the categories of reversal theory's general framework. It does not therefore contradict reversal theory to find that only certain parts of the reversal theory classification apply in this case. This was considered to be as a useful method to uncover and understand the structure of motives for aggression in the sports domain in general. The research needs to be continued by diversifying the quantitative methodological approaches with other groups of athletes to provide a wider understanding of aggressive acts in sport (Apter, 2013).

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APPENDIX

The 48 items related to probable metamotivational states.
During a match I might commit an aggressive act…

Paratelic
because the atmosphere is stimulating.
out of enjoyment.
because I am excited.
because it is a way to pursue excitement.
in the euphoria of the game.
out of amusement.
Telic
because the objective is to avoid a goal being scored against us.
to stop the impetus of the opposing team's attacking game.
to further my future sporting achievements.
in order to retain a winning score.
because it is necessary that I should pursue my own goals.
to avoid a counter-attack.
Negativistic
because I am cheesed off.
because I am an impulsive person.
because I am unpredictable.
because I react to a provocation.
because I am upset.
to provoke the other team.

Conformity
following the instructions that had been given.
because I have seen it done before.
because it's part of the risk that needs to be taken.
because it is what was expected of me.
because I am led by others to do so.
because the coach asked me to be more aggressive.

Autic-mastery
because I have to get my own back.
because I give nothing away to the opponent.
because it is a way to show that I am the strongest player.
to gain respect.
because I had been the victim of an aggressive act beforehand.
because I want to impose myself.

Alloic-mastery
because it is a way to keep control of the game.
to upset an opponent.
Autic-sympathy
to keep my place in my team. because it is a way of changing the course of the match.
so my team wins.
to fight back against the opponent.
because it is a way to rapidly assert my team's domination
because I have to prove my worth.
so that people can see my determination in a difficult match.
so as to impress my teammates by making a good challenge at the right time.
because it is a way to be noticed.
because I want to be flattered by my team-mates.
Alloic-sympathy
because my team is disrupted and is losing.
because I have to defend another player from my team.
because it is a way of giving my team a shock to make it react.
because I help a teammate in trouble.
because it is a way of showing the determination of my team.
because I am worried about the result of the match for my team.

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