



Technische Universität München
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Lehrstuhl für Sportpsychologie

Collective sport team collapse – a process model

Vivian Vanessa Wergin, M.Sc.

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*Winners
are not those who never fail
but those who never quit.*

-Banksy-

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Abstract

Collective sport team collapse can be described as a sudden, collective, and dramatic drop in performance of a sports team within a game. Although most team sport athletes are familiar with the phenomenon and agree that it plays an important role for the outcome of games or competitions, research in the area of collective sport team collapse is still in its infancy. This dissertation project reveals causes of collective team collapse, defines the phenomenon, and distinguishes it from other dynamic team processes. It furthermore tests selected causes of collective team collapse in the field and provides practical implications for athletes and coaching staff members. The dissertation involves two qualitative studies investigating causes of collective team collapse through the perceptions of athletes, coaches, and sport psychologists. A third quantitative study explores the phenomenon of collective team collapse in the field and further quantifies the role of negative emotion as a cause of collective sport team collapse. The first two studies reveal that collective sport team collapse is evoked by a cascade of triggers rather than by single causes. This cascade includes antecedents which make the occurrence of a team collapse more likely, critical events on the court which trigger the actual team collapse, and cognitive, affective, and behavioral outcomes that maintain the collapse and prohibit the team's recovery. Results further show that certain factors seem to play a special role in team collapse situations. In this regard, all participant groups described social processes, as for example the transfer of negative emotions or decreased performance, to be important factors influencing the course of a team collapse. The third study shows that collective sport team collapse manifests itself in a reduced running performance of players compared to lost game situations without the experience of collective collapse. Further results reveal that especially negative emotions are involved in the process of collective team collapse, where they are higher compared to lost game situations. While the first two studies give an insight into the process of factors causing a team collapse, study three is the first study to quantify collective team collapse situations in the field. It furthermore quantifies the association between negative emotions and the occurrence of team collapse although the causal relation between negative emotion and team collapse needs to be investigated in depth in future research. In a final evaluation, team collapse is analyzed in the light of existing theories in the field of work and organizational psychology and relations between collective team collapse and other team phenomena are discussed. Building up on this, possible directions for future research are provided.

1 Introduction

“It was the night Germany removed the crown from football royalty. They did so with their own version of the beautiful game and, by the time they had finished, Brazil had suffered an ignominy that was so extreme and implausible, it felt as though a black marker pen had been taken to the pages of their football history.” (Taylor, 2014).

When people talk about the Brazilian-German semi-final of the soccer world cup on July 8 2014, they mainly associate this game with a very good performance of the German team, who defeated Brazil 7-1. While it is undeniable that Germany did play soccer on an excellent level, the phenomenon that Brazil underwent that night tends to fade into the background in media reports and in people’s memory. The striking defeat that Brazil experienced, describes one of the most significant examples of a collective sport team collapse in recent years. Although Brazil started with a powerful and dynamic game that led to a goal chance within the first two minutes, the team started to collapse with the first German goal in the eleventh minute (Kamp, 2014). Thereupon, Germany scored six more goals, three of those within just six minutes. Reasons for this significant collapse of the Brazilian team remain unexplained.

While most team sport athletes are familiar with similar game situations and have experienced comparable dramatic underperformances with their teams, research in the area of collective sport team collapse is still in its infancy. In order to support athletes and coaching staff in dealing with collective team collapse, a better understanding of the underlying processes is needed. This dissertation thesis aims to reveal causes and mechanisms of collective sport team collapse to support sports teams and professionals working with sports teams suffering from collapse situations. Hereby, causes of collective sport team collapse will be explored through two qualitative studies that provide insight into causes of the phenomenon by investigating athletes’, coaches’, and sport psychologists’ perceptions. The qualitative studies further introduce a process model of causes of collective team collapse and define the phenomenon in contrast to seemingly similar psychological team phenomena. Furthermore, possible triggers of team collapse, identified in the initial qualitative studies, will be investigated quantitatively in a third explorative field study. Results of the studies may be of use for practitioners working with sports teams, but could possibly also be of advantage in other areas, as for example in the organizational context, where teamwork plays a significant role as well.

1.1 Social Origins of Human Behavior

From an evolutionary perspective, it is very valuable for humans to join social groups, because they provide an advantage in the struggle for survival (Baumeister & Leary, 1995). Even though we may not face the same threats as our ancestors anymore, groups and social contacts still have a very positive influence on our lives. A lack of social contacts and attachment has been associated with illness and an increased risk of dying (e.g., House, Landis, & Umberson, 1988). Complementary, affiliation is linked to better health and well-being (e.g., Haslam, Jetten, & Alexander, 2012). This may be a reason for us to join groups. Looking at today's society, most of us automatically belong to different types of social groups, such as our family, our groups of friends, classes, work groups, political parties, religious groups, or sports teams. A social group can be defined as "a collection of individuals who perceive themselves to be members of the same social category, share some emotional involvement in this common definition of themselves, and achieve some degree of social consensus about the evaluation of their group and of their membership in it" (Tajfel & Turner, 1986, p. 15). Social groups play a major role in people's everyday lives and shape their behavior in many different ways, depending on their size, norms, composition, status system, degree of member interaction, and interdependence (Levine, 2012). Understanding human behavior is the major goal of psychology as a scientific discipline. Social psychology seeks to explore the influence groups exert on our behavior and is defined as "the scientific investigation of how the thoughts, feelings, and behaviors of individuals are influenced by the actual, imagined, or implied presence of others" (Allport, 1954, p. 5).

One of the most prominent theories addressing the relationship between social group belonging, human behavior, and social psychological processes related to that constitutes Social Identity Theory (Tajfel & Turner, 1986). According to Social Identity Theory, individuals' self-concept is derived from their social groups and the shared self-concept present in these groups. The concept of social identity is further used to explain intra- and inter-group behavior (Hogg & Vaughan, 1995). Group dynamics research focuses especially on these intra- and inter-group behaviors and on psychological processes occurring in and between groups as a result of group belongingness (Brown, 1988), because these factors also determine the effectiveness of teams (Gladstein, 1984). The association between group belongingness, group behavior, and group effectiveness or team performance will be introduced in more detail in the following section.

1.2 Group Processes and Team Performance

An important reason for individuals to join groups is to perform a task together that cannot be accomplished by the individual alone, which is why the aim to perform well is of outstanding importance for most groups (Levine, 2012). Thus, research investigating team performance played a crucial role in social psychology since its beginning. An early and famous model describing team performance constitutes McGrath's (1964) input-process-outcome framework, which assumes that teams are more than the sum of their members due to their interaction. It incorporates inputs, processes, and outcomes and is displayed in an adapted version in Figure 1. Although various adaptations to the model have been introduced, as for example placing it into a larger context, it still contains the basic factors relevant for understanding team performance (Mathieu, Maynard, Rapp, & Gilson, 2008).

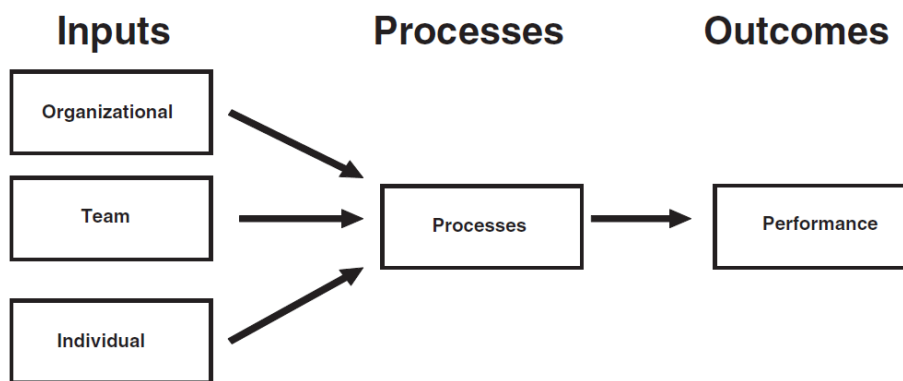


Figure 1. Adapted version of the Input-Process-Outcome framework by McGrath (1964). Illustration from Mathieu et al. (2008).

Inputs illustrate organizational factors, such as the complexity of the environment, team-level factors, as for example task structure, or individual factors, such as individual skills or personality of the team members. Inputs can be understood as antecedent factors, enhancing or constraining interaction while driving team processes. Team processes transform inputs into performance outcomes, including performance itself and other outcome factors, such as commitment or team cohesion (Mathieu et al., 2008). Thus, team processes are indispensable when investigating team performance. Team processes that have shaped research on team performance will be introduced and explained in the following sections.

1.2.1 Social Facilitation and Inhibition

Research shows that the presence of others has the power to enhance or lower our performance. This phenomenon has been referred to as social facilitation, which happens when our performance increases in the company of other individuals (Triplett, 1898), and social inhibition (Zajonc, 1965), which appears when individual performance is reduced by the presence of others. Hereby, “the others” typically represent co-actors or an audience present while a task is being performed (Blascovich, Mendes, Hunter, & Salomon, 1999).

A possible explanation for social facilitation and inhibition is given by drive theory of social facilitation (Zajonc, 1965). According to drive theory, the presence of others increases arousal in the performing individual. This arousal tends to increase performance in simple or well-learned tasks, but can decrease performance in difficult or new tasks. Several other theories were developed based on Zajonc’s drive theory, one of them being Distraction Conflict Theory (Baron, Moore, & Sanders, 1978). Distraction Conflict Theory expands Zajonc’s (1965) drive theory, by assuming that the presence of others only creates arousal if it distracts attention needed for the performed task. Other theories argue that the presence of others creates more effort in the performing individual, which then increases or decreases performance. To date, research investigating the origin of social facilitation and inhibition is still inconsistent (Levine, 2012).

1.2.2 Motivational Gains and Losses

Performance in teams has been found to not only vary in accordance with the presence of an audience but also depending on whether individual performance outcomes are being evaluated or the common performance of the whole group is being measured (Levine, 2012). The process when individual performance is lower while performing a team task compared to performing individually, became known as the Ringelmann effect (Ringelmann, 1913). Ringelmann observed that teams’ performance in a rope-pulling task was lower than the sum of individual performances of team members added up. Research offers two explanations for this phenomenon. The first explanation is given through a lack of coordination in the performance of a team task compared to an individual task (Steiner, 1972). The second explanation is given through a lack of motivation in individuals when performing a team task and is of great interest for social psychology. There are two approaches explaining the reduced motivation of individuals in team tasks.

One approach is widely known as social loafing (Latané, Williams, & Harkins, 1979). Research on social loafing shows that individuals do not exert the same effort in teams as they would alone because they know that the lower team performance cannot be traced back to them. The effect of decreased performance cannot be found if individuals believe that their individual performance can be assessed. It is assumed that, once individual contributions to team performance remain unclear in a team task, a lack of motivation to perform well is created in individuals, which is why they exert less effort (Latané et al., 1979). Another approach explaining decreased motivation in individuals to perform in a group task and decreased team performance as a result, assumes that individuals exert less effort to perform well if they believe that their performance is replaceable (Kerr & Bruun, 1983).

1.2.3 Shared Responsibility

Closely related to the phenomenon of social loafing is the group process of shared responsibility. It also offers an explanation for why individuals' performance decreases in group settings. Early studies in social psychology reported that individuals' perception of responsibility decreased with an increasing number of others around them. Cases of the so called "bystander effect" illustrated how individuals' readiness to help in emergency situations tends to decrease if they perceive that others have witnessed the emergency as well (Darley & Latané, 1968). Latané and Darley (1970) described shared or diffused responsibility as a cognitive process transferring accountability for work or performance outputs to others. Investigating reasons for this behavior, Darley and Latané found that individuals' feeling of responsibility to help in an emergency was reduced if other observers were present. It is assumed that shared responsibility lowers the exercise of an individual's self-control because personal agency for the outcome that the group of observers may or may not achieve is obscured (Alnuaimi, Robert, & Maruping, 2010). As a result, personal responsibility for the outcome of the situation is perceived to be lower, which is similar to the underlying mechanisms of the social loafing phenomenon in groups. Besides the presence of shared responsibility, possible blame occurring due to the observers' inactivity is also diffused among them. Thus, the blame that one individual of all observers could possibly receive is expected to be slight. High-performance teams can suffer from shared responsibility and decreased performance as a result as well when accomplishing a group task (Darley & Latané, 1968). Unfortunately, shared responsibility has not gained much attention in research on team performance so far.

1.2.4 Shared Cognition

Motivational gains and losses and shared responsibility may account for some part of team performance, but it appears that they cannot fully explain it (Levine, 2012). Team coordination plays a crucial role for team performance as well and can partly be achieved through shared cognition. Shared cognition can be defined as the “social processes that relate to the acquisition, storage, transmission, manipulation, and use of information for the purpose of creating a group-level intellectual product” (Larson & Christensen, 1993, p. 6). It can be described as a joint understanding of problems and their solutions among team members (Razzouk & Johnson, 2012). A well-known concept of shared cognition constitute shared mental models, which were first introduced by Cannon-Bowers, Salas, and Converse (1993). Shared mental models can be understood as a “mechanism whereby humans generate descriptions of system purpose and form, explanations of system functioning and observed system states, and predictions of future system states” (Rouse & Morris, 1986, p. 360). In other words, shared mental models explain how team members are able to smoothly coordinate their interaction with no need to communicate (Cannon-Bowers & Salas, 2001; Levine, 2012) and are often described in terms of a group mind (Klimoski & Mohammed, 1994). Cannon-Bowers and colleagues (1993) assumed that teams develop a mutual understanding of their environment, of the tasks that are required by the situation, and of appropriate strategies to fulfill these tasks. Thus, mental models need to be shared by all team members on the one hand, but need to be accurate on the other. Research indicates an association between the general mental ability of team members and the accuracy of their mental models (Edwards, Day, Arthur, & Bell, 2006). If mental models are accurate and shared by all members, they are of advantage for the team and can enhance team performance (e.g., Lim & Klein, 2006; Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000; Stout, Cannon-Bowers, Salas, & Milanovich, 1999).

1.2.5 Collective Emotion and Emotional Contagion

Not only cognition, but also emotions are essential for the understanding of group dynamics and group performance (Barsade & Knight, 2015). The association between positive and negative individual emotions and positive and negative individual performance is relatively well investigated (e.g., Davis, Woodman, & Callow, 2010; Eysenck & Calvo, 1992; Hanin, 2000; Lazarus, 2000). Research on collective emotions, emotional contagion, and their impact on team performance has gained attention in

psychological research during the past years as well. Le Bon (1895) first described the occurrence of collective emotions in groups, which can be understood as a “synchronous convergence in affective responding across individuals towards a specific event or object” (von Scheve & Ismer, 2013, p. 411). Le Bon (1895) already assumed emotional states to be “infectious” and to transfer from one individual to another leading to a collective group emotion. Barsade and Gibson (2012) similarly assumed that collective emotions are created through emotional contagion and defined collective emotion as an “affective state arising from a combination of the group’s top-down components (i.e., the affective context) and its bottom-up components (i.e., the affective composition of the group) as transferred and created through explicit and implicit affective transfer processes” (p. 119). Further research confirms collective moods to be an outcome of the process of emotional contagion (e.g., Hatfield, Carpenter, & Rapson, 2014). Emotional contagion can be defined as the “process in which a person or group influences the emotions or behavior of another person or group through the conscious or unconscious induction of emotion states and behavioral attitudes” (Schoenewolf, 1990, p. 50). The phenomenon of emotional contagion within a team may be explained by evolutionary processes, such as the mimicry of other individuals’ emotions for survival purposes (Hatfield, Cacioppo, & Rapson, 1994). Another approach assumes that individuals consciously compare their feelings to others and adapt (Hsee, Hatfield, & Chemtob, 1992). Emotional contagion has also been associated with team performance. Barsade (2002) in this context reported that positive emotional contagion increased cooperation and perceived task performance in the team and decreased conflict among group members. Totterdell (2000) showed an association between individual mood, team mood, and team performance. Complimentary, Cole, Walter, and Bruch (2008) reported negative team mood to be associated with decreased team performance.

1.2.6 Flow

A further team process that has particularly been associated with increased sport performance is the flow state (Swann, 2016). Flow is the experience of being fully involved in the present moment (Nakamura & Csikszentmihalyi, 2014) and can be described as a positive experiential state that “occurs when the performer is totally connected to the performance, in a situation where personal skills equal required challenge” (Jackson & Marsh, 1996, p. 17). Csikszentmihalyi (1990) identified nine dimensions of a flow experience, including a balance of challenge and skill, the merging

of action and awareness, clear goals, unambiguous feedback, total concentration on the task, a sense of control, the loss of self-consciousness, a transcendence of time, and an autotelic experience. Csikszentmihalyi's (1975) model of flow state, which is pictured in Figure 2, illustrates the assumption that skill and challenge have to be balanced out in order to experience flow. In cases of imbalance, anxiety can arise through low skill level combined with high challenge, or individuals can get bored in cases of high skill level combined with low challenge.

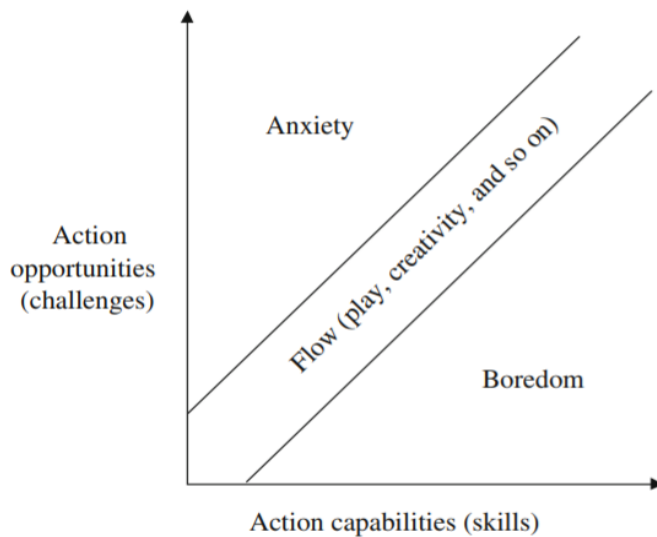


Figure 2. Csikszentmihalyi's (1975) model of flow state. Illustration from Nakamura and Csikszentmihalyi (2014).

Flow states have been related to peak sport performance (Cohn, 1991; Jackson, 1992; Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson & Eklund, 2002; Jackson & Marsh, 1996; Jackson & Roberts, 1992; Landhäuser & Keller, 2012), which is why they are very desirable for athletes, especially when nuances of performance decide between success and failure (Swann, 2016). Athletes have described the experience of flow as feeling out of the body and watching themselves perform (Jackson, 1996).

Research further indicates that flow exists on a team level as well (Bakker, Oerlemans, Demerouti, Slot, & Ali, 2011; Csikszentmihalyi & Csikszentmihalyi's, 1988; Lipman-Blumen, 1999; Swann, Keegan, Piggott & Crust, L., 2012), assuming a "hot group" phenomenon, whereby a whole team encounters a flow state (Lipman-Blumen, 1999). Bakker and colleagues (2011) suggest that team flow may occur due to the common experiences and goals a team shares during a game. They further assume that emotional and behavioral contagion effects evoke flow states in a team and show perceptions of flow at the team level to be associated with positive match results.

1.3 Performing under Pressure

While most of the team processes described above have the potential to enhance team performance, other phenomena exist, which hinder individual and team performance. Since they occur not only but often in high-pressure situations, such as important games or competitions, they play a crucial role in the sport context. Performance related phenomena can emerge on the individual level, i.e. choking under pressure, or on the team level, like negative momentum and collective sport team collapse, and thus are important for both individual and team sport athletes.

1.3.1 Choking under Pressure

It is a phenomenon as old as mankind itself: we tend to perform worse if we are being watched by significant others or if our performance in a specific situation is of high importance to us. It is in the nature of sport that this phenomenon plays an important role for athletes and their victories and defeats, as they mostly have to perform under competitive conditions, where their performance is evaluated in comparison to others. Research has described the underperformance of athletes in situations that go along with high performance demands as “choking under pressure”. According to Baumeister (1984), choking under pressure can be defined as “performance decrements under circumstances that increase the importance of good or improved performance” (p. 610).

To date, choking under pressure has received attention in various field of sport psychological research and several theories have been developed. Within these theories, anxiety plays a crucial role, as an increase in anxiety is required for choking to occur (Mesagno & Beckmann, 2017). According to self-presentation models, increased anxiety is a result of personality traits (Mesagno, Harvey, & Janelle, 2011). An athlete who is worried about making a good impression and the evaluation of his or her performance by others is likely more anxious and thus more susceptible to choke than one who likes standing in the spotlight (Mesagno & Beckmann, 2017). Research using attentional models argues that, when anxiety increases, athletes’ attention is being shifted from sport-specific relevant information to either internal or external cues, which are irrelevant for an optimal performance (Baumeister, 1984; Beilock & Carr, 2001). According to the self-focus model, attention is focused on skill execution, when anxiety increases, inhibiting performance. Distraction models on the other side argue that attention is shifted to task irrelevant cues, such as the audience, which also limits performance (Eysenck, Derakshan, Santos, & Calvo, 2007; Oudejans, Kuijpers, Kooijman, & Bakker, 2011).

Based on self-presentation and attentional theory, several interventions for choking under pressure have been developed. They include for example the use of pre-performance routines, biomechanical metaphors, quiet eye, or acclimatization (Mesagno & Beckmann, 2017). While several theories on the causes of choking under pressure exist and various interventions have been tested, research investigating the underperformance of entire sports teams is just beginning.

1.3.2 Momentum and Psychological Momentum

In the late 1970s, good and bad physical performance of sports teams was first described as positive or negative momentum (Adler & Adler, 1978). Positive momentum describes a situation where the team performs well, while negative momentum stands for a state where a team underperforms (e.g., Cotterill, 2012; Den Hartigh, Gernigon, Van Yperen, Marin, & Van Geert, 2014). Momentum can shift between positive and negative momentum within a team or between teams, where one team typically experiences positive momentum, while the other team undergoes negative momentum (Taylor & Demick, 1994). A theoretical model explaining positive and negative momentum is the Multidimensional Model of Momentum developed by Taylor & Demick (1994). It proposes a momentum chain of precipitating events, causing a change in cognition, affect, and physiology, which leads to behavioral changes and improved or decreased performance as a result. The combination of change in performance, change in affect, cognition, physiology, and a change of the opponent's behavior results in a change in outcome.

Den Hartigh and colleagues (2014) quantitatively investigated outcomes of positive and negative momentum in dyadic sports teams by assigning participants to rowing pairs competing against a virtual opponent on a rowing ergometer. Feedback related to participants' performance was manipulated to simulate either positive or negative momentum. Results showed negative psychological changes (perception of collective efficacy and task cohesion) during negative momentum to be stronger than positive psychological changes during positive momentum. Besides that, team effort and interpersonal coordination decreased during negative momentum, while effort was found to be more variable and adaptive during positive momentum. Through this study, Den Hartigh and colleagues showed that psychological changes occurred in teams as outcomes of positive and negative momentum, which are also referred to as "psychological

momentum” (e.g., Crust & Nesti, 2006; Iso-Ahola & Mobily, 1980; Vallerand, Colavecchio, & Pelletier, 1988).

The term psychological momentum is closely related to momentum and describes psychological processes accompanying the perception of momentum or collective good and bad performance periods in a team and can be defined as “an added or gained psychological power, which changes interpersonal perceptions and influences an individual’s mental and physical performance” (Iso-Ahola & Mobily, 1980, p. 391). Like momentum, psychological momentum can be either positive or negative and this state can switch during a game. Thus, it describes the team’s perception of their own performance as either better (positive psychological momentum) or worse than normal (negative psychological momentum). A recent qualitative study investigating psychological momentum was conducted by Moesch and Apitzsch (2012). The authors interviewed nine coaches of professional female handball teams about positive and negative psychological momentum and reported that positive and negative psychological momentum was associated with behavioral, cognitive, emotional, and confidence-related factors. They furthermore categorized triggers of positive psychological momentum into confidence, individual factors, team factors, and opponent factors; and triggers of negative psychological momentum into coach factors, confidence, external factors, individual factors, and team factors. When asked about strategies to influence psychological momentum, coaches of Moesch and Apitzsch’s study tended to describe general strategies for performance improvement, as for example the use of positive enhancement.

1.3.3 Collective Sport Team Collapse

Apitzsch (2006) was the first researcher to scientifically use the term “collective collapse”, mainly used by media up until that point, to describe sudden and extreme performance decrements of sports teams. He proposed the following initial and preliminary definition of collective collapse, which is not scientifically based: “Collective collapse occurs when a majority of the players in a team sport suddenly perform below expected level in a match of great, often decisive, importance in spite of a normal or good start of the match or when a team underperforms right from the start of a match” (Apitzsch, 2006, p. 38). While his definition gave a direction for research to develop, it left some questions open for empirical research to answer, as for example what the majority of a team was or what performing below an expected level meant. Besides his

definition, Apitzsch suggested to consider cognitive, affective, and behavioral approaches, when investigating the phenomenon of collective team collapse. He furthermore emphasized the importance of emotional contagion in the collective team collapse equation.

Apitzsch himself (2009a) conducted the first study in the field of collective collapse, aiming to investigate causes of the phenomenon qualitatively through semi-structured interviews with nine male athletes of the same handball team. Results of this case study revealed inappropriate behavior of the players, failure of the role system, negative communication, a change in tactics of the opponent, and goals scored by the opponent to be crucial factors causing a collective team collapse. Furthermore, Apitzsch (2009a) proposed negative thinking, negative emotions, and negative emotional contagion to be factors that a team would need to deal with in order to prevent the occurrence of a collective team collapse.

In a further study, Apitzsch (2009b) included four male coaches in addition to the nine male handball players in a qualitative study investigating causes of team collapse. He distinguished between external and internal causes of team collapse, whereby most factors turned out to be internal at the team or individual level. Apitzsch reported factors at the individual level to be mental factors, as for example the perceived pressure to win, and behavioral factors, such as failure or playing without effort. Factors at the team level included negligence of the tactics, irritation that had a negative impact on team spirit, and players not fulfilling their roles.

Boss and Kleinert (2015) transferred the concept of collective collapse to the lab and investigated it in relation to social contagion in sport, as suggested by Apitzsch (2006). Boss and Kleinert applied balance theory (Heider, 1958) to understand social contagion in sport. Participants of their study were assigned to dyadic teams and performed a balancing task in these teams, whereby it was evaluated whether false negative feedback on the partner's performance affected the relationship to the partner. They found that participants compensated for perceived bad performance of the partner by devaluing the relationship and by decreasing their own performance. The study therefore offered insights into possible performance contagion processes occurring when an individual underperforms in a team.

1.4 Critique of the current studies

The described studies provided initial insights into processes related to collective team collapse, however, some limitations need to be mentioned. First, existing research in the area of momentum, psychological momentum, and collective collapse of sports teams does not sufficiently distinguish between the three terms. For example, Moesch and Apitzsch (2012) aimed to investigate positive and negative psychological momentum, but also mentioned perceptions of psychological momentum, which is contradictory, because psychological momentum by definition (Iso-Ahola & Mobily, 1980) is the perception of momentum. It can thus be assumed that Moesch and Apitzsch (2012) were investigating momentum rather than psychological momentum. This negligence to distinguish between momentum and psychological momentum is an issue occurring in many studies in the field.

Furthermore, momentum and collective team collapse are interchangeably used to describe the same phenomenon. Apitzsch (2009a) for example, states: “Collective collapse in team sports, conceived in terms of negative psychological momentum, was investigated...” (p. 35). If no differentiation between momentum and collective team collapse is being made, it is questionable if both terms are needed. Cotterill (2012) proposed a distinction between the two terms, because negative momentum and negative psychological momentum describe a process that can be overcome by a team and shifted to the opposite, which may not be the case for a collective collapse.

In relation to the research designs of the qualitative and quantitative studies conducted on momentum or team collapse, it has to be noted that many investigate causes of momentum or team collapse in one specific sport (Apitzsch, 2009a; Den Hartigh et al., 2014) or one specific task (Boss & Kleinert, 2015) only, which does not allow to draw general conclusions. Furthermore, some of the qualitative studies (Apitzsch 2009a,b) renounced audiotaping and transcription of the interview data and relied on notes taken by the researchers, whereby important data may have been filtered out due to the researchers being engaged in interviewing and taking notes at the same time. The methods sections of the two studies by Apitzsch are rather vague, which complicates replication. In addition to that, the qualitative studies involved either participants of male (Apitzsch 2009a,b) or female (Moesch & Apitzsch, 2012) sports teams, which limits the possibility of drawing conclusions among gender. The quantitative studies on momentum (Den Hartigh et al., 2014) or collective collapse (Boss & Kleinert, 2015) investigated artificial dyadic teams

assigned to each other in a laboratory setting, rather than natural teams, consisting of more than two players, in actual game situations. This may also limit transferability of the results to the field of team sports.

2 Aims of the Studies

The aim of the first study was to qualitatively investigate athletes' perception of causes of collective sport team collapse. Since previous qualitative studies, focused on specific types of sports, did not follow qualitative research standards, and included only male athletes (Apitzsch, 2009a,b), both male and female athletes from a variety of sports were included in the first study. A further goal of the first study was to define the phenomenon of collective team collapse based on the results of the study and to distinguish it from the construct of negative momentum.

The second study aimed to complement the results of study one by further investigating coaches' and sport psychologists' perceptions of causes of team collapse and to compare them to athletes' perceptions in the first study. Again, to overcome limitations of previous studies, both male and female coaches from a variety of sports were included in the sample. By adding coaching staff to the initial athlete sample, a 360-degree-view on the phenomenon of team collapse should be provided.

The major goal of the third study was to quantitatively measure the phenomenon of team collapse, investigated qualitatively in study one and two, in the field. Since negative emotion and negative emotional contagion were found to be important factors or causes related to collective sport team collapse, the study further aimed to quantitatively investigate the relationship between negative emotions and individual as well as team performance in the field.

3 Methodology

Since this dissertation projects is explorative in nature, a mixed methodology was chosen to assess causes of collective sport team collapse in a variety of studies. While study one and study two were conducted in a qualitative fashion investigating causes of team collapse, study three included a quantitative design. A detailed overview of the methodology of each study is provided in the following section.

3.1 Study 1

The first study is based on an explorative qualitative design, as only few theories of the phenomenon of team collapse existed and the main goal was to gain initial insights into its origins. A constructivist-interpretivist grounded theory methodology (Charmaz, 2006) was applied for data collection, data analysis, and for the development of a theoretical model of causes of team collapse based on the collected data. This constructivist-interpretivist approach is built on the assumption that it is impossible to gain an unbiased view of a phenomenon, which can only be assessed through individual subjective perceptions and descriptions of it (Holt, 2016; Weed, 2017). To explore athletes' perceptions of causes of collective team collapse, a semi-structured interview guide (see attachment 8.1) consisting of 13 questions was developed and applied in 10 interviews with participants of different teams from various sports playing between first and fourth division in Germany. The athletes were provided with a short description of the phenomenon of team collapse and asked to describe a similar past experience with their own team as detailed as possible. The interviews were audiotaped and manually transcribed verbatim. An inductive thematic grounded theory procedure incorporating incident-to-incident coding and in-vivo codes was used to derive categories. During data analysis, constant comparison and theoretical memos in form of graphical mind maps were used to develop categories, subcategories, relations between the categories, and to further summarize them in a theoretical model of team collapse. Once data and theoretical saturation were identified, no further interviews were conducted and a "critical friend" (Sparkes & Smith, 2014; Smith & McGannon, 2018) challenged the developed categories and the theoretical model from the perspective of an independent expert. The developed process model was evaluated post hoc using Weed's (2017) criteria of fit, work, relevance, and modifiability.

3.2 Study 2

Since a theoretical model of collective sport team collapse had been developed in the first study, the second qualitative study was of abductive nature. Abduction is typically used to explore the fit between existing theories and newly gathered data (Peirce, 1960/1979). While the theoretical framework of the model was applied to the data collected with coaches and sport psychologists in a deductive fashion, the inductive development of new categories was allowed. A relativist ontology and a constructivist epistemology was used to collect and analyze seven coaches' and four sport psychologists' perceptions of causes

of team collapse, assuming that participants' subjective interpretations of the phenomenon are also influenced by the researcher's interaction with them and his or her interpretation of their perspective. The interview guide of the first study was slightly adapted and used for the semi-structured interviews of this study (see attachment 8.1), which were again audiotaped and manually transcribed verbatim. For data analysis, the methodological steps developed by Timmermans and Tavory (2012) were applied, which include revisiting, defamiliarization, and alternative casing to enrich deductive analysis. Transcripts, codes, and memos were questioned and rethought to revisit the phenomenon of collective team collapse, while defamiliarization was fulfilled through the textual mode of transcripts. The methodological requirement of alternative casing was met through constant comparisons. Again, critique and feedback regarding the process model, which was adapted throughout the inductive process of data analysis, was provided by a "critical friend" (Sparkes & Smith, 2014).

3.3 Study 3

The third study was conducted in an exploratory quantitative field study fashion in order to initially record a collective sport team collapse in the field, and to examine whether it was related to emotional states of players. Within a preparation tournament, running performances and emotions of 75 field hockey players belonging to one of five different teams was assessed during all games of the tournament. Players' running performance was recorded through GPS sensors, whereby running distance and the time each athlete played were put into relation and used as a measure of running performance. Emotions prior to and after each game were assessed through the Positive and Negative Affect Scales (PANAS) by Watson, Clark, and Tellegen (1988). Participants were individually interviewed after each game and asked whether they would classify their team performance as a collective collapse based on a description of the phenomenon. Two teams consisting of 33 players consistently indicated to have experienced a collective collapse in one of their games. These games were classified as collective team collapse games and participants' running performance and their emotional states before and after those games were compared to game situations where the same team lost a game but did not experience a collective collapse.

4 Publications and Submissions

4.1 Article 1

Authors: V. Vanessa Wergin, Zsuzsanna Zimanyi, Christopher Mesagno, & Jürgen Beckmann

Title: When Suddenly Nothing Works Anymore Within a Team – Causes of Collective Sport Team Collapse

Journal: Frontiers in Psychology

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Summary:

Since research in the area of collective team collapse is just starting, the present article aimed to investigate causes of collective team collapse in different types of sport and to develop a definition of the phenomenon, which allows for a differentiation from similar team phenomena. The exploratory qualitative study employed a grounded theory methodology and included semi-structured interviews with 10 professional German team sport athletes about their perceptions of team collapse events they had experienced with their teams. Results showed that collective team collapse was not induced by single triggers, but by a temporal cascade of causes happening one after the other. Antecedents represented the beginning of this cascade. They included factors, such as perceived pressure, overconfidence, or poor preparation, which increase the likelihood of a team collapse to occur, but did not directly trigger the collapse itself. Antecedents were found to be followed by critical events occurring on the court that actually triggered the collapse, such as the failure of a key player or a perceived wrong referee decision. Results further indicated that critical events evoked changes in affect, cognition, and behavior of the team, which were summarized as outcomes maintaining team collapse. Affective outcomes for example included increased anxiety or anger, while a lack of accountability or despair constituted examples for cognitive outcomes. Examples for behavioral outcomes were decreased performance contagion and cautious play. Based on these findings, a process model of causes of collective sport team collapse was developed, serving as a theoretical framework of the phenomenon. Besides that, results highlighted the importance of social factors in causing collective collapse of the team, indicating that collective team collapse is more than individual choking experiences added up. These insights were incorporated in a definition of collective team collapse, which differentiates

the phenomenon from negative momentum. The article therefore provides initial insights into causes of collective sport team collapse, providing a starting point for future research as well as for practitioners working with sports teams.

The manuscript was submitted in July 2018, accepted in October 2018, and published in November 2018 in the section *Movement Science and Sport Psychology* of the Journal *Frontiers in Psychology*. *Frontiers in Psychology* is an international peer-reviewed journal publishing research across all psychological areas. It is an open-access journal and constitutes the largest journal in the field of Psychology.

Contribution:

Vanessa Wergin was the principal investigator and author of the published article. She developed the idea for the study, the study design, and chose the methods to be used. She developed the interview schedule in exchange with Christopher Mesagno and collected and analyzed the data with the support of Zsuzsanna Zimanyi and the feedback of Christopher Mesagno. Vanessa Wergin created the process model of collective sport team collapse and developed the definition of the phenomenon distinguishing it from negative momentum. She wrote the published article, while receiving feedback from her co-authors.



When Suddenly Nothing Works Anymore Within a Team – Causes of Collective Sport Team Collapse

V. Vanessa Wergin^{1*}, Zsuzsanna Zimanyi^{1†}, Christopher Mesagno² and Jürgen Beckmann^{1,3}

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Edson Filho,
University of Central Lancashire,
United Kingdom
Mustafa Sarkar,
Nottingham Trent University,
United Kingdom
Emmanouil Georgiadis,
University of Suffolk, United Kingdom

*Correspondence:

V. Vanessa Wergin
vanessa.wergin@tum.de

†Present address:

Zsuzsanna Zimanyi, Faculty of
Humanities, Universität Konstanz,
Konstanz, Germany

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¹ Chair of Sport Psychology, Department of Sport and Health Sciences, Technical University of Munich, Munich, Germany, ² School of Health and Life Sciences, Federation University Australia, Ballarat, VIC, Australia, ³ School of Human Movement and Nutrition Sciences, University of Queensland, Brisbane, QLD, Australia

Collective team collapse occurs when multiple players of a sport team experience a sudden and extreme underperformance within a game. To date, minimal research has been conducted on the causes of collective team collapse. Thus, goals of this study were to explore perceived causes of collective team collapse in different sports and to define team collapse in contrast to negative momentum. To investigate factors causing and maintaining collective sport team collapse, an inductive, exploratory qualitative analysis of individual interviews was conducted. Semi-structured interviews were carried out with 10 athletes of professional German teams of various sports playing in between first and fourth division. Participants were interviewed about a team collapse event they had experienced with their team during the past year. Data were collected and analyzed using a grounded theory methodology. Collective team collapse appeared to be induced by a temporal cascade of causes rather than by single triggers. This cascade included antecedents, which represent factors that make the occurrence of a team collapse more likely; critical events, which include specific events within the game that trigger a team collapse; as well as affective, cognitive, and behavioral outcomes that foster a maintenance of the collapse. Within this theoretical framework, social factors, such as decreased performance contagion or emotional contagion, played crucial roles in causing a team collapse. These results illustrate that collective team collapse is more than the sum of individual choking of multiple players at the same time. In conclusion, a new definition, differentiating team collapse from negative momentum, is introduced. Furthermore, a process model of causes of collective team collapse is proposed. The results provide first insights into causes of collective collapse in a variety of team sports. The developed model is supposed to help future research to better connect to practice and to support athletes, coaches, and sport psychologists.

Keywords: collective team collapse, negative momentum, emotional contagion, performance contagion, key player collapse

INTRODUCTION

Most team sport athletes are familiar with the following phenomenon: Their team's game is going well and suddenly, from one moment to the other, performance drops so considerably that nothing seems to work anymore for the team. The 2017 Super Bowl describes one of the most significant examples of such a sport team collapse in recent years: The Atlanta Falcons led 28-3 against the New England Patriots during the second half and had a 98.9% statistically calculated chance to win the game, but unexpectedly lost 28-34 in overtime (Rafferty, 2017). The Falcons' performance was described as one of the toughest losses in Super Bowl history, where one could observe a team falling apart. Such an incident is an example of collective team collapse, which occurs when a team is in the lead and abruptly loses control over the game (Boss and Kleinert, 2015). It describes situations where unexpectedly nothing seems to be working anymore within a team's performance capability. Apitzsch (2006) defined team collapse as occurring "when a majority of the players in a team sport suddenly perform below expected level in a match of great, often decisive, importance in spite of a normal or good start of the match or when a team underperforms right from the start of a match" (p. 38).

Adler and Adler (1978) were among the first researchers to describe the sudden, extreme shifts in sport team performance with the term "momentum". These changes in physical performance can be both positive and negative, where positive momentum is when everything seems to work well in a team, and negative momentum is when the team underperforms collectively (Den Hartigh et al., 2014). Momentum can shift from positive to negative as well as from one team to the other during a game (e.g., Cotterill, 2012; Den Hartigh et al., 2014). Recent research in the area of momentum in sport showed that negative psychological changes, such as collective efficacy and team cohesion, as well as interpersonal coordination seem to play a role in causing negative momentum (Den Hartigh et al., 2014). Furthermore, Boss and Kleinert (2015) discovered the social effect of performance contagion as an underlying mechanism of negative momentum with rowing pairs. These results are difficult to transfer to actual sport teams though, since they focused on teams consisting of two members, randomly assigned to each other. Group processes within teams consisting of more than two members, who have been part of a team for months or years, may be different and more complex. Various models of momentum have been developed so far. Taylor and Demick (1994) proposed the Multidimensional Model of Momentum, consisting of a momentum chain that explains the development of both positive and negative momentum. This momentum chain includes precipitating events, followed by changes in cognition, affect, and physiology, which cause behavioral changes that lead to an increase or decrease in performance. This change in performance combined with changes in cognition, physiology, affect, and behavior of the opponent team then causes a change in outcome.

Momentum constitutes a phenomenon that is closely related to collective team collapse (Cotterill, 2012), but existing research has failed to sufficiently distinguish between the two phenomena.

Apitzsch (2009), the first known researcher to investigate collective team collapse, used Taylor and Demick's (1994) momentum chain and extended it through qualitative data from players of a handball team that had just recently experienced collective team collapse. Apitzsch (2009) explains that two different causal chains, happening at two different points in time within a game, could evoke what he labels as collective collapse. The first chain, prior to the start of a match, includes either negative thoughts, leading to negative emotion and resulting in a passive playing style, or positive emotions, leading to positive thoughts and resulting in overconfidence and mistakes during the game. The second chain, occurring at the end of a game, involves a critical event within the game that leads to negative cognitions, which then cause passive behavior and subsequent negative performance. Apitzsch (2009) developed these causal chains through a qualitative case study exploring the causes of team collapse with a sport team. He found inappropriate behavior, failure of the role system, negative communication, opponent's change in tactics, and scoring by the opponent to be major causes of the handball team's collective collapse but misses to specify in detail what these factors stand for. Although Apitzsch's (2009) case study provides some insight into team collapse, knowledge of factors causing team collapse across different teams and game situations is limited. In order to identify factors that make the occurrence of team collapse across various teams and team sports more likely, qualitative research with different situations and various types of sport is needed (e.g., Crust and Nesti, 2006; Apitzsch, 2009).

Several factors influencing momentum (Taylor and Demick, 1994) and possibly collective team collapse (Apitzsch, 2009) as well as related to psychological processes and the perception of momentum, which are often referred to as "psychological momentum" (Iso-Ahola and Mobily, 1980; Crust and Nesti, 2006; Gernigon et al., 2010; Mortimer and Burt, 2014). Iso-Ahola and Mobily (1980) defined psychological momentum as "an added or gained psychological power, which changes interpersonal perceptions and influences an individual's mental and physical performance" (p. 391). Congruent to momentum, psychological momentum can be either positive or negative and Taylor and Demick (1994) argue that positive or negative shifts in performance (momentum) can only happen if they are recognized by the team (psychological momentum). The existence of psychological momentum has been discussed broadly in the literature (e.g., Taylor and Demick, 1994; Crust and Nesti, 2006; Mortimer and Burt, 2014). Cornelius et al. (1997), for example, argue that attributions of positive or negative psychological momentum are no more than mental labeling processes to evaluate or describe performance. In their model, negative psychological momentum is an outcome rather than a cause of bad performance. Vallerand et al. (1988) introduced the Antecedents-Consequences Model (ACM) of psychological momentum, suggesting that the impact of positive psychological momentum on performance depends on personal factors, such as motivation, as well as on situational factors, such as audience behavior. While the ACM distinguishes antecedents from consequences of psychological momentum, it focuses on positive psychological momentum only and does not consider negative

psychological momentum, which is problematic (Apitzsch, 2009).

While empirical research on causes of momentum, psychological momentum, and collective team collapse is still developing, many studies have investigated the causes of individual performance failure (i.e., choking under pressure or simply “choking”). Choking can be defined as “performance decrements under circumstances that increase the importance of good or improved performance” (Baumeister, 1984). Various theories exist about causes of choking, which are related to concentration difficulties, including distraction (Wine, 1971), a high self-focus (Baumeister, 1984; Beilock and Carr, 2001), and shifts of attentional focus (Eysenck et al., 2007; Oudejans et al., 2011). In order to bridge the gap between individual and team sport performance failures, Hill and Shaw (2013) conducted a qualitative study examining individual choking in various types of team sports. By interviewing team sport athletes, Hill and Shaw (2013) found important games, expectations, individual responsibility, presence of an audience, and physical as well as mental errors to be important antecedents for the occurrence of individual choking within a team sport. Anxiety, distraction, and perceived control were mechanisms triggering choking within a team. Furthermore, moderators, such as team cohesion or motivational climate, as well as perceived consequences, such as a significant drop in performance or negative affect, were crucial for the occurrence of individual choking in teams. These findings offer initial insights into factors influencing individual choking in a team environment that could be similar to causes of the choking of a whole team. It, however, does not consider the reasons of a collective decrease in a team’s performance.

While individual choking is well explored already, research related to the collective collapse of an entire team is still limited. It further appears that existing research applies two different terms, namely collective team collapse, and negative momentum, to describe this phenomenon without differentiating between the terms. Momentum is even used to describe both the individual and collective underperformance of athletes. Thus, the current qualitative study does not only aim to investigate athletes’ perception of causes of collective sport team collapse, but also attempts to define team collapse in contrast to the seemingly similar construct of negative momentum. In order to overcome limitations of Apitzsch’s (2009) case study, a sample of athletes from different teams in a variety of sports was included, which we expect to result in a more global view of causes of team collapse.

MATERIALS AND METHODS

Philosophical and Methodological Orientation

One purpose of the study was to gain an understanding of athletes’ lived experiences and perceptions of collective team collapse in their specific team sport environment, and a second to develop an inductive theory that displays the phenomenon in these specific situations. Considering this purpose and the limited empirical research exploring the causes of team collapse, a constructivist–interpretivist grounded theory methodology

(Charmaz, 2006) was used to collect and analyze data and subsequently derive a substantive theory (Holt, 2016; Weed, 2017). Constructivists reject the idea of objectivity and assume that the view of the world and certain phenomena rely on individual perceptions of it (Weed, 2017). Since these individual perceptions are subjective due to personal experiences, it is impossible to gain a perfect, unbiased view of the world. Thus, a grounded theory methodology can be used to understand multiple biased perspectives of reality in order to achieve a view that is plausible and representative of the data. Charmaz (2006) described grounded theory as “a systematic, yet flexible methodology for collecting and analyzing qualitative data to construct theories that are grounded in the data themselves” (p. 2). Consequently, she proposed that it was both a method and product of inquiry (Sparkes and Smith, 2014). This methodology enables “an analytical interpretation of the participants’ worlds and the processes constituting how these worlds are constructed” (Charmaz, 2005, p. 508) to generate theory from data.

Participants

Participants consisted of 10 athletes (seven male, three female) from different teams within various sports (i.e., four volleyball, three basketball, two soccer, and one field hockey). Athletes’ ages ranged from 19 to 30 years ($M = 24.30$, $SD = 3.74$). Participants’ criterion for inclusion was 10 years or more of experience in the sport and varied between 10 and 20 years ($M = 15.60$, $SD = 3.57$). The time they were a member of their current team varied between 0.5 and 14 years ($M = 4.95$, $SD = 4.49$). All participants were playing in between first and fourth division in Germany and therefore either on a national or the highest regional level. The experience level of the athletes was required to ensure that a lack of skills and abilities was not the reason for the experienced team collapse.

Interview Guide

We developed a semi-structured interview guide to investigate athletes’ perceptions of causes of collective sport team collapse. The first author, with a background in psychology, and the second author, with a background in sport science, designed potential interview questions dealing with underlying factors of team collapse and with processes occurring within the team during the collapse event. During 4×4 -h sessions, the first and second authors discussed the questions with the third author, who is experienced in qualitative research. The three authors then discussed the third author’s critique and review until consensus on a final version of the interview guide was reached.

The first section of the interview guide consisted of a short colloquial description of team collapse to ensure participants were envisioning the same phenomenon. It was developed during 2×4 -h sessions by the first, second, and third authors. The description included several aspects mentioned to be important for team collapse in existing literature (Apitzsch, 2006; Boss and Kleinert, 2015), namely that the team’s performance decreased more than usual, that this happened unexpectedly and that nothing seemed to be working anymore within the team during the collapse. Participants then described a similar experience with their team preferably within the last 12 months or within

the last 5 years at maximum to capitalize on memory recall. Even though we provided a lengthy timeframe (up to 5 years), all participants were able to recall a team collapse event within the last year. The second section (Questions 1–7) consisted of questions about details of the team collapse, such as, at what point during the game it took place or how many players were involved. The content of the third section (Questions 8–12) included questions about the impact the team collapse had on players and game. A sample question for this section was “To what extent did the team collapse influence the further course of play?” The last question (Question 13) specifically asked about influencing factors of collective team collapse and was posed last in order not to affect participants’ answers to previous questions. To conclude the interview, participants were asked whether there was anything else they found to be relevant regarding the topic of collective team collapse (Question 14). The full interview guide is included in the **Supplementary Data Sheet 1**.

Data Collection

Given the purpose of the study, two different sampling methods were used to recruit participants. The purposeful sampling method of criterion-based sampling was chosen as the principal sampling method to approach athletes of various German sport teams. In order to fulfill the sampling criteria, participants needed to: (a) be members of a team sport consisting of more than two players, (b) play in between first and fourth division, (c) have experience in playing the sport for 10 years or more, (d) have experienced a team collapse event with their current team, and (e) be willing to talk about the team collapse event. Athletes who fulfilled these criteria were recruited for the study and the purpose of the research was explained upon arrival for the interview. After implementation of the initial interviews, theoretical sampling was applied to recruit further participants. First results showed that key players and their performance seemed to play a crucial role in the team collapse process and that athletes attributed more responsibility to key players, who fulfill a leadership role in the team. Although there are several formal and informal leadership roles present within teams, and even though team captains do not necessarily fulfill a principal informal leadership role in their team, it is undeniable that captains hold a formal leadership role. Therefore, in order to include the perception of causes of team collapse of players with a leadership role in the team, team captains were predominantly recruited during theoretical sampling. The retrospective semi-structured interviews were carried out by seven different interviewers, whereby the first author interviewed three athletes and the second author interviewed one athlete. The additional five trained assistant interviewers were involved in interviewing due to organizational issues, such as the implementation of interviews in different parts of Germany at the same time. Furthermore, it was important for the interviewers to be knowledgeable in the sport to fully engage in the interview. All interviewers were trained professionally on semi-structured interview conduction for 12 h prior to carrying out any interviews. To further ensure consistency among the different interviewers, they tested the interview guide with two athletes each as a pilot testing phase, while being supervised by the first and second authors. Specific

feedback on the interview conduction was provided before interviewers completed actual interviews with study participants. This procedure was repeated twice and occurring differences in the application of the interview guide were discussed between interviewers, and first and second author until consensus about the interviewing process was reached.

The duration of the interviews ranged from 20 to 40 min ($M = 31.14$; $SD = 6.97$). Interviews were carried out in German, which was the native language of all participants and interviewers. All participants were informed that participation was voluntary and that goals of the study were to identify underlying factors and mechanisms of the phenomenon of team collapse. They were assured the right to withdraw from the interview at any time without penalty. Participants were further informed that audio records would be used for research purposes only and that recorded data would be treated confidentially. Additionally, they were asked to sign a declaration of consent, stating that they had been informed about the purpose of the study and agreed with audiotaping of the interview. All participants gave written informed consent in accordance with the Declaration of Helsinki. The study did not involve any invasive or potentially dangerous methods and therefore, in accordance with the German Research Foundation (DFG) and in accordance with the guidelines of the Department of Sport and Health Sciences at the Technical University of Munich, did not require a formal ethics approval.

Data Analysis and Trustworthiness

All interviews were audio recorded and manually transcribed verbatim, resulting in 146 pages of single-spaced text. The first two authors analyzed the interview transcripts following Charmaz (2006) suggestions on an inductive thematic grounded theory analytical procedure. Both authors read the interview transcripts multiple times to enhance familiarity with the content. During initial coding, interview data were analyzed using incident-to-incident coding and *in vivo* codes (Charmaz, 2006). An example for initial coding is given on the basis of the following quote: “Passes don’t arrive anymore, throws don’t reach the basket, you don’t achieve stops, talking of defensive stops, and everything becomes difficult and then you think. Then you get this panic and this panic doesn’t help at all and so the collapse continues.” While the first part of this quote was coded as unforced error and bad defense, the second part was coded as anxiety. During focused coding (Charmaz, 2006), concepts generated through open coding were reassembled into categories and subcategories to better explain the perceived causes of team collapse. The categories unforced error and bad defense for example were classified as subcategories in the superior category of unforced error accumulation. Theoretical integration included the investigation of relationships between categories and sub-categories in order to gain an understanding of the connections between categories. In the presented example, unforced error accumulation was linked to player anxiety. Throughout the process of initial and focused coding, constant comparison was applied, continuously comparing new data with already developed concepts, categories, and relationships between categories. Simultaneously, theoretical memos were

used during initial and focused coding and contained various interpretations and relations between the identified categories in the form of graphical mind maps. Memos were further used to guide integration of categories into a theoretical framework in seeking to plausibly explain the relationships between causes of team collapse. Data saturation was identified when interviews did not provide any new information for the development of further categories. Theoretical saturation occurred when fresh interview data did not reveal any new properties of the established categories of the theoretical process model (Charmaz, 2006). Data saturation and theoretical saturation were reached after eight interviews, which is why we stopped interviewing after 10 participants.

Data collection and analysis followed the suggestions of Smith and McGannon (2018) for conducting rigorous qualitative research. Therefore, methods used in the past to demonstrate methodological rigor, such as member checking, inter-rater reliability, and the notion of universal criteria, have been omitted in the analytical process as they were “shown to be ineffective for verification, trustworthiness, or reliability purposes” (Smith and McGannon, 2018, p. 1). In order to support the analytical process and enhance methodological rigor, assumptions made by researchers were regularly compared to newly gathered data (Weed, 2017). In addition, graphical illustrations of the developing model were used during data analysis to help researchers think theoretically instead of descriptively (Holt, 2016). The third author, who was not involved in data analysis initially, acted as a “critical friend” (Sparkes and Smith, 2014; Smith and McGannon, 2018) and challenged the abstracted qualitative categories as well as the theoretical model developed by first and second author. In this role, he provided feedback on the classification of categories from an independent, external expert perspective. Categories and the developed theoretical model were then discussed extensively between first, second, and third author. The resulting process model was furthermore evaluated *post hoc* using “fit, work, relevance, and modifiability” as quality criteria (Weed, 2017, p. 153). It was evaluated to fit the complex phenomenon of team collapse as experienced by the participants and to work through explaining the relationship between various causes of team collapse. The phenomenon was also judged to be relevant for teams competing in a league system and the developed model was found to be suitable for future adaptations.

RESULTS AND DISCUSSION

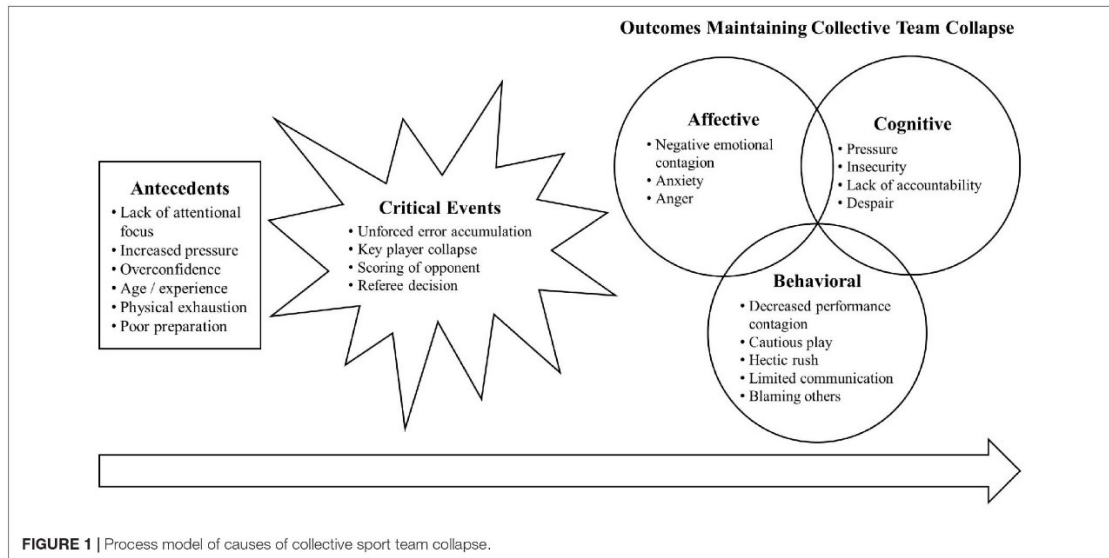
To gain a better understanding of causes of collective team collapse, we analyzed athletes’ perceptions of the phenomenon and possible causes of it. We included interview responses from all 10 participants in the results. The interview analysis showed that athletes described collective team collapse as being evoked and maintained by a cascade of causes rather than by specific single triggers. Participants found these causes to be in a temporal order, which is why the results of the interview analysis are also presented in a sequential order. Some factors seemed to be present before the underperformance of the team and tended

to make the team prone to a team collapse. These factors were labeled as antecedents. Other factors seemed to describe a specific event within the game triggering the actual team collapse, which were classified as critical events. Furthermore, participants named factors that seemed to be a result of the critical event, leading to the further maintenance of the team collapse. These factors maintaining the collapse were further divided into affective, cognitive, and behavioral outcomes. **Figure 1** shows a schematic illustration of the relationship between these factors in the form of a process model. The process model of collective sport team collapse illustrates the results of our analysis and our interpretation of the data, but not necessarily the characteristics of the phenomenon of collective team collapse. With the depiction of our results, we chose a linear representation to account for a general trend in the athletes’ narration, implying a temporal difference between antecedents and outcomes of team collapse. A process model represented this data best since it incorporates the temporal differences between facilitators of collective team collapse reported by athletes. As indicated by group dynamics research, however, group phenomena are often subject to cyclical and dynamic rather than linear processes. While this seems to be contradictory to our representation, we want to emphasize that dynamic processes may still play a major role within our temporal, linear framework, but were not subject of our investigation in this study. Future research needs to further explore the specific processes within the phenomenon of collective team collapse.

Definition of Collective Team Collapse

Based on our study as well as existing literature in the field, we define collective team collapse as a sudden, collective, and extreme underperformance of a team within a competition, which is triggered by a critical situation that interferes with the team’s interplay, a loss of control of the game, and ultimately the inability of the team to regain their previous performance level within the game.

Collective team collapse was described to happen suddenly, since athletes for example said “suddenly our scoring stops” or “you had a buffer of 10 points and then suddenly it’s plus minus two”. The collapse was further mentioned to be collective, meaning that all players in the team were involved. Athletes described that it started with several individual players but that “at the end all are involved” and that collective team collapse is “generally a team thing”. Athletes also stated that the collapse situation evoked an extreme underperformance, where “nothing worked anymore” for them. All participants further emphasized that the collective team collapses they had experienced were induced by a specific “key moment,” a critical event on the court like “a harmless duel,” a “very harsh duel,” or a situation where “the referee decided against the team.” These critical events were described to create a game situation where “nothing fit together anymore” in the team and the team “couldn’t play together anymore” or “didn’t get back into the normal game rhythm,” because they were playing “unstructured,” with “no clear scheme.” This was captured in the definition as “a critical situation that interferes with the team’s interplay.” Athletes perceived that the collapse also went along with a loss of control



of the game situation, because they felt that they “couldn’t make anything work anymore” and that “control had been taken out of their hands.” Moreover, participants described that they were “trying to get out of the collapse” but this seemed “to make the collapse even worse.” This was summarized as the inability of the team to regain their previous performance level. At the end of the definition, we added that the collapse had to happen within a game in order to differentiate it from underperformances of teams during several games.

Antecedents

Participants described that prior to the start of a match certain conditions had an impact on the occurrence of a team collapse event, which likely increased the team’s vulnerability to a team collapse. One condition reported by athletes was a *lack of attentional focus*. Participants described attention within the team to be very low prior to the occurrence of a team collapse. They explained that teammates were either distracted or did not focus on the game anymore. Athlete 1 (basketball) described that his teammates were mentally absent and how this lack of concentration transferred to other players: “I have the feeling that we went on the court and it was like we missed the start of the game. Maybe one or two [players] were there a little, but the rest was ‘sleeping’ and you infected the others with it.” While Athlete 1 reported an absence of concentration at the beginning of the match, other athletes described that their perception of the opponent as weak was what caused a lapse in concentration. For example, Athlete 2 (volleyball) described that the attentional focus of her team was minimal because everything went smoothly and was possibly too easy for them: “A team collapse happens if everything seems to work on its own, if the opponent makes mistakes and the concentration decreases. You have to keep concentration up,

no matter if you score or not. If everything goes too smooth, you lose focus. You have to continue playing as precisely as possible, as if you had to give everything.” This preexisting lack of concentration seems to increase the likelihood of unforced errors and therefore team collapse occurrence, which is a well-known cause of individual choking (e.g., Eysenck et al., 2007; Oudejans et al., 2011; Fryer et al., 2017). Similarly, athletes seemed to perceive a collective absence of minds that may have transferred between team members as a precursor of collective team collapse. Morgan et al. (2013) could, similarly, show that resetting a team’s focus could alleviate pressure and increase a team’s performance.

Another factor mentioned to be present prior to a team collapse was *increased pressure*, which was likely due to perceived importance of the game, presence of a huge audience, or an audience of significant others. Athlete 10 (basketball) said: “There was this pressure on us. It was the last game of the season and you wanna win the title. And the audience that was there and the atmosphere and you know it’s the last game. The whole season, the practice, what you invested. This is the final game ... and I believe that performance wouldn’t have decreased so significantly in another game. There was so much external pressure in this game ... and I’m someone who then becomes relatively anxious.” This finding is in line with Martens et al. (1990) model of competitive anxiety that explains the experience of pressure through perceived importance of the game. Marchant et al. (1998) showed that perceived importance of an event also plays a key role in increasing competitive anxiety in golfers. It appears that athletes experienced pressure through the importance of the game, which seemed to cause an increased fear of losing, and thereby may have fostered the team’s vulnerability to experience collective collapse.

Participants also perceived *overconfidence* to be important prior to a team collapse. Athletes described that their team had already perceived a “win” in their heads, because they had a big lead or because the opponent was not playing well, before the team collapse occurred. Athlete 9 (soccer) stated: “We were in the lead 3-0 at half time and we were quite euphoric. The atmosphere was – it was a really good day, nothing could go wrong anymore. Then we even scored the 4-0 after half time. Actually, there wasn’t much that could happen anymore. And then the first goal of the opponent was okay but from the second on there was a jolt going through the team. Because you don’t wanna ruin it.” It seems that the team was very confident about winning the game and thus surprised when the opponent scored, whereby their confidence of winning shifted to a fear of losing the game. Athlete 5 (soccer) even described his team being arrogant due to their ranking and dominance in the game, which likely led to mistakes of the players due to their careless style of playing: “I would say it [the reason for the collapse] was extreme arrogance on our side. We were ranked first in the league and we thought we would easily win . . . It [the collapse] happens when you feel overly secure and you try difficult passes, play extremely careless and thoughtless, and make mistakes.” Apitzsch (2009) and Hill and Shaw (2013), similarly, found overconfidence to be an antecedent of team collapse and of individual choking in teams, respectively. It seems that overconfidence increases the chances of failure (Baumeister et al., 1993; Apitzsch, 2009) by causing an overestimation of own abilities, leading to a more reckless and careless behavior. This behavior appears to increase the chances of failure and to make a team more vulnerable to the occurrence of team collapse.

Participants also found the composition of *age and experience* of the players on the court to be important before a team collapse event. Athletes suggested that a larger number of younger players on the court with less experience in difficult game situations increased the likelihood of the team to experience a collapse. For example, Athlete 6 (volleyball) explained the cause of the team collapse as follows: “The team was set up newly with many younger players, who hadn’t experienced such a situation before. You could see that they were, well not actually desperate, but they didn’t know how to handle the situation at all and then everything became hectic . . . And the coach started substituting players way too late”. The athlete argues that younger and unexperienced players were more affected by team collapse situations than older players were. This is similar to what Apitzsch (2009) describes as a lack of experience causing team collapse. Repeated experience of stressful situations was found to foster resilience to stress (Fletcher and Sakar, 2012) over time. It seems like athletes learn from their experiences with team collapse situations and are less susceptible to other team collapse situations afterward. This resilience could also be facilitated by a knowledgeable other like the team’s coach.

Players also indicated *physical exhaustion* to be an antecedent for team collapse. Athlete 10 (basketball) explained that his team was exhausted from a previous game and therefore not able to show its regular performance in the team collapse game: “Maybe [the collapse happened] because we were a little tired. Because we had semifinals the day before, where we played really well and then we were a little tired the next day . . . And then there was

this extreme collapse.” Fatigue has been found to cause individual choking (Hill and Shaw, 2013) as well as negative momentum in teams (Taylor and Demick, 1994). If the whole team is fatigued from semifinals on the previous day, their exhaustion may cause a lower level of play or more mistakes within the team and thereby make a collapse more likely.

Furthermore, participants reported *poor preparation* of the team to be important prior to a team collapse. This poor preparation included an insufficient warm up, as Athlete 1 (basketball) explains: “I think it [the collapse] came from half-time, when we didn’t warm up enough. You have a break of 10–15 min and after talking to others and relaxing a little, you should focus during the break and warm up for 8–10 min to prepare, to get back in the game, but we didn’t do that, were not focused, and couldn’t play well.” In addition, insufficient practice before the game seemed to increase the risk of a team collapse, as Athlete 8 (field hockey) described: “I believe 2 weeks before, the basis for this event was founded because we didn’t practice and the effort and intensity of practice decreased, which is why we couldn’t follow the speed of the opponent during the first minutes.” Within choking research, Hill and Shaw (2013) reported that poor physical preparation caused fatigue and individual choking. Complementary to this, Morgan et al. (2013) found that thorough preparation fosters team resilience in difficult match situations.

Critical Events

All participants described a specific trigger, an event or situation within the game that caused their team’s actual collapse. A very common factor describing such a critical team collapse event was *unforced error accumulation*, meaning that several individual players produced errors within the game at the same time or in succession. For example, Athlete 6 (volleyball) stated: “After the first set was finished, nothing worked anymore at all in the second set. I believe we lost that set by 12 or 13 and this was not related to any individual person, it was the whole team. The individual players started to make mistakes they didn’t make before, meaning serving, mainly during attacking, many balls just hit the block and then there was this pressure and tension in the team that didn’t vanish during the whole game anymore.” The accumulation of individual errors is likely a key factor that may lead to an underperformance of the whole team and to perceived pressure and tension. Athlete 8 (field hockey) expanded on this statement. The athlete proposed that several unforced individual mistakes led to a collapse of the tactical approach of the team and therefore to the actual collapse: “The collapse happened early in the game, where both teams were still scanning each other and several simple mistakes happened, which the opponent took advantage of. It was relatively simple individual mistakes of single players that eventually undermined the whole play system of the team and therefore made it very easy for the opponent to score.” The inability to maintain the play system due to the mistakes of the players appears to allow the opponent to score and cause the team to fall behind. Mistakes have been shown to play a crucial role in relation to a team’s underperformance but tend to be classified as a symptom or outcome of team collapse (Apitzsch, 2009), negative psychological momentum (Jones and Harwood, 2008), or negative momentum (Taylor and Demick, 1994) rather

than as a trigger. A collapse of a team's play system due to errors is a new finding to team collapse literature.

Some players further described that the poor performance of key players had a particular impact on the team and that *key player collapse* was what evoked a loss of points and underperformance of other players. Athlete 1 (basketball) stated: "I have the feeling that it was two or three [players] at the same time, but important players, who reacted too slowly and then there was a bad pass caused by two, but somehow the third, who could get the ball, didn't do anything either." Athlete 7 (volleyball) further explained: "We got a key player, who is very stable in reception, and she suddenly couldn't manage anything anymore and that continued within the team ... That was what caught my eye, that nothing worked anymore for her and shortly after that the same thing happened to the other players." Somehow, the team seems to be strongly oriented toward key players and their underperformance appears to immediately cause an underperformance in other players. Apitzsch (2009), similarly, found that key players underperform and fail to do what is expected of them, which leads to an underperformance of the whole team. The underperformance of a key player may cause a decrease in perceived self-efficacy (Bandura, 1977) of the teammates resulting in a collective underperformance of the team.

Further to errors within their team, several players described *scoring of the opponent* to have a crucial impact on performance of their own team, triggering the team collapse. Athlete 3 (basketball) stated: "We were in the lead with three points in the first quarter and then in the second quarter we lost 9-33. We really did score only nine points. It started when the opponent scored all their throws and nothing worked anymore for us, we lost the ball, produced turnovers." The opposing team scoring points during this time seemed to disturb their team's course of play. This happened even if the own team was playing well before, as Athlete 2 (volleyball) explained: "So we have a run, meaning everything works, the interplay and everything; and then there's this momentum when the opponent surprisingly scores and then we lost five points in a row because we couldn't play the ball anymore." Scoring of one team might lead to negative momentum for the other team demonstrating a momentum shift for both teams (Taylor and Demick, 1994). Apitzsch (2009) explained that factors associated with the opponent, such as scoring, have a moderating effect on the strength of the team collapse.

Athletes also reported that a perceived wrong *referee decision* was a critical team collapse event. Athlete 5 (soccer) described that the team complaining about the referee's decision was what caused the team collapse: "There was this harmless duel in the middle [of the playing field]; we knew it was a foul, but we complained and stopped and they continued playing and were running up to our goal. They didn't score but they gained back hope and played euphorically and induced a lot of pressure." Jones and Harwood (2008) have found that poor refereeing decisions have a possible impact on psychological momentum, but did not specify in what ways. In this study, it seems that the interruption, the refusal of the team to continue playing, and the negative emotion about the perceived wrong

referee decision had a negative impact on team performance and a positive impact on the mindset and performance of the opponent. Apparently, players perceived the referee's decision and the game situation resulting from it as unfair and felt angry and helpless about it, which seemed to cause a drop in team performance.

Outcomes Maintaining Team Collapse

All athletes further described that the critical team collapse event seemed to have changed certain processes within their team that led to aggravation and maintenance of the team collapse. These changes included emotional, cognitive, and behavioral factors and appeared to be mutually dependent upon each other. Several of the athletes' statements reported especially emotional and cognitive outcomes to be so interrelated that it was impossible to identify a causal relationship in their perception (e.g., insecurity and anxiety). Factors were identified as emotional factors, if they represented one of the six basic emotions (Ekman, 1989), which can be identified from an individual's facial expressions, and as cognitive factors if they incorporated cognitive evaluations of the situation. Some of these cognitive outcomes seem to operate through emotional reactions, which is why they are presented as inter-related dimensions in **Figure 1**.

Affective Outcomes

Affective outcomes were emotional changes that athletes described due to the critical team collapse event that fostered the maintenance of the collapse. Emotional contagion is defined as the transfer of emotion and moods within a group (Barsade, 2002). Players reported *negative emotional contagion* within their team due to the collapse situation. Athlete 7 (volleyball) described how the mood of her team changed during the collapse: "When we lost the first few points, everything was okay, we were like 'okay, we're gonna do this!' Because in volleyball, it happens that you lose two or three points. But we lost more and more points and even if we scored in between, it [our mood] became more negative on the field and no one wanted to take the ball anymore." Player 6 (volleyball) explained how negative emotions increased within the team and led to despair: "Some players became aggressive, others went quiet. I believe that emotions play a crucial role in volleyball and we didn't lift ourselves up on our own points anymore and desperation became bigger and bigger, like a vortex." Many studies have reported an association between negative emotions and individual underperformance (e.g., Hill et al., 2009; Barsade and Gibson, 2012; Hill and Shaw, 2013) as well as underperformance of a sport team (Kelly and Barsade, 2001; McEwan and Beauchamp, 2014). Similarly, collective positive emotions have been shown to be positively related to team resilience and team performance (Morgan et al., 2017). Furthermore, researchers have found a link between mood of the whole team and individual players (George, 1990; Totterdell, 2000) resulting in the assumption of an emotional contagion effect within a team. Apitzsch (2009) also reported emotional contagion as an outcome of the handball team's collapse he investigated. Using Taylor and Demick's (1994) theory and Apitzsch's (2009) extension, it seems that negative affect and negative emotional contagion may have

an impact on athletes' cognition and evoke negative thoughts that, besides the underperformance itself, may maintain the collapse.

Athletes also described that *anxiety* was what maintained the collapse within their team and was crucial to the team collapse. Athlete 10 (basketball) explained: "We were 2-7 behind and then we received this run against us and then you start to panic, and that panic doesn't help at all and that's how the collapse remains. I believe if we would have been more relaxed and would have kept cool, we may have been able to manage the collapse." Athletes also specified that they experienced a fear of making mistakes, which led to cautious play and caused even more errors. Athlete 6 (volleyball) described it as follows: "The quality of our play got worse in every possible way. We knew we could do better but no one performed anymore, especially in attacking, many balls were hit into the block blindly, serves weren't hard anymore, because you had fear of failure. It's hard to say but this also went along with a more hectic way of playing." Especially fear of losing the game, fear of negative evaluation, and panic about the collapse itself seemed to be causes of a hectic way of playing and thus of a remaining underperformance of the team. This supports findings reported by Apitzsch (2009) as well as in choking under pressure literature on how anxiety associated with failure leads to decreased performance (Hill et al., 2009; Otten, 2009; Mesagno et al., 2012). Mesagno et al. (2012) use self-presentation theory (Schlenker and Leary, 1982) to explain that anxiety in individuals increases, when they want to impress others but do not believe in their own success. By applying self-presentation theory to this study, pressure and the desire to show good performance may be antecedents of the team collapse event, which increase even more through the critical event that seems to bring along a lack of self-efficacy. The resulting anxiety may, in turn, prohibit effective processing of task-relevant information and lead to maintenance of choking (Hill et al., 2009), or collective team collapse.

Participants described *anger* as another affective outcome. They explained how they themselves or other players within their team expressed their anger on the court due to their dissatisfaction with their team's or their own performance. Athlete 10 (basketball) said: "Suddenly nothing works anymore and people get angry and yell at each other because of a mistake." Athlete 9 (soccer) described how mistakes of teammates can lead to anger in individual players: "If your neighbor starts doing weird things, it has an indirect impact on you, too. Because it annoys you and makes you angry and then you are not as focused as you should be during the next action ...and if a player causes four or five failures in a row, the team becomes uneasy. It can happen that two start to yell at each other and then the next yells at them." This increasing anger in the team seems to prevent the team from finding their way back to a regular performance, possibly, as Athlete 9 describes, because they are busy dealing with their emotions and cannot focus on their actions or the game anymore. One participant in Apitzsch's (2009) study also described the emotion of anger in relation to the team collapse. Other studies, similarly, found increased frustration in athletes due to their own choking (Hill and Shaw, 2013).

Cognitive Outcomes

Cognitive outcomes were perceptions, thoughts, and thought processes about the team collapse that maintained the team's underperformance. Participants perceived that *pressure* resulting from the team collapse event hindered them from returning to an effective play. Athlete 7 (volleyball) described how pressure developed from the feeling of falling behind and the necessity to score in order to end the collapse: "During the game, nervousness increases because you think 'Okay, you HAVE [emphasis added] to score now'. And that blocks the head even MORE because it's always about HAVING to do something." It seems that, as an outcome of the perceived pressure, the player experienced her thought processes as being blocked. Pressure being an outcome of the team collapse event itself besides being an antecedent present before the occurrence of team collapse has not been reported in other studies so far. It is assumed though, that underperformance caused by individuals or several team members, further increases pressure, which then again maintains the team collapse as kind of a vicious cycle.

The critical team collapse event as well as the pressure resulting from it often seemed to cause perceived *insecurity* in players. Some athletes explained that this was what caused them making even more mistakes. Athlete 9 (soccer) stated: "Then there's insecurity, I'd say. If things don't work and you don't have a good day, you don't trust in yourself and do more things that you normally wouldn't do." Athlete 7 (volleyball) further described how insecurity spread within the team during a team collapse and how it increased even more, if the key player did not perform well: "If you're insecure on the court already, you look at the key player and if she plays good you think: it'll work out somehow. And if she collapses you think: Okay, if she can't do it, how am I supposed to?" The choking of a key player in this case seems to further increase insecurity in other players, which made them underperform as well. Increased insecurity caused by a team collapse event has also been reported by Apitzsch (2009) and is similar to low self-confidence and a perceived lack of ability as reported by Jones and Harwood (2008) during the experience of negative psychological momentum.

This perception of insecurity was closely related to the perception that the team suffered from a *lack of accountability* of the individual players. Athlete 5 (soccer) described how, especially in difficult situations, responsibility was handed over from one player to another: "You realized that this is a team sport and you can easily shift responsibility to the next one, meaning players are passing and then they hide a little." Athlete 7 (volleyball) explained that this was also related to insecurity and anxiety associated with potential failure, meaning that players handed responsibility to their teammates so they themselves would not be responsible for the next mistake: "Everyone thought 'oh god I don't wanna take the ball anymore, you take it, you do the mistake.'" This shift in responsibility has not been reported in team collapse literature so far. Morgan et al. (2013, 2015), however, show that collective accountability is an important factor for a team's resilience, especially when the team experiences setbacks. The effect of diffusion of responsibility in collapsing teams may be explained by the social loafing process in groups

(Karau and Williams, 1993) to some extent. Another explanation, given by Athlete 8, might be that anxiety about making mistakes is what leads to avoidance behavior in the athlete and therefore to the transfer of responsibility. Atkinson and Feather (1966) explained how fear of failure causes avoidance of situations in which the threat of failure is present or in which ability is being evaluated.

Furthermore, athletes stated to have experienced increased *despair* within the team during the collapse. Athlete 6 (volleyball) described that helplessness and despair within his team increased like a vortex due to the experience of team collapse: "Some players became aggressive, others went quiet. I believe that emotions play a crucial role in volleyball and we didn't lift ourselves up on our own points anymore and desperation became bigger and bigger, like a vortex . . . You could sense a certain helplessness; no one knew why that happened or what actually happened in that situation." Athlete 6 describes how the despair and helplessness perceived by his team originated from negative emotions on the court. It seems that emotions became so negative that the team felt desperate and hopeless about the game, did not know what was going on anymore, and ultimately resigned since they did not believe to be able to change anything anymore. Jones and Harwood (2008), similarly, reported hopelessness as an outcome of the experience of negative psychological momentum. Murayama and Sekiya (2015) observed resignation and despair to play an important role in individual choking under pressure, as well. Hill and Shaw (2013) even reported that athletes would withdraw from a game and demand to be substituted due to their own underperformance.

Behavioral Outcomes

Behavioral outcomes were behaviors that athletes showed as a reaction to the team collapse event. Participants reported *decreased performance contagion* to be occurring within their team, meaning that decreased performance of individual players transferred to other players of the team. Athlete 8 (field hockey), for example, described how the bad performance of individual players caused other players of the team to fail as well: "The collapse was triggered by individual mistakes and that led to collective failure. I would say that the individual mistakes caused an insecurity in the whole team and mistakes increased even more." This contagion effect seems to be especially strong, if the player making initial mistakes is a key player. Athlete 7 (volleyball) specified that the key player "infected" the team with her bad performance and caused collective collapse: "We have a key player who is very stable in reception and she suddenly didn't get her act together anymore in reception and shortly after that the same thing happened to the others." Boss and Kleinert (2015) reported an analogical phenomenon, when they observed how balancing performance of one team member had a contagious effect on the other one. While their study was only examining teams consisting of two people, the current study is the first to discover decreased performance contagion as a cause of team collapse in teams consisting of more than two members.

Some players also found *cautious play* to be present within their team during a collapse as a result of insecurity and anxiety to fail. Athlete 4 (volleyball) said: "The setter doesn't dare to

play the right pass, the more difficult long way anymore, but focuses on simple passes, but then you can't make the game complex anymore and it's easy for the opponent to read the game. And that makes it harder for the attackers, which is why the error rate increases even more and that continues." Wallace et al. (2005) found that pressure leads to higher levels of cautiousness in individual athletes in team sports. The level of cautiousness depends on the degree to which they try to avoid failure rather than to aim for success. They further argue that this failure avoidance behavior is closely related to negative performance outcomes. The authors also assume that cautiousness in team sports leads to athletes passing the ball to teammates more often instead of taking chances themselves. This behavior appears to be closely related to the cognitive outcome of lacking accountability that has been found to maintain team collapse in this study and the avoidance behavior that goes along with it. Cautious behavior in team sports therefore seems to be related to insecurity and anxiety to fail and to be characterized by athletes playing a more cautious style to avoid further mistakes.

Contrary to cautious play, athletes described how team collapse and the pressure created a *hectic rush* and made the players rush their actions in order to overcome the collapse and score. Athlete 6 (volleyball) described how a hectic rush, in order to end the collapse, made scoring even harder: "It's the task of the setter to make the game calm but due to the hectic rush, setting became imprecise and due to that it was more difficult to make a point. It's a vicious circle." Apitzsch's (2009) participants also mentioned that throws within the handball team were taken too quickly and from unfamiliar positions, what Apitzsch (2009) refers to as "making wrong decisions." We assume though that a hectic rush was what caused those wrong decisions and quick throws in the first place.

Players further found that *limited communication* was important during the team collapse situation and prohibited the team's recovery from the collapse. Athlete 2 (volleyball) explained: "We usually communicate a lot on the court; you realize the collapse when it gets quiet. No one calls for the ball anymore." Some players even indicated that others pulled them down by communicating less after failure, like Athlete 7 (volleyball): "There was a lack of communication on the court. Two, three players had a down and pulled the others down, too. We should have talked to each other more to get out of this again." While Apitzsch (2009) reported communication in the handball team to become particularly negative, participants in this study indicated that, independent from its valence, communication decreased significantly during a collapse, causing a loss of coordination and structure within the team. McEwan and Beauchamp (2014) argue that communication within the team is one of the most important teamwork behaviors that regulates team performance. They further explain that sharing information through communication allows for "moment-to-moment adjustments" in the team, such as tactical changes, that support a good performance. Contrary to this, limited communication seems to cause a performance decrease, which may be due to the inability of the team to adjust their tactics without communicating. Morgan et al. (2013, 2017) in this context argue that working communication channels foster team

resilience when encountering stressors and should be facilitated in teams to foster resilience in high-pressure situations.

Athletes said that *blaming others* after failure also played a role during team collapse and fostered maintenance of the collapse. Athlete 10 (basketball), for example, admitted to show this behavior himself due to his increased nervousness: “[In team collapse situations], I become extremely nervous and I’m someone who doesn’t try to find the failures in his own play, but in others’ [play] instead.” This negative handling of each other’s failures within critical events seems to foster maintenance of team collapse. Jones and Harwood (2008) found negative criticism of team members to cause negative psychological momentum in sport teams. It appears that negative handling of previous mistakes can also cause maintenance of collective collapse. Morgan et al. (2013, 2015), similarly, argue that a no blame culture is very important for a team when experiencing failure.

GENERAL DISCUSSION

The main goals of this study were to gain an understanding of athletes’ perspectives on causes of collective team collapse and to define team collapse in contrast to negative momentum. The definition that developed from the interviews was: “We define collective team collapse as a sudden, collective, and extreme underperformance of a team within a competition, which is triggered by a critical situation that interferes with the team’s interplay, a loss of control of the game, and ultimately the inability of the team to regain their previous performance level within the game.” Our results show that the collectivity of the collapse manifests itself in the transfer of negative affect, cognition, and behavior within the team. These transfer processes within the team illustrate that collective team collapse is more than merely the sum of individual choking of multiple players at the same time. Our definition adds two valuable new aspects compared to Apitzsch’s (2006) previous definition: First, team collapse is collective and thus involves the whole team, and second, the team is unable to recover from it within the game. Future research in the area of team collapse to question or support this new definition is warranted.

Researchers have examined similar constructs to collective team collapse, such as the choking of individuals in a team setting (Hill and Shaw, 2013); however, this previous research mainly focused on individual factors causing individual underperformance in single or team sports. To date, group factors causing team collapse have not attracted sufficient empirical examination in previous studies, although the examination of team collapse on a team level is important to gain an understanding of group-related causes of this phenomenon. We therefore examined the causes, processes, and maintenance of team collapse as experienced by 10 team sport athletes to better understand the group-related processes as well as provide increased conceptual clarity and potential differentiation to negative momentum.

Regarding social or group-related causes of team collapse, unforced error accumulation, key player collapse, emotional contagion, decreased performance contagion, lack of

accountability, limited communication, and blaming other players for mistakes were identified as social factors that cause and notably maintain team collapse in various situations. These factors differed from individual factors influencing team collapse (e.g., insecurity or cautious play), as they necessarily involved an interaction with other players. While insecurity, cautious play, or anger could also be expressed by an individual as an individual reaction to a bad game situation, social factors, such as a lack of accountability or blaming others for mistakes, are directly dependent on and necessarily involve the interaction of individuals on the court.

Results also showed that factors causing team collapse seemed to be interconnected within a temporal process that leads to team collapse and maintenance of this collapse. Jones and Harwood (2008), similarly, suggest a division between triggers and outcomes of psychological momentum but do not further distinguish between triggers and antecedents or between various outcomes of psychological momentum. The Multidimensional Model of Momentum (Taylor and Demick, 1994) proposes a precipitating event causing individual subjective changes in cognition, affect, and physiology depending on the individual experiences of the event. These changes are further believed to cause a change in behavior, performance, and subsequent outcome. Again, antecedents of the precipitating event are not included in Taylor and Demick’s (1994) model and underperformance is explained as an outcome of momentum, while it has been found to induce team collapse in this study.

The model proposed by Apitzsch (2009) divides causes of team collapse into causes before and during the match and makes further attempts to explain causal relations between emotional, behavioral, and cognitive factors influencing collective team collapse during a match. Apitzsch (2009) suggests a tentative relation of cognition causing emotion and emotion causing behavior before the start of a match and emotion causing cognition and cognition causing behavior after the occurrence of a team collapse event. Results of the current study partly support these suggestions (e.g., anxiety of failure causing a lack of accountability, which then causes cautious behavior during the game). Nevertheless, each interviewed athlete indicated his or her own tentative relation between affective, cognitive, and behavioral outcomes that maintain collective collapse. The reason for these discrepancies in athletes’ descriptions may be that they had experienced various collapse situations within different teams and different types of sport, whereas Apitzsch (2009) reports a specific team collapse event experienced by a single handball team. We therefore suggest to divide causes of collective team collapse into antecedents, critical events, and consequences as a chronological sequence as illustrated in **Figure 1**. We do not propose to include further directions of relations between affective, cognitive, and behavioral outcomes at this stage of research, since they have not yet been investigated sufficiently.

It is noticeable, although athletes from interactive ball team sports were included in the study in order to identify overall causes of team collapse relevant in a variety of team sports, that participants named a wide range of causes of collective team collapse. This variety of antecedents, critical events, and outcomes maintaining team collapse on the one hand illustrates

the complexity of the phenomenon and the many factors that can, through combined appearance, trigger a team collapse. On the other hand, this variety may be an indicator for causes being of varying importance in evoking a team collapse depending on the type of team sport. Future research could therefore further investigate differences in causes of collective team collapse in different types of team sport.

As mentioned earlier, existing research does not sufficiently distinguish between the terms negative momentum and collective team collapse. Researchers have argued that individual athletes who choke differ from those who underperform (Hill and Shaw, 2013; Mesagno and Hill, 2013); specifically athletes who choke experience more intense emotions that they cannot self-regulate to recover their performance. Similarly, athletes in this study described that especially negative affect, such as anger and anxiety, was present, and transferred within the team during collective team collapse (i.e., negative emotional contagion) and prohibited the team from returning to a regular performance. Therefore, we consider it important to distinguish conceptually between negative momentum and team collapse. The “sudden, collective, and extreme underperformance of a team” and “the inability of the team to regain their previous performance level within the game” are integral elements of our definition of collective team collapse. According to this definition and our findings, collective team collapse seems to constitute a more extreme form of negative momentum (Cotterill, 2012), often with limited opportunity of returning to previous levels of performance within the game, while negative momentum can shift between teams (Adler and Adler, 1978). In other words, collective team collapse can be seen as a chronic and fatal underperformance of a team, while negative momentum is a temporary phase that can be overcome. Future research needs to clarify if and to what extent collective team collapse can grow out of negative momentum and what possible buffering factors are that allow a team to prevent the collapse when experiencing negative momentum.

Limitations and Future Research

There are some limitations to the study. First, the interviews were conducted by seven different interviewers due to organizational settings of the study. Although one can argue that several interviewers are less subjective than one, this procedure does not pursue a strict interpretation of grounded theory, since themes developed during initial interviews may not shape later interviews in the same way as if conducted by the same interviewer. Besides that, the interview length of 20–40 min, due to the limited availability of professional athletes, has to be acknowledged as a further limitation. It cannot be ruled out that longer interviews may have created additional information. Another factor to be mentioned is that athletes may have been influenced in defining team collapse by the short colloquial description of the phenomenon that they received prior to the interview in order to make sure they knew what kind of phenomenon we were addressing. Moreover, the study only included athletes from elite sport levels. We are aware that team collapse situations can occur in amateur sports as well, which is why they should be included in future research. Another

point to be raised is that the current study applied only one method to assess athletes' perceptions in a single setting, using only one theoretical pathway to interpret data. Future studies should include multi-modal methods to capture participants' perceptions across different settings and use more than one theoretical interpretation of the data. Furthermore, the study only revealed insights into athletes' inner perceptions of antecedents, critical events, and outcomes as causes and maintaining factors of team collapse. In order to get a more global view of the phenomenon, outer perceptions of observers (e.g., coaches and sport psychologists) of team collapse should be considered as well. We suggest for future studies to include coaching staff's perceptions of causes of team collapse within specific team sport settings. Future research should also engage in investigating the relationship between affective, cognitive, and behavioral consequences of critical team collapse events to gain a better understanding of possible starting points for future interventions. Besides that, sport-specific triggers of collective team collapse could be investigated.

The findings of the current study allow for the derivation of several applied implications for sport teams to prevent a team collapse, which also need to be investigated and tested for effectiveness in future research. Such applied implications could for example include the prevention of antecedents, which tend to increase the probability of a team to suffer from collective team collapse. Especially poor preparation or physical exhaustion from practices before the game could be prohibited by coaches and players. Furthermore, coaches and sport psychologists could help the team to react differently to a critical team collapse situation. Emotional regulation strategies have been shown to help prevent negative emotion and improve team performance (e.g., Tamminen and Crocker, 2013). Another suggestion is to coach key players or players with a leadership role in the team to keep the communication level up after a critical event and to communicate a mutual strategy to the players to prevent a decrease in communication and to foster team cohesion. In relation to blaming others for failure, a culture of no blame is associated with team resilience (Morgan et al., 2013) and could be established. Further ideas to make a team more resilient to collective collapse are the inclusion of simulation trainings and resilience trainings into practice on a regular basis. As mentioned before, the effectiveness of such applied interventions needs to be investigated in future studies prior to implementation.

CONCLUSION

In this study, we explored athletes' perceptions of causes of collective sport team collapse in various team sport disciplines. Major causes included emotional contagion, decreased performance contagion, lack of accountability, limited communication, and blaming other players for mistakes. These causes appeared to be interconnected in a temporal order consisting of antecedents, critical events, and outcomes that foster a maintenance of the team collapse. Based on these findings, we proposed a process model of causes of collective

sport team collapse and a definition of team collapse to distinguish it from the related concept of negative momentum. The results provide first insights into causes of collective team collapse in a variety of sports and sport teams and found a basis for understanding what team collapse is and how it divides from other individual or group phenomena related to performance decreases.

AUTHOR CONTRIBUTIONS

The original research is part of the Ph.D. thesis of VW, supervised by JB. VW, ZZ, CM, and JB contributed to the conception and

design of the study. ZZ and VW performed data collection and analysis. VW wrote the first draft of the manuscript. CM and JB wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2018.02115/full#supplementary-material>

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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4.2 Article 2

Authors: V. Vanessa Wergin, Clifford J. Mallett, Christopher Mesagno, Zsuzsanna Zimanyi, & Jürgen Beckmann
Title: When You Watch Your Team Fall Apart – Coaches’ and Sport Psychologists’ Perceptions on Causes of Collective Sport Team Collapse
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Summary:

Building up on the results of the first article, aims of the second article were to further explore causes of collective team collapse by including coaches’ and sport psychologists’ perceptions of the phenomenon to gain a broader view of team collapse and to compare their perceptions to athletes’. Therefore, the process model invented in the first article was applied to data collected for the second article. Again, semi-structured interviews were conducted with seven coaches and four sport psychologists. This time, abductive content analysis was used to deductively apply the process model of collective team collapse to the newly gathered data and still allow for the inductive development of new categories. New subcategories for antecedents, critical events, and outcomes maintaining collective team collapse developed. Furthermore, the illustration of antecedents and outcomes maintaining team collapse were adapted in accordance with the coaches’ and sport psychologists’ explanations. Antecedents were split into antecedents of first and second order appearing at different points in time, while cognitive, emotional, and behavioral outcomes were restructured, since participants mentioned behavioral outcomes to occur after emotional and cognitive outcomes. It was furthermore noted that athletes, coaches, and sport psychologists differed in their perceptions of outcomes of team collapse. While athletes described all three outcomes to the same extent, coaches focused especially on behavioral outcomes and sport psychologists reported especially cognitive outcomes to be important. Taken together, the results of this article supported the overall structure of the process model of collective sport team collapse but caused some minor modifications. Further research investigating the relations between affective, cognitive, and behavioral outcomes of collective team collapse is needed and interventions need to be developed based on the results of article one and two.

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in Psychology. Frontiers in Psychology is an international peer-reviewed journal publishing research across all psychological areas. It is an open-access journal and constitutes the largest journal in the field of Psychology.

Contribution:

Vanessa Wergin was the principal investigator and author of the published article. She developed the study design based on the initial qualitative study and chose the methods to be used. Again, she collected and analyzed the data with the support of Zsuzsanna Zimanyi and adapted the process model of collective sport team collapse in exchange with Clifford Mallett. Vanessa Wergin wrote the article, published in *Frontiers in Psychology*, while receiving feedback from her co-authors.



When You Watch Your Team Fall Apart – Coaches' and Sport Psychologists' Perceptions on Causes of Collective Sport Team Collapse

V. Vanessa Wergin^{1*}, Clifford J. Mallett^{1,2}, Christopher Mesagno³, Zsuzsanna Zimanyi^{1†} and Jürgen Beckmann^{1,2}

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Nottingham Trent University,
United Kingdom

***Correspondence:**
V. Vanessa Wergin
vanessa.wergin@tum.de

†Present address:
Zsuzsanna Zimanyi,
Faculty of Humanities,
Universität Konstanz,
Konstanz, Germany

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¹Department of Sport and Health Sciences, Chair of Sport Psychology, Technical University of Munich, Munich, Germany,
²Faculty of Health and Behavioural Sciences, School of Movement and Nutrition Sciences, University of Queensland,
Brisbane, QLD, Australia, ³School of Health and Life Sciences, Federation University Australia, Ballarat, QLD, Australia

Collective team collapse occurs when multiple players of a sport team experience a sudden and extreme underperformance within a game and are unable to return to their initial performance level. The occurrence of such a team collapse event commonly leads to the loss of the game or championship. A recent study investigated athletes' perceptions of the phenomenon and proposed a process model of causes of collective sport team collapse. The main goal of this study was to apply this process model to the data collected from coaches and sport psychologists. A further goal was to explore differences in perceptions of causes of team collapse among athletes, coaches, and sport psychologists of various professional German sport teams. Semi-structured interviews were conducted to investigate seven coaches' and four sport psychologists' perceptions. Following an abductive approach, a deductive content analysis was used to explore if the data supported the process model of collective sport team collapse. Perceived antecedents and critical events causing team collapse were similar among the three participant groups. Coaches and sport psychologists differed from athletes in their perception of emotional, cognitive, and behavioral outcomes of team collapse. Coaches tended to report behavioral factors, such as immobility or the blaming of other players, as critical factors maintaining team collapse. Sport psychologists reported cognitive factors, such as individualization or a lack of accountability between the players, to be relevant for team collapse maintenance. Overall, the data of this study supported the general structure of the process model of collective sport team collapse; however, minor amendments to the temporal cascade of causes of team collapse are introduced. Future research is encouraged to examine this model, to provide guidance to teams, coaches, and sport psychologists in dealing with collective sport team collapse.

Keywords: collective team collapse, emotional contagion, key player collapse, performance contagion, team choking

INTRODUCTION

"I'm past it, but I'm not over it. I don't think I'll ever be." (Orr, 2017) was what head coach Dan Quinn said a few weeks after the Atlanta Falcons dramatically lost the 2017 Super Bowl. Their sudden underperformance is often referred to as a collective team collapse, since they led 28-3 during the second half of the game but eventually lost 28-34. Collective team collapse can be defined as "a sudden, collective, and extreme underperformance of a team within a competition, which is triggered by a critical situation that interferes with the team's interplay, a loss of control of the game, and ultimately the inability of the team to regain their previous performance level within the game." (Wergin et al., 2018, p. 15).

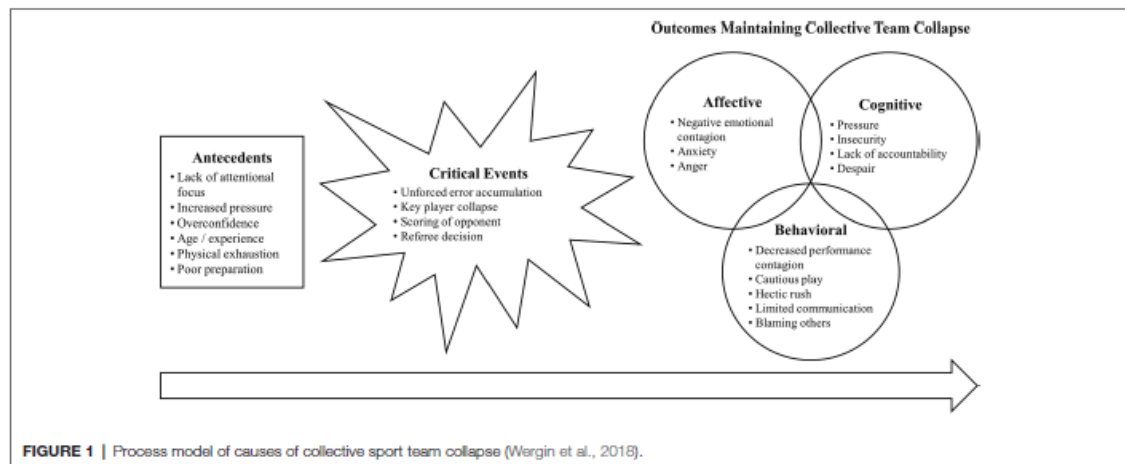
Although collective sport team collapse is a widely known phenomenon, research investigating its causes is lacking. In an initial case study, Apitzsch (2009a) investigated causes of collective team collapse in nine male handball players of the same team and found that inappropriate behavior, failure of the role system, negative communication, a change in the opponents' tactics and goals scored by the opponent were factors that played a role in the specific collapse that was described by players of the handball team. He further reported that negative thinking, negative emotions, and negative emotional contagion should be dealt with in order to prevent a team collapse. In a further study with athletes and coaches, Apitzsch (2009b) explored, in part, four male (handball, ice hockey, and soccer) coaches' perceptions on collective team collapse. Similar to the first study, Apitzsch reported coaches' perceptions of the major causes of team collapse to be inappropriate behavior, a failure of a team's role system, negative communication, a change in the tactics of the opponent, and the opposition scoring points. Moesch and Apitzsch (2012) interviewed nine female elite handball coaches about their perceptions of positive and negative psychological momentum. Psychological momentum is defined as "a change in cognition, affect, physiology, and behavior caused by an event or series of events that will result in a commensurate shift in performance and competitive outcome" and can be either positive or negative (Taylor and Demick, 1994, p. 54). Moesch and Apitzsch (2012) found that negative psychological momentum was associated with various factors related to coach and individual players, such as passive coaching behavior or anxiety and stress in the players. Furthermore, Moesch and Apitzsch reported confidence as well as external factors (e.g., referee decisions) or team factors, such as not taking responsibility for what happens on the court, to be related to negative psychological momentum.

Although there are good initial studies on athletes' and coaches' perceptions of team collapse and psychological momentum, some limitations exist. For example, Apitzsch's (2009a) study investigated causes of team collapse in a case study design. In order to explore the causes of the phenomenon of team collapse and draw general conclusions, different game situations and various types of sport are needed. Furthermore, Apitzsch's (2009a,b) qualitative studies were conducted without audiotaping and transcription of the interviews; instead notes

were taken by the researchers, which may have limited their abilities to fully engage in the interview and thoroughly follow the statements made. The interview guides and methods of analysis used in the studies are rarely described, which limits transparency and complicates the conduction of subsequent studies. Besides that, Apitzsch's (2009a,b) studies involved only male athletes and coaches and Moesch and Apitzsch's (2012) study included exclusively female handball coaches, which limits researchers' ability to draw conclusions among gender. Moreover, Moesch and Apitzsch explored causes of psychological momentum rather than collective sport team collapse. A further improvement suggestion is that perceptions of other coaching staff, who are less involved in the game, and therefore have a more distanced view, than the coach, should also be included since they provide other perspectives about team collapses in sport.

Another issue regarding existing research in the field is that many studies tend to employ interchangeable terms to describe the collective collapse of a sport team. Especially, negative momentum is a term widely used in sport psychology research (e.g., Crust and Nesti, 2006; Den Hartigh et al., 2014; Moritmer and Burt, 2014) to describe shifts in a team's performance. In order to distinguish between the terms of negative momentum and collective team collapse and to gain first insights into causes of collective team collapse of different teams in various sport, Wergin et al. (2018) conducted a qualitative study. Within this study, 10 team sport athletes from various teams and sports were interviewed on their perception of causes of a collective team collapse they had experienced with their team. Results indicated that collective team collapse was induced by a temporal cascade of causes rather than by single triggers. This cascade included antecedents (i.e., factors that make the occurrence of a team collapse more likely), critical events (i.e., specific occasions within the game) as well as affective, cognitive, and behavioral outcomes that foster a maintenance of the team collapse. Within Wergin and colleagues' theoretical framework, social factors, such as decreased performance contagion or emotional contagion, played crucial roles in causing and maintaining team collapse, illustrating that team collapse seems to be more than concurrent choking of several individual players. These findings were compiled in a process model of collective sport team collapse (Figure 1). Based on these results, Wergin et al. (2018) distinguished collective team collapse from the term negative momentum: Collective team collapse is described to be chronic and more extreme than negative momentum. It is accompanied by an inability of the team to return to previous levels of performance. In contrast to negative momentum, a collective team collapse does not shift between teams, but causes one team to underperform dramatically during competition. While negative momentum can be related to both individual and team-based sports, collective team collapse is a term specifically describing sudden and dramatic underperformance of sport teams.

Wergin et al.'s (2018) finding provides first insights into causes of collective collapse and some clarity for the differentiation between the terms collective team collapse and negative momentum. One restriction of Wergin et al.'s (2018) study, however, is that only athletes' perspectives were included.



In order to gain a more global view of the phenomenon, other observers' (e.g., coaches, sport psychologists, or officials) perceptions of the team collapse event should also be considered. Thus, the main goal of the current study was to explore coaches' and sport psychologists' perceptions of causes of collective team collapse across different sports. Coaches and sport psychologists would offer two different observational perspectives of the phenomenon of collective sport team collapse and would enhance our understanding of the phenomenon. A second goal was to qualitatively compare coaches' and sport psychologists' perspectives to athletes' perceptions reported by Wergin et al. (2018). The third goal was to explore whether coaches' and sport psychologists' perceptions would support the process model of causes of collective sport team collapse, that was developed based on athletes' perceptions of team collapse.

MATERIALS AND METHODS

Philosophical and Methodological Orientation

A relativist ontology and a constructivist epistemology (Ritchie et al., 2013; Sparkes and Smith, 2014) were considered most appropriate to investigate coaches' and sport psychologists' interpretation of causes of collective team collapse. A relativist ontology assumes that humans develop subjective mental constructions of reality (Sparkes and Smith, 2014). These constructions of reality can be understood and interpreted using a constructivist epistemology, which considers that the interpretation of data relies not only on the participant's subjective interpretation of reality, but also the researcher's interpretation of the participant's perspective, which is influenced by the interaction between the participant and the researcher's ontological approach.

Since the process model of collective team collapse was applied as a theoretical framework to the data collected in

this study, abductive reasoning was used as a method of data analysis (Peirce, 1960/1979). Abduction is understood as a form of pragmatism, which favors practical action over theoretical reason (Timmermans and Tavory, 2012). Abduction is used to examine the fit between existing hypotheses or theories and current data. As a result of abduction, existing theories can be modified, rejected, or elaborated upon to explain the data (Kennedy and Thornburg, 2018). The approach constantly compares theory and data and requires an openness to both data and preexisting theories in order to incorporate the two. Abduction assembles the advantages of inductive and deductive approaches, as, in contrast to inductive approaches, it is guided by a theory and prohibits "wild guessing," and, in contrast to deductive approaches, it is open to the change of existing theories for the sake of representing the data as well as possible.

Participants

The sample ($N = 11$) consisted of seven coaches (five male) and four sport psychologists (all male) of different team sports. Two coaches and one sport psychologist had a background in volleyball, two coaches and one sport psychologist in soccer, two coaches in basketball, two sport psychologists in handball, and one coach in field hockey. Participants' age ranged from 25 to 55 for coaches ($M = 34.14$, $SD = 10.80$) and from 38 to 55 for sport psychologists ($M = 45.50$, $SD = 8.35$). All participants were coaching either the German national team of their sport or a team playing in between first and fourth divisions in Germany. This competitive level of teams, coaches, and sport psychologists was required to ensure that the teams' collapses were not a result of a lack of skills in athletes, coaches, or psychologists. Inclusion criterion for selection was that participants had to have worked as a coach or sport psychologist for at least 10 years. Participants' actual experience ranged between 11 and 44 years for coaches ($M = 24.57$, $SD = 9.93$) and between 10 and 28 years for sport psychologists ($M = 17.00$, $SD = 8.37$). The time they were working with their current

team varied between 0.5 and 5 years for coaches ($M = 2.00$, $SD = 1.61$) and between 0.3 and 12 years for sport psychologists ($M = 5.21$, $SD = 4.93$).

Interview Guide

The interview questions were based on Wergin et al.'s (2018) interview guide. Accordingly, participants were initially asked to report a team collapse they had experienced with their team based on a short colloquial description of the phenomenon of team collapse: "A collective team collapse is the moment or process, when the performance of your team unexpectedly decreases more than normal. It is the situation, when your team experiences a significant performance collapse during a competition/game. It is the moment or process when 'nothing works anymore' within your team during a specific competition/game." Afterward, they answered a section of questions about details of the team collapse (questions 1–7); for example, "How many players were involved?" or "At what point during the game did the collapse occur?" The next section contained questions about the impact the collapse had on the team (questions 8–12); for example, "To what extent did the team collapse influence the further course of play?" The final question (question 13) dealt with specific triggers of team collapse: "In your opinion, what were the influencing factors for the team collapse?" Participants were then asked whether there was anything else they would like to add related to team collapse (question 14). The full interview guide is included in **Supplementary Data Sheet 1**.

Data Collection

The study did not involve any invasive or potentially dangerous methods and therefore, in accordance with the German Research Foundation (DFG) and the guidelines of the Department of Sport and Health Science at the Technical University of Munich, did not require formal ethical approval. Participants were recruited through the purposive sampling method of criterion-based sampling. Coaches and sport psychologists were recruited when they fulfilled the following criteria (similar to Wergin et al., 2018): (1) being a coach or sport psychologist of a team sport consisting of more than two players, (2) coaching a team between the first and fourth division, (3) having experience in coaching/applied sport psychology of 10 years or more, (4) having experienced a team collapse event with their current team, and (5) being willing to talk about the team collapse event. They were contacted *via* email or telephone and asked, whether they fulfilled the criteria mentioned above. If they did, they were invited to participate in the study. Recruited participants were informed of voluntary participation, the purpose of the study, and the confidential treatment of data prior to the start of the interview. They were assured the right to quit the interview at any time without penalty. Participants were further informed that audio records would be used for research purposes only and that recorded data would be treated confidentially. Additionally, they signed a declaration of consent, stating that they had been informed about the purpose of the study and agreed with audiotaping of the interview. All participants gave

written informed consent in accordance with the Declaration of Helsinki. The retrospective semi-structured interviews were conducted at the sports facilities where participants worked or in one case in course of a seminar. The duration of interviews ranged from 32 to 57 min ($M = 37.21$; $SD = 7.22$).

Data Analysis and Trustworthiness

The 11 interviews were audio taped and transcribed verbatim by the first and fourth authors, who typed out the recordings manually, yielding 122 total pages of single-spaced text; coaches' interviews generated 81 pages and sport psychologists' interviews generated 41 pages. The first and fourth authors read all interview transcripts several times to familiarize themselves with the content. A deductive content analysis was conducted to apply the process model of collective sport team collapse (Wergin et al., 2018) to the experiences reported by coaches and sport psychologists. For example, coaches' and sport psychologists' statements, such as "If we would have won this game, we would have been first in the ranking," were linked to categories of the process model, in this case *increased pressure*. Simultaneously, an inductive content analysis was employed to screen transcripts for novel content. If statements were not represented through preexisting categories of the process model, new categories were developed in accordance with the data, such as *immobility* as a category for the statement "Nothing works anymore, no reception, no movement towards the ball, no extra movement, no reaction, they're just looking at each other."

Data collection and analysis were conducted following the recommendations of Smith and McGannon (2018) for developing rigor in qualitative research. Accordingly, member checking, inter-rater reliability, and the notion of universal criteria, which constitute former methods for the development of methodological rigor, were renounced in the analytical process since they were "shown to be ineffective for verification, trustworthiness, or reliability purposes" (Smith and McGannon, 2018, p. 1). Instead, the formal methodological steps of revisiting, defamiliarization, and alternative casing for enriching deductive analysis proposed by Timmermans and Tavory (2012) were followed. In order to "revisit" the phenomenon of team collapse, transcripts, codes, and memos developed during the coding process were reevaluated and rethought several times during the process of data analysis. Furthermore, it can be assumed that the researcher's ability to see data from different angles and to pay attention to details that would vanish in a regular conversation is enhanced by the textual mode of transcripts. The text and the inscriptions create a "semantic distance from the taken for granted" (Timmermans and Tavory, 2012, p. 177). The methodological step of alternative casing requires the researcher to find as many ways as possible to understand the data. In order to fulfill this methodological step, constant comparisons were used throughout analytical process to compare new data with the theoretical framework of the process model of team collapse. It was explored whether new data conformed to the model and whether the model could explain variation in the data. Once data analysis was finished, the third author, who was not involved in the initial analysis process, acted as a "critical friend" (Sparkes and Smith, 2014;

Smith and McGannon, 2018), who challenged the categories as well as the adapted model, and provided independent feedback from an external expert perspective. The final categories and adaptations to the model were discussed extensively among all authors until consensus was reached.

RESULTS AND DISCUSSION

We analyzed coaches' and sport psychologists' perception of causes of collective team collapse by applying Wergin et al.'s (2018) theoretical framework, provided through the process model of collective sport team collapse, to the data. Thus, results are presented separately for the three temporal sequences of antecedents, critical events, and outcomes maintaining collective team collapse, as proposed by Wergin et al.'s process model. Within this theoretical framework, categories are presented in the same order as in Wergin et al.'s process model. Results are then compared to athletes' perceptions in the Wergin et al. study as well as to other collective team collapse research. General differences between athletes', coaches', and sport psychologists' perceptions are discussed in the "General Discussion" section.

Antecedents

The first antecedent of collective team collapse found by Wergin et al. (2018) is a *lack of attentional focus*. Coaches in the current study also reported this antecedent to be present prior to a team collapse game. Coach 6 (basketball), for example, explained a team collapse in the second half of the game by saying: "In my opinion, it was more or less the whole [third] quarter, it is hard to define... Maybe it was not as bad at the very beginning and [the team] started collapsing after the first minute but often there is this phase: After half time you are in a low, not really awake and the others are motivated and induce pressure and you are in deep sleep and that's why it doesn't really work." Similar to what athletes in the Wergin et al. (2018) study reported, the whole team seemed to be unfocused prior to the team collapse already, which appears to have increased the chances of a motivated opponent scoring and the likelihood of the own team to cause errors. A lack of concentration is also associated with individual choking (Eysenck et al., 2007; Oudejans et al., 2011; Fryer et al., 2017). Complementary to this finding, Morgan et al. (2013) found resetting a team's focus to increase the team performance and reduce choking under pressure. Resetting a team's focus may function as a protective factor against choking under pressure or collective team collapse.

Coaches and sport psychologists also found that the perception of *increased pressure* prior to a game made their team more vulnerable to a team collapse. Coach 3 (volleyball), for example, explained the pressure before the game was likely due to ranking if they won: "If we would have won this game, we would have been first in the ranking." Sport Psychologist 4 (handball) similarly described that his team was under pressure due to the importance of the game: "It was the critical game determining whether we could see the championships as a success or a failure. The team said before [the game] that the quarter finals were their

goal and that would have meant a qualification for a major tournament. And in this round of 16 the team had to play against a team, which is one of the best teams in the world in women's handball." It appears that perceived importance of the game caused the experience of pressure in team members, which is similar to athletes' perceptions of antecedents of team collapse (Wergin et al., 2018). These findings support Marchant et al.'s (1998) model of competitive anxiety, which indicates that perceived importance of a game may lead to increased pressure and anxiety in athletes. We assume that perceived pressure caused increased anxiety in players and thereby an increased vulnerability to team collapse. This association between anxiety and failure can also be found in choking under pressure literature (e.g., Hill et al., 2009; Otten, 2009; Mesagno et al., 2012).

Furthermore, coaches and sport psychologists described that their teams' as well as their own *overconfidence* about winning the game was another common factor preceding a team collapse. Sport Psychologist 1 (soccer) explained that his team lost focus in the game because they thought they had won the game already: "A main indicator [of the team collapse] was that, to exaggerate a little, a few players on the team were busy thinking about the next game already, because they seemed to have ticked off [the win for] that game already, since everything was in such a flow. And the main indicator then was that at least two players did by far not show the same running performance anymore and did not close the spaces anymore." Coach 5 (basketball) described how he was overconfident about winning the game and accordingly changed the formation of the team to give younger and inexperienced players the chance to play, who then underperformed: "We were in the lead by 20 points five minutes before the end of the game and then you usually assume that you have won the game. I let the other two [younger and inexperienced players] play. Well, first, I substituted one player, then the second. I'm not sure if that was the trigger but it was definitely a disadvantage and you learned that a basketball game is still open two minutes before the end of the game, even if you're in the lead by 10 or 15 points." Overconfidence of players or the team was reported as an antecedent in existing research (e.g., Apitzsch, 2009a; Hill and Shaw, 2013; Wergin et al., 2018). Wergin et al. (2018) suggested that overconfidence might cause an overestimation of players' own abilities and reckless behavior in athletes, leading to failure as a consequence. Overconfidence of a coach has not been reported as an antecedent of team collapse in existing literature so far. It is not our intent to jump to any conclusions based on this single case, but the possibility cannot be ruled out that, similar to athletes' overconfidence, the coach's overconfidence may also cause a slightly negligent coaching behavior, characterized by the substitution of successful players with less experienced and younger players, who were not able to deliver their regular performance.

Coaches also reported the antecedent of *composition of age and experience* to be relevant for the occurrence of team collapse. Specifically, young and less experienced players were described to be more vulnerable to the experience of team collapse. Coach 5 (basketball) explained these players tend to have difficulties reacting to tactical changes of the opponent: "If the opponent somehow changes strategy and the team is

very young and inexperienced and moves into a negative hole, insecurity develops through this inexperience. That's how these negative runs happen, it's related to age and the situation." Researchers have similarly reported a lack of experience as an antecedent for a bad performance (Moesch and Apitzsch, 2012) and for team collapse (i.e., Apitzsch, 2009a; Wergin et al., 2018). Further research showed that repeated experience of challenging or stressful situations fosters resilience to stress over time (Fletcher and Sakar, 2012; Morgan et al., 2015; Decroos et al., 2017) and assumed that less experienced athletes are more likely to choke in stressful situations.

Coaches further described the antecedent of *poor preparation*. Coach 6 (basketball) explained that his team did not warm up enough during halftime, which made them vulnerable to a team collapse: "After the first half, we talked quickly about what was good and bad and then they went to their friends and chatted with them. They only warmed up for two, three minutes before the end of half time and in my opinion that was a little too late and too short. And they switched off their heads completely during halftime and were in a totally different focus instead of gathering together somewhere and starting to warm up earlier for the second half." From this description, it appears that spending time with friends distracted the team from the game and changed their focus at the beginning of the second half. This is similar to the findings of Hill and Shaw (2013) and Wergin et al. (2018), but adds to existing research by making a connection between insufficient physical and mental preparation for the game and a lack of attentional focus at the beginning of the game as antecedents of collective team collapse. Similarly, a thorough preparation was found to be of advantage when facing difficult game situations (Morgan et al., 2013; Decroos et al., 2017). This adds to the process model of collective team collapse and will be further discussed in the "General Discussion" section.

Furthermore, *respect for the opponent* was reported as an antecedent in sport psychologists' transcripts. Sport Psychologist 3 (handball) explained that in his perception, too much respect for the opponent may have led to a lack of self-confidence in their own team: "I was told that, before the game, the team said: 'In previous games, we were more focused on ourselves and today we talked more about the opponent.' In the end they thought that was a failure, to talk about the opponent that much and that this was the reason why the awareness of the own strength wasn't there. And I believe this founded the basis that made the team so vulnerable for this triggering moment [when the team played a bad pass and the opponent scored]." Knowing how good the opponent was may have indirectly intimidated the team enough to lower the team's confidence of its own strengths. Sport Psychologist 4 (handball) similarly explained that the players overestimated the opponent and underestimated their own capabilities: "Respect for the opponent was too high. We were about to play against one of the best teams in the world and expectations about having to do something special were too high. It seemed like they went into the game with that idea in their head of 'We can only win if somehow everything works out well for us.'" In this case, respect for the opponent was so high that the team

did not believe they could win without some external factors (i.e., luck or poorer performance by the opponent) in their favor. This is consistent with Rotter's (1966) external locus of control – an individual's assumption that life is based on external factors, which cannot be influenced. The respect for the opponent and their subsequent external locus of control could have made them more vulnerable for a team collapse when the critical event occurred. This subsequent external locus of control could possibly also be related to self-handicapping (Jones and Berglas, 1978), as the team seemed to not believe in a win and may have provided excuses for the outcome of the game prior to its start.

In addition to the antecedents reported by Wergin et al. (2018), a *lack of self-confidence* was mentioned. Coach 7 (soccer) explained that his team was lacking self-confidence due to prior poor performance: "It simply didn't work that well during the last weeks regarding the results and that's why self-confidence was missing. The self-confidence and the mental toughness and the trust in the strength of the team was missing and then such a process [a team collapse] can easily happen." Sport Psychologist 3 (handball) described how the apparent lack of self-confidence of his team made it more vulnerable to a critical situation occurring during the game: "The trigger clearly was this key situation but there is more to this than meets the eye. Why can such a situation be so effective? I believe because the team did not play with the same self-confidence in this game as they did in prior games and that they never gained an inner security, this feeling of 'We know what we're doing, this works.' There was always this latent insecurity and I believe the team did not feel secure prior to the game already." Insecurity was also reported to play a role in team collapse situations in existing literature (Wergin et al., 2018), but it was revealed to be an outcome of a critical team collapse event. In this study, a lack of self-confidence was reported to be present prior to the critical team collapse event. A similar association between self-confidence and performance under pressure was found in several studies on individual choking (e.g., Baumeister et al., 1985; Craft et al., 2003; Woodman and Hardy, 2003; Otten, 2009; Hill and Shaw, 2013), positive psychological momentum (Jones and Harwood, 2008), and team resilience (Morgan et al., 2013, 2015; Decroos et al., 2017). It is, however, a new finding in the research on collective team collapse. Furthermore, the presented quotes indicate that other antecedents, such as respect for the opponent, may have caused a lack of self-confidence, making the teams more vulnerable to a critical event on the court. This association will be discussed further in the section "General Discussion."

Critical Events

The most common critical event, reported by coaches and sport psychologists, was an *unforced error accumulation* within the team. Coach 3 (volleyball) described how cumulative failures contributed to perceptions of helplessness in his team: "We couldn't score a single point. Not true, we scored one point, I believe we served when it was 14-9 [for us] and the serve was out or [hit the] net. Nothing worked anymore, really nothing! Then it was 14-10 and we gave away point after point, although we had good and prestigious players on the court.

We didn't know what to do." It appears that the team was unaware of what was happening and what to do to recover from the collapse. Coach 7 (soccer) explained in more detail how, in his view, errors within his team changed the team's psychological state: "It happened relatively sudden and it was an important mental situation for the team. We scored and we were in the lead and clearly superior to the other team. Then, our goalkeeper made a mistake and the whole team started to produce failures. I think this is what often leads to a team collapse. If it does not work well for the team, trust and the mental strength get lost. They start to doubt that they can get back into the game." It appears that the accumulation of the mistake of the goalkeeper and the mistakes of the team that happened right after have caused a feeling of insecurity in players, which confirms the findings of Apitzsch (2009a) and Wergin et al. (2018). Furthermore, the errors seemed to have increased despair in the team, which will be elaborated further in the "Cognitive Outcomes" section.

Coaches and sport psychologists reported *key player collapse* to be a critical event. Coach 5 (basketball) clarified how a key player experiencing choking affected the rest of the team: "If one, an important player or a key player, who usually always carries the others along, if he collapses or has a bad day, which is totally normal, he pulls the team down... Like I said this is a team sport and if someone doesn't pull through, he pulls down a second one and then then this negative spiral, a collapse, can happen very fast." This statement illustrates how other players orient themselves toward the key players and experience a decrease in self-efficacy if a key player chokes (Apitzsch, 2009a; Wergin et al., 2018). Sport Psychologist 4 (handball) reported another possible association between a key player choking and collective team collapse: "The key situation was that they [the team] missed three seven-meters [shots] in a row but it was even more important that the key player was the one who missed the first seven meter [shot] and what happened then was that responsibility was continuously shifted to the next player." In this example, it appears that the team was so dependent on the key player scoring that they were unsure about what to do or how to compensate for the key player's underperformance and kept shifting responsibility to other teammates. This connection between key player collapse and the transfer of responsibility to other players adds to existing team collapse literature.

Coaches and sport psychologists further confirmed *scoring of the opponent* to be a critical event. Sport Psychologist 2 (volleyball) explained how his team started to collapse after both teams were fighting for an important point during a long rally and the opponent scored: "It was a combination of an unexpected point gap and several losses of points. In this situation, a point was lost, they fought for very hard, and then you got the impression that the willpower of the team was exhausted and the concentration was gone and then the set was lost although it could have been won." In his description, it seems that just the single point the team worked hard to win but the opponent scored led to extreme disappointment for the players, which may have caused a change in the team's mind-set and triggered the collapse. Sport Psychologist 3 (handball)

similarly described that scoring of the opponent changed the team's cognition: "Instead of leading by three goals, it happens fast, counterattack, in the lead with only one goal, and you realize how the team changes into a different mode and in the end loses the game... They could not gain back their solution-oriented thinking, which could have allowed them to win." It appears that scoring of the opponent changed the teams' view of the situation and interfered with their performance, allowing a team collapse to happen. The team seems to have lost its solution-focused thinking after the opponent scored and turned into a problem-focused mode of thinking, worrying about their opponent's good performance instead of focusing on their own performance goals. Scoring of the opponent was found to trigger a team's underperformance in existing research (e.g., Jones and Harwood, 2008; Apitzsch, 2009a; Wergin et al., 2018). These studies, however, did not explain the connection between loss of points and a change in the team's mind-set.

Furthermore, coaches reported that a perceived wrong *referee decision* may have started their team's collapse. For example, Coach 1 (field hockey) explained: "There were two controversial referee decisions made against us that led to two goals of the opponent. That means the referees were in the focus of the team collapse and our captain went to one referee and if the captain starts yelling at the referee already, it doesn't take long until the others do the same." Apparently, the perceived wrong referee decision caused anger of the team captain and made him show his aggression against the referee. The anger and frustration may have transferred to other players, who also became angry and did not focus on the game anymore. This corroborates other researchers' findings (e.g., Jones and Harwood, 2008; Wergin et al., 2018).

In addition to the critical events reported by Wergin et al. (2018), coaches described *game interruption* as a critical event causing a team to collapse. The *game interruption* due to an injury (of own teammate or opposing player) changed the team's performance as Coach 4 (volleyball) explained: "One of the opponent's players got injured, there was an interruption of the game, he was also whining a little and after that nothing worked anymore within our team. It was the typical case, we could have played so much better but... after this happened nothing worked anymore on our side." Even though it was not a teammate who was injured, the team somehow lost focus due to the interruption and was unable to keep up the same level of performance once the game recommenced. Apitzsch (2009a) also reported that a time out called by the coach as well as the coach's behavior during this time out interrupted the play of the team and provoked a team collapse. This critical event constitutes a new category in the process model of collective sport team collapse that will be discussed later on.

Outcomes Maintaining Team Collapse

Outcomes maintaining team collapse specifically refer to factors that occurred after a critical event and contributed to the development and continuation of the team collapse. Like athletes, coaches and sport psychologists found that a critical event happening on the court had an impact on the team, which may have led to various cognitive, affective, and behavioral

processes within the team. These cognitive, affective, and behavioral changes may have led to further mistakes and underperformance that maintained the team collapse. It appeared that cognitive and affective outcomes preceded behavioral outcomes in the coaches' and psychologists' descriptions; hence, they are presented first.

Cognitive Outcomes

Cognitive outcomes include thoughts, thought processes, and perceptions, which hindered the team from gaining back their previous performance level. One of these factors was pressure that was induced by the underperformance of the team and the need to recover from the team collapse in order to stay in the tournament. Sport Psychologist 4 (handball) explained how *pressure* to score was induced: "We had 10 more minutes to go and the team was behind by five points and many already saw their dream vanishing. And they [the players] calculated something like: 'Now there are only 10 minutes left, if we don't score five times, we won't participate in the championship.' And this is exactly what shouldn't happen." Unlike perceived pressure due to the importance of a game (in the "Antecedents" section of this paper), the sport psychologist described how pressure on the team increased due to the team's underperformance and being behind on the scoreboard. This perceived pressure to perform better may have hindered the team even more in gaining back their previous performance level and thus maintained the collapse. The athletes in Wergin et al.'s (2018) study also reported increased pressure induced by the perceived urgency to overcome the team collapse.

The team collapse itself and the pressure induced by it seemed to raise *insecurity* in players. Sport Psychologist 3 (handball) explained how the team was unable to gain an inner security due to the persistent team collapse: "The team went into an uncontrolled mode. There was a latent insecurity present. The first half wasn't good already, we were behind and luckily finished the first half tied, which we didn't deserve with this performance... And I think this underperformance was what caused the feeling of insecurity." The latent insecurity appears to be a result of the team's bad performance and may have led to unrest and a loss of perceived team control, which prohibited the team from returning to their regular performance level, potentially exacerbating the team collapse. While this connection between insecurity and performance (Morgan et al., 2013, 2015; Decroos et al., 2017) and between insecurity and team collapse (Jones and Harwood, 2008; Apitzsch, 2009a; Wergin et al., 2018) has been presented before, Coach 5 (basketball) further mentioned a connection between his behavior and the perceived insecurity of the team. He explained how a coach could also increase insecurity in players through his/her behavior during a team collapse: "If you become nervous outside and start scratching your head, you create an insecurity in the players. If you as a leader are insecure, it becomes difficult. As a coach you have to send out positive and confident signals to the team." As a perceived leader, the coach's behavior can affect the team. Although several studies have emphasized the impact of coaching behaviors on sport teams (e.g., Loughhead and Hardy, 2005; Myers et al., 2005),

the influence of a coach's behavior on a team's performance, or feeling of security, has not been reported in existing literature.

Coaches and sport psychologists further reported that their team suffered from a *lack of accountability*. The players appeared not to take responsibility for scoring anymore after the critical team collapse event happened. Coach 3 (volleyball) stated: "There was no one there saying 'Give me the ball, I'll do that' or simply 'Give it to me, I'll block it down. No one took initiative or gave the others an idea of what to do.'" Sport Psychologist 4 (handball) found that especially key players did not take enough responsibility: "When the key player missed [the seven meter shot], responsibility was passed on to the next and the next [player] and it became absurd who threw seven meters... Some key players did not assume the responsibility that you would wish they did. There were two more seven meters after that and I would have expected them [the key players] to throw them." Wergin et al. (2018) explained the shift of responsibility between players might be associated with the social loafing process that can occur in groups (Karau and Williams, 1993). Another possible explanation for the above quote might be the diffusion of responsibility in groups where the presence of others lowers the feeling of responsibility in individuals when facing a difficult situation (Darley and Latane, 1968). Morgan et al. (2015, 2017) in this context report that collective accountability contributes to team resilience, especially when the team faces setbacks. They further found that certain leadership strategies could enforce accountability and increase performance. Athletes within Wergin et al.'s study also mentioned that the reason for the transfer of responsibility could be anxiety about being responsible for the next mistake. An interesting finding of the current study is that coaches stated that this especially applied to key players, which may be problematic for the team, as players tend to orient greatly toward key players (Apitzsch, 2009a; Wergin et al., 2018).

Similar to athletes in the Wergin et al. (2018) study, coaches and sport psychologists found that increasing *despair* and perceived helplessness within the team were an outcome of team collapse that fostered its maintenance. Sport Psychologist 1 (soccer) stated that players of the team reduced their effort because of the team's underperformance and their disbelief in their ability to change the situation: "Some players did not really participate in the game anymore. In soccer as it is played today, the play completely depends on every player... The game only took place on a part of the field, everyone was very situation-oriented and then a few stopped playing as if to say 'the others collapsed already and I don't believe in the victory anymore.'" Sport Psychologist 4 (handball) described that his team did not believe that they would be able to change the game outcome anymore: "It seemed like they thought a foreign force had conspired against them and that they thought 'Nothing will work anymore anyway.' And in accordance with this the players began to hang their heads." This belief of not being able to change anything is a very typical outcome of a team's underperformance (Jones and Harwood, 2008; Hill and Shaw, 2013; Wergin et al., 2018) and is likely related to learned helplessness (Seligman, 1975), because the team seems to believe to have lost the ability to change their situation.

A new cognitive outcome reported by coaches and sport psychologists in this study was the *failed expectations* of the team. Sport Psychologist 2 (volleyball) explained: "The team that I supervised should have been clearly in the lead, but they weren't and I believe this was a moment that caused confusion in the team... They were so confused and the coordination between players, which is crucial in volleyball, was gone, and you felt that everyone was busy dealing with himself. I believe the focus on the general tactics got lost because everyone was busy dealing with the unexpected situation." It seems that the team's high expectations prior to, or during, the game triggered a disappointment that their expectations were not being realized, because the team was not prepared for this unexpected and insurmountable lead by the opponent. Although the disappointment of prior expectations is known to be an outcome of individual choking under pressure (Hill et al., 2011) and the underperformance of a team (Jones and Harwood, 2008), it has not been reported as a factor maintaining collective team collapse. The maintenance of the collapse, due to disappointed expectations, can possibly be explained through Personality Systems Interaction (PSI) Theory (Kuhl, 2000). According to PSI Theory, negative affect, resulting from frustration, interferes with access to one's capacities. Building on this, the disappointment of expectations of a team after a critical event might increase negative affect, which hinders the players in retrieving their full performance capacities, and, therefore, maintain the underperformance.

Sport psychologists also described an *actionist atmosphere* to be spreading within the team a result of the team collapse situation. This actionist atmosphere was defined as players' perception of an urgent need to score in order to end the collapse, which seemed to lead to rather ineffective moves. Sport Psychologist 4 (handball) stated: "There was this actionist atmosphere developing. You had the feeling they wanted to score by will and force... they thought 'Now that it [the game] doesn't go well, we have to do even more,' and I believe that was too much." According to Sport Psychologist 4, this perception of a need to do more to change the situation did not improve performance but instead maintained the collective team collapse. The absolute determination of the team to score seemed to inhibit their performance even more. This finding is new to team collapse literature and has not been reported in research related to the underperformance of individuals or teams so far.

Sport psychologists also described that in their perception, an *individualization* of players maintained the team collapse. Individualization was described as a loss of coordination between the players. It seemed that every player acted on his or her own instead of working together after a critical event. Sport Psychologist 2 (volleyball) explained: "Regarding the process, I would say there was a shift of focus from the whole team, from the interaction [of players] to the individual. Everyone was on his own, occupied with his emotion, with his frustration about the situation and maybe also with other thoughts related to this. The coordination between players got lost and everyone was on his own with this frustration." The critical event seemed to have changed the team's perception of itself from working in unison to becoming more individually focused, which appeared

to be accompanied by a decrease in coordination between players that fostered the maintenance of the collapse. Apitzsch (2009a) similarly reported that team processes, such as interaction and cooperation, tended to break down during a team collapse and that team players started to play as individuals rather than as a team. He further explained that the performance of the players declined even more through this individualization and the stress that went along with it, resulting in chaos and defeat. Morgan et al. (2015, 2017) further explain that coordination between players is a crucial factor for team resilience and thus especially important when a team faces a stressful situation.

Another new outcome mentioned primarily in sport psychologists' perceptions was the development of a *prevention orientation* or a shift in focus from winning to "not losing." Sport Psychologist 1 (soccer) said: "It should have been clear that we have a goal and not that 'It's our job to defend something.' And suddenly it was all about not letting the catastrophe happen and the goal orientation transformed into a prevention orientation. And in combination with small mistakes of usually very stable players, the others [team mates] suddenly lost orientation and weren't able to work that well in defense anymore." This switch from an aspirational goal to a focus on prevention likely changed the behavior of players on the court to a defensive or less offensive play, making it even harder for the team to score and overcome the collapse. This change of a team's mindset has not been reported in team collapse literature. Apitzsch (2009a) reported that, due to the collapse, the offensive play of the team decreased significantly, which may be a result of a developing prevention orientation.

Affective Outcomes

Affective outcomes are changes in emotions and feelings in the team that prohibit it from returning to the original performance level. The affective outcome of *negative emotional contagion* was mentioned by coaches and sport psychologists. Coach 1 (field hockey) explained that the key player's mood transferred to other players: "In my opinion, a team collapse happens if key players are, I don't know how to say it, for example if they are dissatisfied with the game and then the [other] players adapt to the key player and the negative mood transfers to the whole team." Sport Psychologist 3 (handball) emphasized how the team was unable to stop the spread of anxiety among the team: "There was not much time left to play and to return to our initial performance level... The self-confidence vanishes and anxiety spreads within the team, and the exact opposite happens in the opponent team. Within the last eight minutes of play, this atmosphere is dominant in the team and they can't get out of there." Existing research reported a connection between individual emotion and emotion of the team (George, 1990; Totterdell, 2000) as well as a connection between the spreading of negative emotions and a performance decrease of the team (Kelly and Barsade, 2001; Apitzsch, 2009a; Boss and Kleinert, 2015; Wergin et al., 2018). This transfer of emotion among team members has also been referred to as negative emotional contagion (e.g., Totterdell, 2000). Apitzsch (2009a) further explained that the negative emotional contagion has a negative impact on athletes' cognition and leads to

negative thoughts, which seem to foster a maintenance of the team collapse (Wergin et al., 2018). Complementary to this, Morgan et al. (2017) found that positive emotions are related to team resilience as well as to a team's performance.

As Sport Psychologist 3 (handball) pointed out, *anxiety* seemed to play a crucial role in maintaining collective team collapse. Coaches and sport psychologists recognized the outcome or consequences of anxiety, whereas Psychologist 3 (handball) described the origin of the anxiety that spread in his team: "From that positive atmosphere, that certainty, from this offense situation 'We can achieve something' it [the atmosphere] shifts to anxiety: 'Oh shit, now we're in the lead with only one goal' and then the others get into the flow, it's a classical shift of momentum." It seems that scoring of the opponent caused a fear of losing the game within the team, which further appears to be associated with or a consequence of the earlier mentioned cognitive shift from goal to prevention orientation. Coach 5 (basketball) similarly described: "You realize it immediately, that players drop shoulders and become anxious 'Hopefully I don't make the mistake' and 'hopefully it's not my fault' and things like that, you can see that from the outside." Apparently, players were afraid to make further mistakes and feared to be held responsible for the team collapse. Researchers have found that a fear of failure is associated with increased anxiety and decreased performance (i.e., choking under pressure) in individuals (Jones and Harwood, 2008; Hill et al., 2009; Otten, 2009; Gucciardi et al., 2010) as well as performance decrements in teams (Apitzsch, 2009a; Wergin et al., 2018). It is assumed that pressure, the desire to perform well, and a lack of confidence in one's abilities might lead to anxiety associated with failure, which prohibits a return to a regular performance level and maintains the team collapse (Wergin et al., 2018).

Coaches and sport psychologists further reported that *anger* and *frustration* were negative emotions associated with the team collapse in their opinion. Coach 7 (soccer) explained that failure of players and the externalization of reasons for this failure may have caused frustration and anger within his team, which appear to increase the negative performance and maintain the team collapse: "From the perspective of a coach I can say that it [the team collapse] is a process that maintains and fosters itself. When the game becomes worse, you get the feeling that the players always try to find excuses for their failure and then frustration about failures of team mates or about own mistakes increases." Sport Psychologist 2 (volleyball) explained how frustration then led to individualization within the team: "Everyone was busy dealing with their emotion, their frustration about the situation, maybe also with other thoughts related to this and then the coordination between the players got lost and everyone was dealing with the frustration on her own. The same thing happened with the coach." The frustration that appears to increase in players and coach also seemed to interfere with the coordination between the players and caused them to withdraw from each other. The results are consistent with the findings of Apitzsch (2009a) and Wergin et al. (2018) but provide some additional information about coaches' and sport psychologists' perceptions

on the role that frustration and anger play within the cascade of causes of collective team collapse.

Behavioral Outcomes

Behavioral outcomes are changes in actions resulting from cognitive and affective changes that also foster a maintenance of the team collapse. One behavioral factor reported by coaches and sport psychologists was *decreased performance contagion*, which was defined as poor performance transferring among players. Sport Psychologist 1 (soccer) explained: "It [the poor performance] was especially related to midfield and defense and nothing fit together anymore and that means, for a team that moves as a collective team, everyone suddenly slumped." The decrease of performance of several players seemed to negatively influence the team's collective interplay and therefore led to a performance collapse of all players. Researchers (e.g., Boss and Kleinert, 2015; Wergin et al., 2018) also reported decreased performance contagion, where poor performance of a key player mainly transferred to other players, who oriented themselves toward the key player and tended to adapt to the mood or performance of that key player. Through the quote of Sport Psychologist 1, a perceived underlying link between the performance decrease and the interplay of the team is presented, where the team underperforms collectively due to a disturbance in the play system evoked by individual players.

The behavioral outcome of *cautious play* was mentioned by sport psychologists and coaches. Coach 3 (volleyball) for example explained: "I believe we became too cautious" and Coach 4 (volleyball) stated: "My personal opinion is that when the team collapse happened, we weren't playing sovereign [superior to the other team] anymore, we were insecure due to two bad actions before." Coach 4 described how poor play of her own team caused players to feel insecure, which seemed to provoke a cautious or defensive playing behavior. Cautious play has been found to be an influencing factor in previous studies (Wallace et al., 2005; Wergin et al., 2018), which underscores the notion that one's underperformance (critical event) may lead to a change in other players' cognition (feeling insecure), which might affect playing behavior (playing cautiously).

Contrary to this, sport psychologists also mentioned that some teams tended to play more frantically, being in a *hectic rush*, after a critical team collapse event. Sport Psychologist 4 (handball) in this context explained: "You have to imagine that the goal keeper passes and then they wanted to perform an attack, then a bad pass happens and after receiving a goal, they played in a hectic rush and tried to make a fast counter attack that found a hasty end." This sport psychologist suggested that receiving a goal seemed to induce pressure or gave the players the feeling that they had to score fast in order to end the team collapse, which led to a maintenance of the bad performance. Jordet and Hartman (2008) similarly reported that soccer players in penalty shootouts took shorter times to prepare their penalty shots as an avoidance coping technique to deal with the high-pressure situation and showed individual choking behavior as a result. A hectic rush was also found to be important in maintaining team collapse by Apitzsch (2009a) and Wergin et al. (2018). We suspect that

the feeling of an urgency to score, which is also described by Sport Psychologist 4, may represent the cognitive experience a team goes through before showing a hectic behavior on the field. This will to score in order to end the collapse is assumed to be what we described as an actionist atmosphere in the cognitive outcomes. It appears that increased pressure (e.g., due to scoring of the opponent) may create an actionist state of mind, which might manifest through a hectic playing behavior.

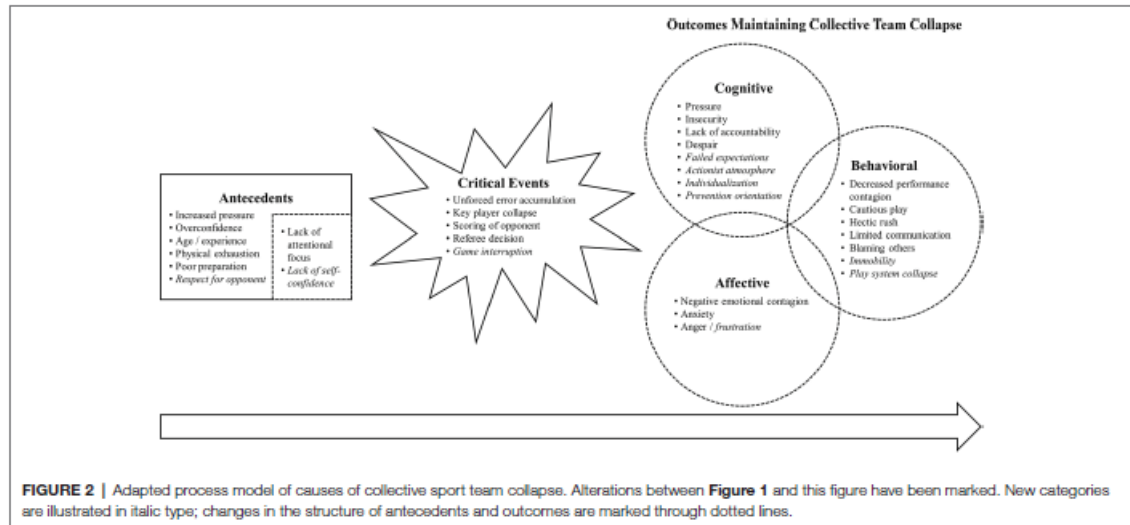
Limited communication was reported to play a crucial role in maintaining team collapse by coaches as well as sport psychologists. Sport Psychologist 2 (volleyball) explained: "I believe that the contact between rallies was less emotional, less contact. The players in this situation as well as in other situations where it didn't work, had less contact with each other. They became more separated and did not celebrate anymore in between rallies when they scored a point." Interestingly, Sport Psychologist 2 made a direct connection between the lack of communication and the individualization of the players, whereby it seems that a lack of communication is the behavioral and thus observable part of the individualization happening in the team. Sport Psychologist 1 (soccer) further mentioned that key players in particular should talk to their teammates and direct an appropriate course of action, but did not communicate much anymore during the collapse: "When a difficult situation occurs, the players themselves have to communicate a strategy. The coach cannot communicate that from the side of the field. Key players have to take half a minute after a goal to talk to the others 'Hey, let's do this and that' to shortly dispute on the field. But they were so confused that no one talked to the other." This statement illustrates that the lack of communication seems to involve key players as well and that they may play a significant role regarding the decrease of communication within the team. This is not surprising, since research highlights the importance of communication for a team's performance (Apitzsch, 2009a; Morgan et al., 2013, 2017; McEwan and Beauchamp, 2014) and shows that key players tend to promote team efficacy (e.g., Bandura, 1977; Spink, 1990; Carron and Hausenblas, 1998). However, the connection between key players, communication within a team, and team collapse has not been reported in existing literature.

The maintaining factor of *blaming others* was perceived by coaches. Interestingly, they did not only state that players started to blame each other during a team collapse but further explicitly stated that this was enhancing the effect of the team collapse. Coach 7 (soccer) in this context said: "You should never blame someone else, a team mate for failure, especially not during a team collapse. In my opinion this is crucial. If you are busy blaming someone else for it, even if it's the referee or the own player who did the mistake, or even someone external, this enhances the effect of the team collapse." This finding supports the assumption by Wergin et al. (2018) that the behavioral outcome of blaming others for failures contributes to the maintenance of team collapse. Morgan et al. (2013, 2015) similarly explain that a culture of no blame can foster team resilience and is important when failure happens within a team.

Besides the behavioral categories of the original process model of collective team collapse (Wergin et al., 2018), several new factors emerged from the coaches' and sport psychologists' perceptions within this study. One of these was an increasing *immobility* of the players on the court. Coach 4 (volleyball), for example, described how the players would not move anymore after the other team had scored: "It was out of the sudden that, nothing worked anymore, no reception, no movement towards the ball, no extra movement, no reaction, they're just looking at each other, not knowing what to do." The shock and disbelief about the deficit in points and maybe also the fear of losing the game seemed to keep players from moving toward the ball. Immobility constitutes a new finding in team collapse research.

Another behavioral outcome, which was novel in sport psychologists' interviews, was *play system collapse*, described as the collapse of the team's game structure. Sport Psychologist 4 (volleyball) explained: "From an outside perspective I would say that there was this moment when the opponent scored and after the opponent scored, they couldn't get a structure back into the game and that made them lose the game and fail utterly." Sport Psychologist 2 (volleyball) explained in more detail how the loss of points caused confusion in his team leading to a lack of coordination, increased individualization, and ultimately a loss of the play system: "There were some unfavorable losses of points and a hard-fought rally, which got lost, and then they got confused and the coordination between players, which is crucial in volleyball, got lost and everyone was dealing with himself. I believe the general tactics got lost because everyone was busy dealing with that unfamiliar or forbidden situation." This breakdown in the playing structure of a team due to a team collapse is a novel finding in the understanding of team collapse processes.

Several new categories were perceived by coaches and sport psychologists in the current study in addition to the categories of Wergin et al.'s (2018) study. **Figure 2** illustrates an integrated process model based on Wergin et al.'s (2018) theoretical framework and the data of this study. Compared to the initial process model of collective sport team collapse (**Figure 1**), the adapted process model (**Figure 2**) distinguishes between prior and posterior antecedents, whereby the posterior antecedents emerge from the prior antecedents. While critical events remain the same between initial and adapted process model, the order of outcomes maintaining team collapse changed in the adapted model. Because coaches and sport psychologists described that behavioral outcomes would emerge from cognitive and affective outcomes, behavioral outcomes are displayed last and after cognitive and affective outcomes. The data informed model is supposed to give a broad overview of the temporal process of causes of collective team collapse by incorporating athletes' (Wergin et al., 2018) as well coaches' and sport psychologists' perceptions. Categories within the model should function as examples to illustrate the interplay of causes of team collapse and do not provide a complete representation of every possible combination of factors. It should further be mentioned that, similar to the process model of Wergin et al. (2018), the adapted process model of collective



sport team collapse (**Figure 2**) illustrates the results of the analysis and interpretations of the data of the current study, rather than general characteristics of the team collapse phenomenon. Results are presented in a linear fashion to account for participants' descriptions of a temporal difference in the components of the model (i.e., antecedents, critical events, outcomes). This linear presentation is not supposed to contradict a cyclical and dynamic process that is in some ways typical in team dynamics research. A cyclical process may still occur within our linear framework, but was not further investigated during coaches' and sport psychologists' interviews in this study.

GENERAL DISCUSSION

The goals of the current study were to explore coaches' and sport psychologists' perceptions of causes of collective team collapse, to qualitatively compare their perspectives to athletes' perceptions, and to explore whether coaches' and sport psychologists' perceptions would support the process model of causes of collective sport team collapse (Wergin et al., 2018).

The general structure of Wergin et al.'s process model was also found in data collected in this study. Perceived antecedents and critical events leading to team collapse were similar between the three participant groups (i.e., athletes, coaches, and sport psychologists) in the current and Wergin et al.'s (2018) study. Nevertheless, a *lack of self-confidence* was brought up as a new antecedent and *game interruption* as a new critical event by coaches and sport psychologists in this study, compared to Wergin et al. It appears that antecedents themselves are temporal and do not happen concurrently, which is why they are presented in a temporal order in **Figure 2**. A *lack of attentional focus* and the *lack of self-confidence* seem to be internal antecedents of the players that result from rather external

antecedents such as *respect for the opponent* and thus temporally follow as secondary antecedents.

While perceptions of coaches and sport psychologists in the current study supported the framework of affective, cognitive, and behavioral outcomes maintaining team collapse, they also mentioned several new categories, in addition to the ones reported by athletes in the initial process model (Wergin et al., 2018). Categories that emerged from the quotes included *failed expectations*, an *actionist atmosphere*, *individualization*, and a *prevention orientation* of the team as new cognitive outcomes, and *immobility* and *play system collapse* as new behavioral outcomes. Regarding the temporal order of affective, cognitive, and behavioral outcomes within the process model of causes of collective sport team collapse, participants in this study explained that behavioral outcomes were a result of affective and cognitive outcomes, although they could not specify whether affective or cognitive outcomes preceded. Thus, behavioral outcomes represent the final temporal outcome in the sequence of causes of team collapse (**Figure 2**). Nevertheless, coaching staff are not as involved in the team collapse process as the athletes on the field and therefore may automatically focus more on the behavioral component of outcomes of team collapse, since it is the most visible and accessible.

In the context of outcomes maintaining team collapse, coaches also tended to especially see behavioral factors, for example *immobility* or the *blaming of others*, as essential for maintaining team collapse. In contrast, sport psychologists especially reported cognitive factors, such as *individualization* or a *lack of accountability* between the players, to maintain team collapse. Accordingly, coaches found behavioral outcomes to be more relevant during a team collapse situation, while sport psychologists focused more on cognitive outcomes. This finding may be explained by the different focal points the two participant groups gain during their education and

career. While psychologists' area of responsibility typically deals with cognitive processes, coaches tend to focus on the more salient area of action and behavior, which they likely perceive they can influence. While describing these processes, sport psychologists appeared more neutral and showed less emotional attachment to team collapse events than athletes and coaches. They also used social psychological theories to explain how underlying processes of team collapse evolved; for example, one sport psychologist explained that, due to the scoring of the opponent, the goal orientation of his team to win the game transformed into a prevention orientation to prevent the loss of the game. Compared to coaches, sport psychologists are not necessarily former athletes of the sport. In contrast, most coaches are former players (e.g., Rynne, 2014; Mallett et al., 2016) and their own experience with collective team collapse might shape their perceptions of the phenomenon. They may include their own experiences from their time as an athlete in their report of collective team collapse.

It further needs to be noted that several categories of the initial process model (e.g., *lack of attentional focus, age and experience, poor preparation, insecurity, lack of accountability, limited communication, blaming others*) as well newly described categories in this study (e.g., *lack of self-confidence, individualization*) can also be associated with team resilience. Studies of Morgan et al. (2013, 2015, 2017) and Decroos et al. (2017) report contrasting factors such as *resetting focus, collective efficacy, thorough preparation, positive emotions, group accountability, frequent communication, or a no blame culture* as factors that can strengthen a team's resilience when encountering stressful or challenging situations. By looking at team resilience and the factors described by coaches and sport psychologists in this study, it appears that team resilience may constitute a protective factor against collective team collapse. If a team manages to improve collective efficacy, game preparation, the group accountability, and communication in the team and to develop strategies to reset focus or establish a culture of no blame, they may be less vulnerable for stressful situations or critical events on the court and less likely to experience a collective team collapse. The interplay of team resilience and team collapse constitutes an interesting starting point for future research.

Overall, the present study was the first one to examine coaches' and sport psychologists' perceptions on causes of collective sport team collapse. It gives insights into perceptions of causes of team collapse in a variety of sports and adds new factors to the cascade of causes evoking collective team collapse. Based on these findings, it provides practical implications and offers new questions for future research. Compared to earlier studies in the field (Apitzsch, 2006, 2009a,b; Moesch and Apitzsch, 2012), it includes both male and female participants from different sport disciplines and contains information on the relations and interplay of the different factors involved in evoking a team collapse. It complements the findings of Wergin et al.'s (2018) study by two more perspectives (i.e., coaches and sport psychologists) and allows a 360° view on the phenomenon of collective team collapse.

Limitations

A limitation to the current study is that the short colloquial description of team collapse that participants received prior to the interview might have influenced their descriptions of the phenomenon when they recalled their team collapse experiences. It is also noteworthy that the coaches in this study might have reflected on their previous playing experiences in discussing their perceptions of the phenomenon. Similarly, the sport psychologists may have included their theoretical knowledge about group processes and group phenomena in their descriptions of collective sport team collapse. Moreover, the study mainly included professional coaches and sport psychologists (and one semiprofessional coach) working in elite sports. To further address team collapse occurring in amateur sports, future research should include athletes, coaches, and sport psychologists of amateur leagues as well. Another point to be raised is that coaches and sport psychologists in this study were coaching in between national and fourth division. This difference could also indicate a skill difference.

Future Research

Although this study provides new insights into coaches' and sport psychologists' perceptions of collective team collapse and its underlying processes, further empirical examination of this phenomenon is necessary to more comprehensively understand it. The present study only included professional coaches and sport psychologists working in a few elite sports. In order to further address team collapse occurring in amateur (and other) sports, future research should consider other settings and sports. It is suggested that both qualitative and quantitative studies are necessary to examine this phenomenon further. Specifically, a more nuanced understanding of the interdependency of the temporal factors (e.g., how they relate to each other) is necessary; that is, future studies might investigate the relations between affective, cognitive, and behavioral outcomes in more detail by including athletes, coaches, and sport psychologists in a focus group discussion about the associations between affective, cognitive, and behavioral outcomes maintaining team collapse. Sport-specific causes of collective team collapse should also be investigated, as it appears that especially bench coaching and non-bench coaching sports deal with different problems during a team collapse process. Moreover, after further empirical examination, possible interventions to minimize the risk of and the capability to disrupt a team collapse need to be developed and tested. Another interesting matter for future research to elaborate on might be to explore the interplay of team resilience and collective team collapse and to investigate whether or to what extent resilience can protect a team from experiencing a collective collapse.

Practical Implications

Based on the findings of this study, we propose several practical recommendations and implications. Emotional regulation strategies and coaching of key players to intervene in team collapse situations have been reported as possible intervention strategies (Wergin et al., 2018) and would also fit within the

results of the current study (e.g., to prevent *anger and frustration*). The newly reported cognitive outcome of *individualization* may be thwarted through key player actions in a team collapse situation. Furthermore, the new categories of *game interruption*, *play system collapse*, and *immobility* indicate that a team's interplay is disturbed by a critical team collapse event. In these situations, another interruption during the team collapse might be helpful, which could involve calling a time-out or substituting a player to potentially reset the team, especially in bench coaching sports, in which these strategies are allowable. In sports where coaching during game play is difficult or impossible, half-time breaks could be used to intervene. It seems that, in order to be effective, interventions conducted during time-outs or half-time breaks should attempt to change the teams' focus from a prevention orientation of "not letting the catastrophe happen" to the perception of opportunities and possibilities in the further course of play (goal orientation). Wergin et al. also suggest that establishing a culture of no blame and including resilience and pressure simulation trainings into practice might be helpful. These practical implications and recommendations, however, need to be examined in future research.

CONCLUSION

Overall, athletes, coaches, and sport psychologists supported the view that team collapse was a phenomenon in their sport. Participants' perceptions in the current study resembled the general structure of the process model of causes of collective sport team collapse and added some categories to the existing theoretical framework. In addition, two adaptations to the process model were discussed. Taken together, the results of this study add richness to the process model of causes of collective sport team collapse. The proposed model should encourage future research in this area and provide a systematic

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overview of the complex phenomenon of team collapse to athletes and practitioners in the field.

ETHICS STATEMENT

The study did not involve any invasive or potentially dangerous methods and therefore, in accordance with the German Research Foundation (DFG) and the guidelines of the Department of Sport and Health Science at the Technical University of Munich, did not require formal ethical approval.

AUTHOR CONTRIBUTIONS

The original research is part of the PhD thesis of VW, supervised by JB. VW, CJM, CM, and JB contributed to the conception and design of the study. ZZ and VW performed data collection and analysis. VW wrote the first draft of the manuscript. CJM, CM, and JB wrote the sections of the manuscript. All authors contributed to manuscript revision, read and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01331/full#supplementary-material>

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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4.3 Article 3

Authors: V. Vanessa Wergin, Zsuzsanna Zimanyi, & Jürgen Beckmann
Title: A Field Study Investigating Running Performance and Emotions of Field Hockey Players in Team Collapse Situations
Journal: Manuscript submitted to the *International Journal of Sport and Exercise Psychology* (currently under review)

Summary:

The aim of the third article was to explore whether the negative emotions and the reduced performance in athletes reported in the first two articles could also be measured quantitatively in the field. A further goal was to assess a collective sport team collapse occurring under natural conditions on the court. Thus, a quantitative field study was conducted during a field hockey preparation tournament in which 75 field hockey players of five different teams participated. After each game of the tournament, athletes were shortly interviewed individually and asked whether they had perceived a collective collapse in their team during the game. Thirty-three players of two teams consistently reported the experience of a collective team collapse in one of their games. Those games were labelled “team collapse games” and athletes’ running performance and emotions before and after each game were compared to their running performance and emotions in games that were also lost but did not incorporate a collective team collapse. Running performance was assessed through GPS data, while positive and negative emotions were measured using the PANAS scales (Watson, Clark, & Tellegen, 1988). Results showed athletes’ running performance in team collapse games to be significantly lower than in lost games. Negative affect did not vary between the two conditions before the games, but was significantly higher after a team collapse game compared to a lost game. It appears that negative emotions and emotional regulation attempts reduce athletes’ capacity to perform and thus lowers their running performance. This article offers initial quantitative insights into the phenomenon of team collapse in the field but further studies investigating the phenomenon are needed.

The manuscript was submitted in the section of *Group Dynamics* to the *International Journal of Sport and Exercise Psychology* in May 2019 and is currently under review. The *International Journal of Sport and Exercise Psychology* is a peer-reviewed international journal promoting research and practice as well as innovative approaches in sport psychology.

Contribution:

Vanessa Wergin was the principal investigator and author of this manuscript. She developed the idea for the study and the study design and collected data together with Zsuzsanna Zimanyi. Vanessa Wergin conducted data analyses and wrote the submitted manuscript, whereby she received feedback from Jürgen Beckmann.

A Field Study Investigating Running Performance and Emotions of Field Hockey Players in Team Collapse Situations

V. Vanessa Wergin, Zsuzsanna Zimanyi, & Jürgen Beckmann

Technical University of Munich

Abstract

Causes of collective team collapse, the phenomenon when a team experiences a sudden, extreme, and collective underperformance, remain unexplained. Existing qualitative research indicates an association between negative affect and collective team collapse. To measure a team collapse occurring during a game and to gain first insights into players' affect in team collapse situations, a quantitative field study was conducted during a preparation tournament with 75 male field hockey players of five teams. Two teams of this sample, consisting of 33 athletes, reported to have experienced a naturally occurring team collapse in one of their games. Players' running performance was evaluated through GPS data and defined as running distance relative to time played. Pre-/post-competitive positive and negative affect was assessed through the PANAS scale. Comparisons were made between perceived team collapse games, where teams choked collectively, and lost games, where a team was generally behind but did not report to have experienced a collective collapse. Results showed that running performance in perceived team collapse situations was significantly lower than in lost game situations. Furthermore, although negative affect did not differ prior to a perceived team collapse game, negative affect was significantly higher after a perceived team collapse game than after a lost game. It is assumed that negative emotions and attempts to regulate the emotional reaction (coping with negative affect) reduce athletes' performance capacity, resulting in a lower running performance. Overall, this is the first study to quantify collective team collapse situations in the field but further research is needed.

Keywords: collective team collapse, negative affect, negative emotion, team choking, team performance

Introduction

A sudden collective underperformance occurring during an important game is a situation that every sport team, professional or amateur, typically fears. If the team is unable to return to a regular performance level, it likely experiences a collective team collapse, which can easily lead to defeat. A collective team collapse can be defined as "a sudden, collective, and extreme underperformance of a team within a competition, which is triggered by a critical situation that interferes with the team's interplay, a loss of control of the game, and ultimately the inability of the team to regain their previous performance level within the game (Wergin, Zimanyi, Mesagno, & Beckmann, 2018, p.5)."

Existing research has mainly investigated the collective performance and underperformance of sport teams in terms of positive and negative momentum, whereby positive momentum describes a good

collective performance and negative momentum stands for the collective underperformance of a team (Den Hartigh, Gernigon Van Yperen, Marin, & Van, 2014). Recent studies in this area have investigated the phenomenon with laboratory experiments in which participants were assigned to different teams. The team members then had to perform different tasks in a team competition. The feedback on their performance was manipulated by the experimenters. Den Hartigh et al. (2014) for example had participants row against an apparent opponent on an ergometer, whereby performance of opponents and participants was shown on a screen. Through manipulation of the performances on the screen, the authors found that an apparent positive (i.e., positive momentum) or negative performance (i.e., negative momentum) affected participants' perceptions of collective efficacy and team cohesion. Boss and Kleinert (2015) similarly investigated the impact of false negative performance feedback on participants and their relationship through a balancing task that participants had to perform in pairs of two. Results showed that participants devalued the relationship to the partner as a compensating mechanism.

These initial laboratory studies offered first insights into outcomes of collective underperformance in dyadic teams, but there are some limitations to be mentioned. Den Hartigh et al. (2014) and Boss and Kleinert (2015) only investigated dyadic teams consisting of participants randomly assigned to each other for the duration of the experiment. The results cannot be transferred to teams consisting of more than two athletes, working together over a longer period. Furthermore, participants performed tasks they were not familiar with prior to the study. In order to produce results that can be transferred to team collapse situations in sport teams, sport specific tasks or game situations should be utilised. Another point of critique is that the mentioned studies and others (e.g., Cornelius, Silva, Conroy, & Peterson, 1997; Crust & Nesti, 2006; Gernigon, Briki, Eyekens, 2010; M. I. Jones & Harwood, 2008; Moritmer & Burt, 2014) do not distinguish between a temporary underperformance of a team and a collective team collapse. Wergin et al. (2018) distinguished this temporary underperformance, often referred to as negative momentum (Taylor & Demick, 1994), from the extreme underperformance of a team collapse and the accompanying inability of a team to regain their initial performance level.

Research in the area of actual collective sport team collapse as defined by Wergin et al. (2018) is still at its beginning, but a few qualitative studies have been conducted, revealing underlying causes and mechanisms of team collapse. Apitzsch (2009a) was the first known researcher to qualitatively investigate causes of collective team collapse through semi-

structured interviews with nine male players of the same handball team. In this case study, he found negative thinking, negative emotions, and negative emotional contagion to be factors that needed to be dealt with in order to prevent a team from experiencing a collective collapse. In another qualitative study, Apitzsch (2009b) interviewed four male coaches about their experiences with collective team collapse and reported inappropriate behaviour, failure of a teams' role system, negative communication, a change in the tactics of the opponent, and the opposition scoring points as further causes of a team collapse. Wergin et al. (2018) interviewed 11 male and female athletes from a variety of team sports about their experiences with the phenomenon of team collapse and developed a process model of causes of collective sport team collapse. Within this model, they identified antecedents, critical events, and cognitive, affective, and behavioural outcomes as primary factors causing a team to collapse. Hereby, antecedents represent factors that make the occurrence of a team collapse more likely but do not trigger it, as for example overconfidence or bad preparation. Critical events constitute situations on the court that function as a trigger of the collapse, such as a lost duel or a negative referee decision. According to Wergin and colleagues, these critical events change the team's affect, cognition, and behaviour, for example, through negative emotional contagion or performance contagion between players. In another study, the structure of this model was supported (Wergin, Mallett, Mesagno, Zimanyi & Beckmann, in press). The authors further reported that a collective team collapse typically went along with an immobility of players, who did not move for the ball anymore and emphasised that especially negative emotions and the transfer of negative affect within the team were factors preventing a team from a collapse recovery. The transfer of negative affect within a team is also known as emotional contagion, which can be defined as the transfer of emotion and moods within a group (Barsade, 2002). The association between negative emotions and team performance (Kelly & Barsade, 2001; McEwan & Beauchamp, 2014) as well as a relation between the mood of players and team through emotional contagion (George, 1990; Totterdell, 2000) have been investigated relatively well. According to Kelly and Barsade (2001), group or collective emotion results from the emotion of the individuals in this group. Existing research assumes a connection between individual emotion and collective performance (e.g., Totterdell, 2000) or team collapse (e.g., Apitzsch, 2009a,b; Wergin et al. 2018, in press) as well, which has not been further investigated yet.

While several causes of collective team collapse have been identified, no study so far has measured a collective team collapse in the field or has quantified the causes identified in the described qualitative studies. Thus, the main goal of the present study was to record collective sport team collapse situations and performance decrements that appear to go along with them in the field through quantitative measures. Since negative emotion and negative emotional contagion are mentioned to cause and maintain team collapses in the previously described studies, a further goal was to assess whether positive and negative affect would be affected as well when the team encountered a collective collapse situation on the field.

Materials and Methods

Participants

An a priori G*Power calculation (Faul, Erdfelder, Buchner, & Lang, 2007) indicated that a sample size of 27 would be of sufficient power (0.80) to detect significant differences in the dependent sample at an alpha level of 0.05. Seventy-five male field hockey players between 15 and 34 years of age ($M = 22.69$, $SD = 4.52$), participated in the study. Participants belonged to one of five different field hockey teams competing in a preparation tournament and played in either the third or fourth national division in Germany. Thirty-three of these players reported to have experienced a naturally occurring team collapse in one of their games. The age of this subsample consisted of 33 male players ranging from 15 to 32 years of age ($M = 22.22$, $SD = 5.12$). Prior to participation, athletes were informed about the experimental procedures and the confidential treatment of their data. They were assured the right to quit the experiment at any time without consequences. Participants then signed an informed consent form in accordance with the guidelines of the Declaration of Helsinki. Ethical approval for the study was secured in line with the guidelines of the German Research Foundation (DFG) and the Department of Sport and Health Science at the Technical University of Munich.

Measures

To investigate the relatively complex relationship between emotion and performance, emotion prior to and after the performance should be taken into account (Woodman et al., 2009). Therefore, positive and negative affect were assessed prior to and after each of the seven games of the tournament using the Positive and Negative Affect Scale (PANAS) by Watson, Clark, and Tellegen (1988). Running performance in relation to playing time on the field was measured during the tournament games using a portable GPS device (GPSports, SPI ProX, 15Hz, Canberra, Australia). Sensors were integrated in a short vest, provided by GPSports, that was worn by every player underneath their jersey during all games of the tournament. To download the data from the GPSports system, the manufacturer's proprietary software (Team AMS; GPSports Systems, Australia) was used.

Experimental Conditions

After the end of each game of the tournament, the first and second authors conducted a short individual interview with each player and coach of the teams that had just played. The interviewers read out the definition of collective sport team collapse by Wergin et al. (2018) to participants to give them an idea about the phenomenon of collective sport team collapse. Athletes were then asked whether they believed that their team experienced a collective team collapse in the game they had just finished. Hereby, players and coaches of each team were approached individually to prohibit conformity in their answers. Participants were asked "Would you say that your team experienced a collective sport team collapse in the game you just played?" and were supposed to indicate their answer by stating "yes" or "no". All individual players and coaches had a matching rate of 100% related to their answers. Players and coaches of two teams consistently reported to have experienced a collective team collapse after one game each. These two games

were allocated the condition of “perceived team collapse games”. Individual running performance, i.e. running distance relative to time played, and positive and negative affect of the same players were compared between these perceived team collapse games and “lost games”. Lost games were determined to be games in which a team was generally behind, but where players and coaches did not perceive to have experienced a collective team collapse.

Procedure

Participants were recruited through a field hockey preparation tournament in Germany, consisting of seven games, by asking organisers and coaches of the teams for their consent. Volunteer participants were addressed prior to the tournament and completed an informed consent form, if they agreed to participate. Players under the age of 18 provided informed consent by their parents, if they agreed with participation. They then completed a short demographic questionnaire. Athletes warmed up regularly prior to each game. First and second authors activated the sensors and checked their functioning. In the short break between warm up and start of each game, participants were equipped with the GPSport sensors and filled out a paper-pencil version of the PANAS (Watson, Clark, and Tellegen, 1988). Goalkeepers were not equipped with the portable GPS sensors, as their running performance is typically very low and thus not conclusive for their performance. Participants then played the game without interruptions from our side and filled out the PANAS for a second time right after each game was finished. After filling out the PANAS, GPS sensors were removed from the vests that athletes were wearing and data was secured using the GPSports docking station. After each game, players and coaches were approached individually by first and second authors and the definition of collective sport team collapse by Wergin et al. (2018) was read out to them. They were then asked whether they had perceived the game they just played as a team collapse game. Using the questions described in the experimental conditions section and participants’ answers, the games were declared as either lost games or perceived team collapse games after the end of each game.

At the end of each tournament day, GPS data was downloaded from the GPSports docking station and players running distance in meters was divided by the time they were actually playing in seconds to account for breaks the players typically take in field hockey due to the constant substitution of players. By excluding the time, the players were out of the game, from the time played and by putting the running distance into relation with the actual time played, a more accurate measure of running distance was created.

Results

A dependent samples t-test revealed that, on average, athletes showed a significantly lower running distance relative to time they played in perceived team collapse situations compared to lost game situations, $t(19) = 3.54, p < .01, d = .39$. In relation to positive and negative affect, dependent samples t-tests showed that, on average, athletes’ positive affect was significantly lower after lost games than before lost games, $t(27) = 7.06, p < .001, d = 1.33$, and after perceived team collapse games than before perceived team collapse games, $t(28) = 6.32, p < .001, d = 1.26$.

Complementary, athletes’ negative affect after lost games was significantly higher than before lost games, $t(28) = -4.37, p < .001, d = -.74$, and after perceived team collapse games than before perceived team collapse games, $t(28) = -5.24, p < .001, d = -.96$. Dependent samples t-test comparing perceived team collapse and lost game situations showed that, in average, athletes’ positive ($t(25) = -.61, p > .05$) and negative emotions ($t(27) = -1.40, p > .05$) did not differ before a perceived team collapse game and before a lost game. While in average their positive emotions after a perceived team collapse game did also not differ from their positive emotions after a lost game ($t(25) = -.88, p > .05$), athletes showed significantly higher negative emotions after a perceived team collapse game than after a lost game, $t(25) = -2.39, p < .05, d = .38$.

Discussion

Goals of the study were to quantitatively assess determinants of collective sport team collapse by measuring the running performance of field hockey players in perceived team collapse situations and to assess whether athletes’ positive and negative affect would change in situations where the team perceived to experience a collective collapse. Results showed that athletes ran significantly less in perceived team collapse situations than in lost game situations. This finding confirms a quantifiable difference between the conditions of lost games and perceived team collapse games, that were created based on athletes’ and coaches’ subjective perception. Wergin et al. (in press) similarly found that athletes tended to reduce their movements towards the ball and became immobile when a team collapse occurred. According to the authors, this immobility constituted a factor that maintained the collapse and prohibited the team from returning to their regular running performance level. Wergin et al. further reported that shock and disbelief about the team collapse situation and a fear of losing the game was what “froze” players and caused a decrease in movement. A similar process may have occurred in the current study. It has to be acknowledged that running performance is only one quantitative factor of the individual performance of a field hockey player, which is complemented by additional qualitative factors like passing quote or shooting accuracy. Nevertheless, this is a first step in quantifying the phenomenon of collective sport team collapse, since factors related to or causing collective team collapse have not been explored in a field study so far.

Further results showed an association between affect and perceived team collapse situations compared to lost game situations. Unsurprisingly, positive affect decreased during lost games as well as during perceived team collapse games, while negative affect increased in both conditions. Existing research similarly reports positive emotion to decrease and negative emotion, such as anxiety or anger, to increase in team collapse situations (Apitzsch, 2009a; Wergin et al., 2018, in press). Complementary, positive emotions are reported to be associated with team resilience and good team performance (Morgan, Fletcher, & Sarkar, 2017).

Furthermore, results showed that athletes reported higher negative emotions after a perceived team collapse game than after a lost game, whereby their positive emotions did not differ between perceived

team collapse game and lost game. It appears that negative emotions are more affected by a perceived team collapse situation than by a lost game situation, while positive emotions are not as much affected by perceived team collapse situations. Several studies reported especially negative emotions to be related to individual underperformance (e.g., Hill, Hanton, Fleming, & Matthews, 2009; Barsade & Gibson, 2012; Hill & Shaw, 2013; Mesagno, Harvey, & Janelle, 2012) and underperformance of a sport team (e.g., Kelly & Barsade, 2001; McEwan & Beauchamp, 2014). An association between negative emotions and the phenomenon of collective sport team collapse has only been reported in a few qualitative studies (Apitzsch, 2009a; Wergin et al., 2018, in press). It is assumed that negative emotions affect athletes' cognition through negative thoughts and prohibit the players and the team to gain back their initial performance level (Wergin et al., 2018, in press). Other research in this area argues that the change in arousal that often accompanies an emotional reaction does affect the physical functioning of athletes (M. V. Jones, 2003). One reason for performance to decrease in team collapse situations could therefore be the change in arousal that occurs when players experience negative affect related to the team collapse. M. V. Jones (2003) in this context further describes that emotional regulation strategies could play an important role for performance related issues. Additional research in this area similarly reported a relation between emotional regulation and reduced performance (e.g., Baumeister, Vohs, & Tice, 2007; Muraven, Tice, & Baumeister, 1998, Schmeichel, Vohs, & Baumeister, 2003; Wagstaff, 2014). Muraven, Tice, and Baumeister (1998) for example, found that participants who exerted emotional self-regulation before executing an isometric handgrip dynamometer task performed worse on this task than participants of a control group. Wagstaff (2014) showed that participants, who performed an emotional self-regulation task, completed a cycling time trial slower than participants who did not exert emotional regulation before. The reduced performance in team collapse situation may thus be a result of emotional self-regulation, which is needed when a team collapse, accompanied by negative emotion, occurs. However, this speculative association requires further empirical investigation.

The present research provides further insights into processes that may play a crucial role in team collapse situations with quantitative data from a field study supporting previous findings from qualitative research (Apitzsch, 2009a, b; Wergin et al., 2018, in press). In order to make applicable statements though, the relationship between affect and performance in team collapse situation requires further exploration. While no causality between the two factors can be identified in the current study, future research is challenged to investigate this relationship in more detail. Several starting points and ideas for future research are presented in the following sections.

Limitations

A first limitation is the small size of the subsample of players who reported to have experienced a team collapse situation, which could not be controlled in this field study. It cannot be ruled out that a larger sample size would have revealed more effects. Besides that, the current study included only male athletes. In order

to draw conclusions among gender, female athletes should have been investigated as well. Moreover, emotions have only been measured prior to and after each game, whereby information on the individual as well as collective emotional states of the team during the game is missing. Beyond that, we did only include running distance related to time played as a measure of performance, which constitutes one component of performance, but does not allow drawing of a comprehensive picture of athletes' in-game performance.

Future Research

Overall, more field studies in various types of team sport need to be conducted, which try to assess the collective team collapse phenomenon and its causes through quantitative measures. Such studies should, if possible, include larger subsamples and assess more factors related to collective team collapse. If investigating larger sample sizes, a multilevel analysis should be considered for data analysis. In relation to emotion and performance, athletes' emotions should be assessed throughout the games and more measures of performance should be added, such as qualitative performance data. In the case of field hockey, game analysis could provide qualitative performance data of the players such as passing ratios or ball possessions. Besides that, the relation between positive and negative emotion and performance in game situations should be investigated in future studies. Future research could also engage in the development of criteria to objectively classify game situations as team collapse situations and distinguish them from lost game situations as well as in the development and assessment of team collapse interventions. Since field research in the area of collective sport team collapse is still in its infancy, the previous recommendations are supposed to provide ideas and directions for future research, while taking into consideration the future development of the field of collective team collapse.

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5 General Discussion

The studies conducted within this dissertation project provide initial insights into causes of collective sport team collapse and the underlying processes of its emergence that broaden the currently small field of team collapse research. The first study offered initial insights into causes of collective team collapse and proposed a process model illustrating the development of team collapse based on athletes' perspectives. It furthermore provided a definition of collective team collapse differentiating it from the seemingly similar construct of negative momentum. The second study included further perspectives of causes of team collapse by adding coaches' and sport psychologists' perceptions. It furthermore applied the process model of causes of collective sport team collapse to newly gathered data and adapted it in accordance with coaches' and sport psychologists' explanations. Herby, a more comprehensive picture of the phenomenon was obtained. The third study transferred the results of the first two studies to the field and assessed emotions and running performance throughout naturally occurring team collapses in a field hockey preparation tournament. Emotional states and running performances of athletes were measured in team collapse games and compared to lost games. Thus, study three provided initial ideas for the assessment of collective team collapse in the field and founded the basis for future quantitative field research.

5.1 Team Resilience

While investigating the phenomenon of collective team collapse, several similarities and contrasts between team collapse and team resilience were identified. Team resilience can be defined as “a dynamic, psychosocial process which protects a group of individuals from the potential negative effect of stressors they collectively encounter. It comprises of processes whereby team members use their individual and collective resources to positively adapt when experiencing adversity” (Morgan, Fletcher, & Sarkar, 2013, p. 552). In other words, team resilience is what enables a team to perform under stressful and demanding conditions and is also referred to as mental toughness (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015). The presence of resilience or mental toughness in a sports team has been associated with transformational leadership, shared team leadership, team learning, social identity, and positive emotions (Morgan, Fletcher, & Sarkar, 2015). Resilience has furthermore been discussed as a mediator of the relationship between positive emotions and team performance (Meneghel, Salanova, & Martínez, 2016).

Several findings of the three studies conducted within this dissertation project can be considered complementary to the factors fostering team resilience in Morgan, Fletcher, and Sarkar's (2015, 2017) and Meneghle, Salanova, and Martínez' (2016) studies, as for example key player collapse, negative emotions, or negative emotional contagion, causing or maintaining team collapse. Therefore, team resilience may potentially function as a protecting factor against the occurrence of a collective team collapse. If a team is able to mobilize resources to withstand stressful and high-pressure situations, this may decrease their vulnerability to experience collective team collapse. Similar to the scientific field of team collapse, research on team resilience is just beginning. Future research should therefore consider investigating the relation between team resilience and collective sport team collapse and assess whether resilience training could decrease a team's vulnerability to collective team collapse.

5.2 Flow and Team Collapse

A further construct that could be considered in relation to collective team collapse, is the previously described phenomenon of team level flow. By comparing literature describing flow states in teams with the results of the current study, it appears that flow results in the opposite effect of collective team collapse, thereby enhancing team performance in a game or competition. Thus, collective flow and collective sport team collapse could be imagined as the two ends of a team's performance continuum, whereby a collective collapse is accompanied by low performance and the experience of flow occurs in combination with improved performance.

Furthermore, flow states appear to be related to resilience or mental toughness, which is also associated with an improved performance (Crust & Swann, 2013). Several researchers argue that factors fostering the experience of flow states, such as a desire for challenge, good concentration skills, a high perceived ability, or low competitive trait anxiety (Jackson & Kimiecik, 2008), have also been associated with resilience or mental toughness (Crust, 2008; Crust & Swann, 2013; Shaerd, 2010). One reason for the positive relation between mental toughness and flow may lie in the characteristics of engagement, commitment, and confidence that accompany mental toughness and help athletes to perceive challenges as opportunities rather than as threats, making it more likely for them to experience flow (Crust and Swann, 2013). Crust and Swann further assume that mentally tough athletes may be able to experience flow states more often, because they

are typically more confident and competitive, which is why, in accordance with theories of achievement motivation (e.g., Atkinson, 1957; McClelland, Atkinson, Clark, & Lowell, 1976), they approach situations, where challenges and their skills are in balance, more often.

Many of the factors mentioned by Crust and Swann (2013) that flow and resilience have in common (e.g., improved concentration, perceived ability, confidence, positive emotions, low anxiety) have been shown to be absent or lacking during team collapse situations in the studies of this dissertation project. Since mental toughness is considered a trait fostering the experience of flow states (Crust & Swann, 2013), it could be assumed that mental toughness functions as a separating factor between collective team collapse and team flow, whose presence or absence indicates which of the two phenomena occurs. Accordingly, if mental toughness or resilience is low, a team could more likely experience a collective collapse than when mental toughness is high, which may more likely lead to the experience of team flow. Since these are only suggestions based on the few existing studies in the field of team resilience and on the results of the team collapse studies conducted within this dissertation project, future researchers are highly encouraged to assess this relationship in more detail.

5.3 Model of Accident Causation

Another theory, which could be investigated in the light of collective team collapse, constitutes the model of accident causation by Reason (1990), which became known as the “Swiss Cheese Model” of latent failure. Reason developed the model through investigations of catastrophes caused by human failure, such as the nuclear accidents of Chernobyl or Three Miles Island. The model, illustrated in Figure 3, compares human systems to Swiss cheese, whereby successively arranged cheese slices illustrate safety measures relying on safety systems or on humans.

In an ideal world, the safety measures would be intact and unperforated but in reality they are characterized by holes, constituting human failure or gaps in the safety measures (Reason, 2000). The holes in the safety measures are constantly opening, closing, or changing position. Hazards occurring in one safety measure will not cause a loss, because they are absorbed by other safety measures. If, however, the holes in the different safety measures are aligned, building up a trajectory by active human failures or latent conditions, the hazard is able to pass through and cause an accident (Reason, 2000).

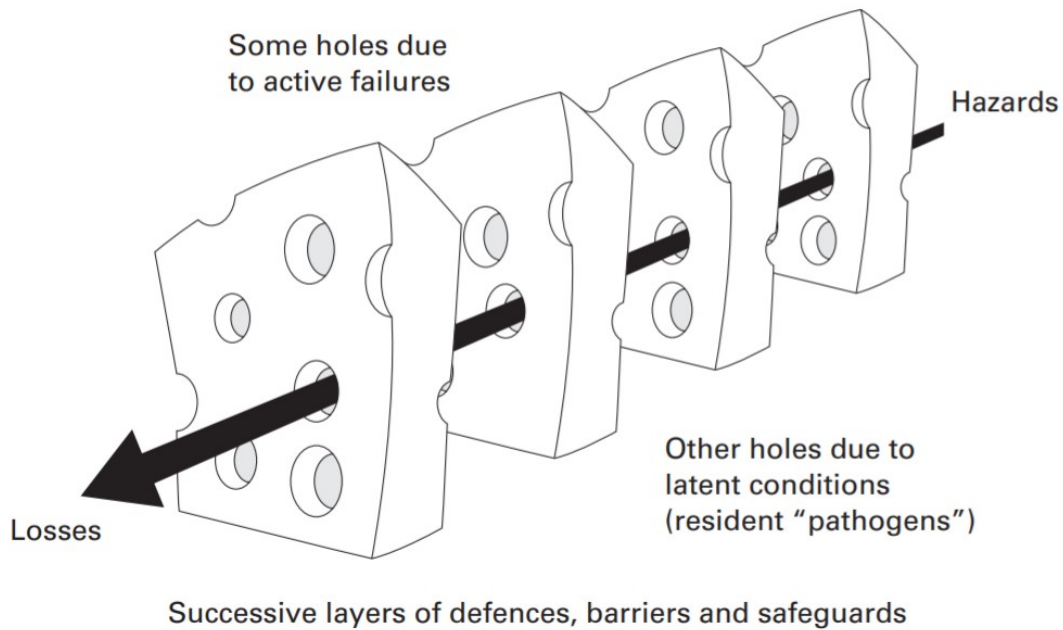


Figure 3. Swiss Cheese Model of accident causation (Reason, 1990). Illustration from Reason, Carthey, and de Leval (2001).

Results of the first two studies of this dissertation project indicate that the Swiss Cheese Model could also be used to explain the emergence of a collective team collapse to some degree. Antecedents of the developed process model of causes of collective sport team collapse are similar to the holes illustrating latent conditions present before an accident happens in the Swiss Cheese Model. Furthermore, several critical events identified in the process model of team collapse, as for example unforced errors occurring during the game, are comparable to the holes representing active failure in the Swiss Cheese Model. The chain of circumstance described by athletes, coaches, and sport psychologists, which seemed to cause the collective team collapse, is perfectly illustrated by the lined up security layers in the Swiss Cheese Model. Collective team collapse appears to differ, however, in relation to its maintaining outcomes. While the Swiss Cheese Model postulates the occurrence of an accident, once a hazard passes through the security layers, collective team collapse appears to occur as a dynamic process in itself. As described in the process model, collective team collapse manifests itself in the negative changes of emotion, cognition, and behavior within the team, which are mutually reinforced and lead to a maintenance of the collapse. Thus, team collapse appears as a negative downward spiral of events rather than as a single event, although it could be argued that the final outcome of a team collapse, the loss of the game, resembles the loss or accident described

in the Swiss Cheese Model. The application of the Swiss Cheese Model to the phenomenon of collective sport team collapse could thus constitute a new perspective for future research in the area of collective team collapse. It could be applied to team collapse data, compared to team collapse processes, and possibly adjusted accordingly, including a dynamic component maintaining collective team collapse. Further perspectives for future research are provided in the following section.

5.4 Future Research Perspective

As mentioned before, research investigating causes and underlying processes of collective sport team collapse is still developing and further studies exploring the phenomenon are needed. A first factor that should be considered by future studies investigating team collapse is specificity of the sport. Results of the studies conducted in this dissertation project indicate that some causes of team collapse or underlying processes of the phenomenon might be sport specific. The category of immobility in the second qualitative study for example has mainly been described by coaches and sport psychologists working with volleyball teams and was quantitatively assessed in field hockey in study three. It is possible that several causes of team collapse reported in this project include sport specific components. Thus, further research should consider investigating the presented causes of collective team collapse separately in specific types of team sports.

Another important question to be answered by future studies constitutes the causal relation between cognitive, affective, and behavioral outcomes maintaining team collapse. While the first study merely distinguished between the three factors, results of study two indicated behavioral outcomes of team collapse to occur after cognitive and affective outcomes. Still, a temporary distinction between cognitive and affective outcomes based on the data was impossible. Thus, the relations between the three factors should be investigated further through qualitative or quantitative measures. A starting point for future studies could be focus group discussions with athletes, coaches, and sport psychologists discussing the relation between the factors.

Besides that, the current dissertation project demonstrates the possibility of relating the phenomenon of collective team collapse to other phenomena and models in the area of team dynamics. For example, established models of work and organizational psychology, such as the Swiss Cheese Model, could be applied to the phenomenon of collective team

collapse to gain a better understanding of its underlying mechanisms. Results of the current studies further indicate a possible relation between collective team collapse, flow states in teams, and team resilience, whereby team resilience could be considered as a protecting factor against team collapse, fostering the experience of team flow. Thus, future research could empirically investigate this suggested relationship between team collapse, team resilience, and team flow.

Several practical implications for the prevention of collective team collapse have been provided in the first two studies. Therefore, future research should further consider the development of interventions based on the suggestions of the first two studies of this project. Once interventions have been developed, they need to be applied and tested in the field in a variety of team sports.

The three studies described in this dissertation project aimed to measure a phenomenon occurring on the team level through individual measures. Team level processes, such as emotional contagion or performance contagion between athletes, were qualitatively investigated through individual perceptions of athletes, coaches, and sport psychologists and quantitatively explored by assessing athletes' individual performance (GPS data) and emotions (PANAS scale). Future research should therefore aim to measure collective team collapse on a team level as well, for example through multilevel modeling. Team resilience, for example, is already measured on different levels of analysis (Morgan et al., 2017) based on the assumption that team resilience is more than the collection of resilient individuals (Morgan et al., 2013, 2015). Similarly, studies one and two of the current project imply that team collapse is more than the sum of individual choking experiences of several athletes at the same time, due to the team processes described by athletes, coaches, and sport psychologists. As most team phenomena include a team level and an individual level, researchers exploring team dynamics should consider how to best measure their phenomena and whether an individual or team level assessment or a combined assessment is most appropriate in relation to their research questions and study design.

6 Conclusion

This dissertation thesis provides initial insights into causes of collective sport team collapse and offers first explanations for the occurrence of dramatic team collapse events in sport, such as the defeat Brazil experienced in the semi-final of the soccer world-cup 2014. Collective team collapse is defined in contrast to similar constructs and phenomena and a process model, explaining the emergence of collective collapses in various sports, which has to be supported or adjusted by future studies, is provided. A first attempt to measure collective sport team collapse in the field has been made, whereby the importance of negative emotions and decreased individual performance in team collapse situations was supported. Further research investigating causes of and developing interventions for collective team collapse is needed. The suggested implications, based on the results of the studies, offer scientists and practitioners in sport as well as in other areas of teamwork (e.g., organizational settings) a starting point for the development and assessment of team collapse interventions.

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8 Attachment

8.1 Interview Guides of Studies 1 and 2

Interview Guide Study 1

Short colloquial description of team collapse read out to the participant: “A collective team collapse is the moment or process, when the performance of your team unexpectedly decreases more than normal. It is the situation, when your team experiences a significant performance collapse during a competition / game. It is the moment or process when ‘nothing works anymore’ within your team during a specific competition / game.”

0. Describe a team collapse that happened during the last 12 months while you were playing.

(If a person cannot recall a team collapse within the last 12 months: Describe a team collapse that happened during the last 5 years while you were playing.)

Questions about the Team Collapse

1. What kind of game/competition was it?
2. At what point within the game did the team collapse occur?
3. How long did the collapse last?
4. How many players were involved?
5. What role within the team did the involved players fulfill?
6. What happened within the team during the team collapse?
7. Describe the atmosphere within the team during the course of play.

Impact of Team Collapse on Players and Game

8. What happened within the team during the team collapse?
9. Describe the atmosphere within the team during the course of play.
10. To what extent did the team collapse influence the further course of play?
11. To what extent did the team collapse influence the next training / game?
12. How do you react to team collapse instantly and after the game?

Influencing Factors of Team Collapse

13. In your opinion, what were the influencing factors for the team collapse?
14. Is there anything else you would like to mention regarding the topic of team collapse?

Interview Guide Study 2 adapted from Wergin et al. (2018)

Short colloquial description of team collapse read out to the participant: “A collective team collapse is the moment or process, when the performance of your team unexpectedly decreases more than normal. It is the situation, when your team experiences a significant performance collapse during a competition / game. It is the moment or process when ‘nothing works anymore’ within your team during a specific competition / game.”

- 0.** Describe a team collapse that happened during the last 12 months while you were coaching.
(If a person cannot recall a team collapse within the last 12 months: Describe a team collapse that happened during the last 5 years while you were coaching.)

Questions about the Team Collapse

- 1.** What kind of game/competition was it?
- 2.** At what point within the game did the team collapse occur?
- 3.** How long did the collapse last?
- 4.** How many players were involved?
- 5.** What role within the team did the involved players fulfill?
- 6.** What happened within the team during the team collapse?
- 7.** Describe the atmosphere within the team during the course of play.

Impact of Team Collapse on Players and Game

- 8.** What happened within the team during the team collapse?
- 9.** Describe the atmosphere within the team during the course of play.
- 10.** To what extent did the team collapse influence the further course of play?
- 11.** To what extent did the team collapse influence the next training / game?
- 12.** How do you react to team collapse instantly and after the game?

Influencing Factors of Team Collapse

- 13.** In your opinion, what were the influencing factors for the team collapse?
- 14.** Is there anything else you would like to mention regarding the topic of team collapse?

8.2 List of Publications and Submissions

- Wergin, V. V., Zimanyi, Z. & Beckmann, J. (under review). A field study investigating running performance and emotions of field hockey players in team collapse situations. *International Journal of Sport and Exercise Psychology*.
- Wergin, V. V., Mallett, C. J., Mesagno, C., Zimanyi, Z. & Beckmann, J. (2019). When you watch your team fall apart – Coaches' and sport psychologists' perceptions on causes of collective sport team collapse. *Frontiers in Psychology, 10*, 1331. doi:10.3389/fpsyg.2019.01331
- Mesagno, C., Beckmann, J., Wergin, V. V., & Gröpel, P. (2019). Primed to perform: Comparing different pre-performance routine interventions to improve accuracy in closed, self-paced motor tasks. *Psychology of Sport and Exercise, 43*, 73-81. doi:10.1016/j.psychsport.2019.01.001
- Wergin, V. V., & Beckmann, J. (2019). Volitionale Aspekte sportlichen Handelns. In Emrich, Krüger, Güllich, Hackfort, & Pierdzioch (Hrsg.) *Sport in Kultur und Gesellschaft: Handbuch Sport und Sportwissenschaft*. doi: 10.1007/978-3-662-53385-7_40-1.
- Wergin, V. V., Zimanyi, Z., Mesagno, C., & Beckmann, J. (2018). When suddenly nothing works anymore within a team: Causes of collective sport team collapse. *Frontiers in Psychology, 9*, 2115. doi:10.3389/fpsyg.201

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M.Sc. Vanessa Wergin
Wissenschaftliche Mitarbeiterin

Lehrstuhl für Sportpsychologie
Fakultät für Sport- und Gesundheitswissenschaft
Technische Universität München
Campus D - Uptown München
Georg-Brauchle-Ring 60 / 62
80992 München

Telefon: +49(0)89-289-24547

Telefax: +49(0)89-289-24555

E-Mail: vanessa.wergin@tum.de

Web: <http://www.sportpsychologie.sg.tum.de/>

Wergin, Vanessa

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