ORIGINAL RESEARCH REPORT

What Drives Our Emotions When We Watch Sporting Events? An ESM Study on the Affective Experience of German Spectators During the 2018 FIFA World Cup

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There is ample evidence that watching sports induces strong emotions that translate into manifold consequential behaviours. However, it is rather ill-understood how exactly spectators' emotions unfold during soccer matches and what determines their intensity. To address these questions, we used the 2018 FIFA World Cup as a natural quasi-experiment to conduct a pre-registered study on spectators' emotional experiences. Employing an app-based experience-sampling design, we tracked 251 German spectators during the tournament and assessed high-resolution changes in core affect (valence, activation) throughout soccer matches. Across the three German matches, multi-level models revealed that all spectators exhibited strong changes on both affective dimensions in response to Germany's performance. Although fans experienced slightly more intense affect than non-fans, particularly during losses, this moderating effect was very small in comparison to the magnitude of the affective fluctuations that occurred independent of fan identity. Taken together, the findings suggest group emotions (collectively felt emotion irrespective of individual affiliation) rather than group-affiliation based emotions (individually felt emotion because of an affiliated group), as the dominant process underlying spectator affect during the 2018 FIFA World Cup.

Keywords: affect; soccer World Cup; experience sampling methodology; group emotion; group-affiliation based emotion; emotional contagion; shared attention; affective disposition

Introduction

When South Korea beat incumbent world champion Germany at the 2018 FIFA World Cup, they made history: Never before had the German national team been eliminated during the first stage of the World Cup. For millions of German spectators this was not just any loss. Soccer is deeply rooted in German culture and the FIFA World Cup represents one of the most ritualised events in German society (von Scheve, Beyer, Ismer, Kosłowska, & Morawetz, 2014). Germany is no exception. Soccer is the world's pre-eminent team sport (Ashton, Gerrard, & Hudson, 2003) and along with the Olympic Games, the FIFA World Cup is one of the most globalised, prestigious, and socially electrifying events in the world (Giulianotti & Robertson, 2007). The fascination of soccer has long spread far beyond its traditional strongholds in South America and Europe, with more US-Americans watching the 2014 FIFA World Cup than the same year's NBA finals (Atwell Seate, Na, Iles, McCloskey, & Parry-Giles, 2017). Across the globe, more than 3.2 billion people watched the 2014 FIFA World Cup and more than 1 billion watched the final between Germany and Argentina (1–0; FIFA, 2015).

Soccer not only reaches billions of spectators but also affects them on various levels. Indeed, while wins of one's identified national soccer team have been related to enhanced national pride (Maennig & Porsche, 2006), greater overall spending and socialising behaviour (Jones, Coffee, Sheffield, Yangüez, & Barker, 2012) as well as more favourable assessments of one's own economic situation and government satisfaction (Schramm & Knoll, 2017), there appears to be a dark side too. For instance, team losses have been linked to heightened rates of attempted suicides (Steel, 1994) and psychological distress (Banyard & Shevlin, 2001). In a rare example of extreme escalation, riots during a soccer match between El Salvador and Honduras even led to a temporary suspension of diplomatic relations between the two countries (Lever,

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1969). Furthermore, soccer also appears to substantially affect the stock market with price drops corresponding to billions of dollars following defeat of the respective national soccer team (Ashton et al., 2003; Edmands, García, & Norli, 2007).

Watching a soccer match can also strongly affect spectators' emotions (Jones et al., 2012; Kerr, Wilson, Nakamura, & Sudo, 2005; Knoll, Schramm, & Schallhorn, 2014; Leach & Spears, 2009; Stieger, Götz, & Gehrig, 2015), which in turn may cause intense physical and psychological reactions (Edmans et al., 2007; Lee & Kim, 2013; Wilbert-Lampen et al., 2008). For example, prior research suggests that the stress that comes with watching a soccer match substantially increases the incidence rates of acute cardiovascular events (i.e., heart attacks, cardiac arrhythmia) among hospitalised patients (Wilbert-Lampen et al., 2008). Such effects seem to be especially pronounced after close matches and losses of one's own team (Kirkup & Merrick, 2003; Witte, Bots, Hoes, & Grobbee, 2000). But how exactly do the dynamic trajectories of spectators' emotional experiences unfold during soccer matches and what determines their intensity?

The Present Study
To address this question, the current research applied an app-based experience sampling method (ESM) design to monitor dynamic emotional trajectories among soccer spectators during the three group-stage matches of the German national soccer team, as well as 22 reference games of the 2018 FIFA World Cup in Russia. Special effort was made to gather a fine-grained temporal resolution, assessing core affect (arousal, pleasure; Russell, Weiss, & Mendelsohn, 1989; Russel, 2003) before, during, and after each selected game.

Beyond a purely descriptive approach, designed to capture the development of spectator affect over the course of the respective soccer matches, our research also sought to shed light on social psychological factors that are assumed to determine the magnitude of spectators' affective responses. In so doing, our work was guided by two different theoretical perspectives on emotion. On the one hand, group-affiliation based emotion accounts assume that emotions occur at the individual level and are a direct consequence of the extent to which the individual spectator identifies with the team they watch, which we will label process A (Goldenberg, Halperin, van Zomeren, & Gross, 2016; van Zomeren, Spears, & Leach, 2008).

On the other hand, group emotion accounts assume that emotions occur at the collective level and are the same for all members of a group of spectators, regardless of individual differences in the extent to which spectators identify with the team that they watch, which we will label process B (Barsade, 2002; Bartel & Saavedra, 2000; Bar-Tal, Halperin, de Rivera, 2007).

Process A (Group-Affiliation Based Emotions)
Among the accounts that assume group-affiliation based emotions, the disposition theory of sports spectatorship (Bryant, Comisky, & Zillmann, 1981; Zillmann, Bryant & Sapolsky, 1989) is probably the most prominent. Drawing on social identity theory (Tajfel, 1974, 1982), the disposition theory of sports spectatorship assumes that individuals use membership in social groups to satisfy a need for belonging and to enhance self-esteem. Within the context of organized sports, membership manifests in team identification (Bryant et al., 1981; Zillmann et al., 1989). Accordingly, the theory posits that the emotional reactions elicited by a sporting event are a function of that event's content and the spectator's feelings towards the team.

Thus, at soccer matches, fans should experience group-affiliation based emotions (i.e., emotions that are felt because of the performance of the group – or in this case team – that one identifies with), whereas spectators who are indifferent to the teams should not experience affective reactions. The disposition theory of sports spectatorship is supported by evidence from studies of fans of various sports (e.g., Banyard & Shevlin, 2001; Hirt, Zilllmann, Erickson, & Kennedy, 1992; Knoll et al., 2014), ranging from women's soccer (Schramm & Knoll, 2017) and US college basketball (Wann, Dolan, McGeorge, & Allison, 1994; Zillmann, et al., 1989) to Super Bowl spectators (David, Horton, & German, 2008). Moreover, while the disposition theory of sports spectatorship is the most empirically supported and most prominent explanatory framework postulating group-based emotions in the sports spectator literature, others derive very similar predictions.

For instance, according to cognitive appraisal theory the subjective evaluation of personal relevance, rather than the objective properties of an event per se, elicit emotion (Lazarus, 1982, 1991, 1993). It thus posits that all emotional states are preceded by a complex cognitive evaluation of personal significance and that only information that is perceived as personally relevant will evoke an emotional response. In the given context, relevance is reflected in the degree of a spectator's psychological attachment or identification with a team (Madrigal, 2008). In keeping with social identity theory (Tajfel, 1974, 1982), and the disposition theory of sports spectatorship (Bryant et al., 1981; Zillmann et al., 1989), strong psychological attachment enables an extended notion of the self, wherein a team's successes and failures are internalised by identified fans and subsequently treated as personal success and failures (Hirt et al., 1992; Madrigal, 2008).

Furthermore, cognitive appraisal theory assumes that while personal relevance determines the magnitude of an emotional response, motivational goal congruence determines its valence. In the present context, the motivational goal of identified spectators, i.e. German fans, is to see their team succeed. Thus, a German victory would constitute a result that is congruent with the individual fan's goal and hence result in positive affect, whereas a German defeat would constitute an outcome that is incongruent with the identified spectator's goal and hence result in negative affect. Meanwhile, neutral spectators who are indifferent to the results of the German matches would neither appraise them as personally relevant or important, nor would they have a personal stake or motivational goal and in turn no emotional response should be observed (Lazarus, 1991, 1993).

Taken together, with respect to the 2018 World Cup, process A would predict that a German win should

result in heightened pleasure and arousal among self-proclaimed fans of the German team, whereas a German loss should lead to reduced pleasure and heightened arousal (see **Figure 1**, group-affiliation based emotion). Importantly, this pattern would only emerge among actual fans, whereas spectators without an emotional affiliation with the German team (i.e., non-fans) should not be particularly affected by the results of the German team (neither pleasure, nor arousal; see **Figure 1**, group-affiliation based emotion, last three bar charts).

Process B (Group Emotions)

Meanwhile, a group emotion perspective would expect a pattern with identical affective trajectories for fans and non-fans. In the sports spectator literature, the most prominent account subscribing to this view is emotional contagion theory (Hatfield, Cacioppo, & Rapson, 1993), which predicts that spectators "catch" the emotions of the spectators around them, regardless of whether they identify as fans and support the German team. The idea that emotional contagion underlies sport spectators' experiences during live events has been around for over a century. Indeed, Howard (1912), for example, argued that sports spectator crowds are particularly susceptible to affective amplification, which he called emotional conductibility.

Another theory of group emotion that has recently been gaining momentum is shared attention (Shteynberg, 2015). The perception of a group of individuals to synchronously co-attend to the same object or stimulus is assumed to give rise to a unique psychological perspective (Shteynberg, 2010, 2015, 2018). In turn, the self perceives the world from the collective angle of 'our attention.' Objects or information that receive shared attention also receive deeper cognitive processing (Shteynberg, 2015, 2018), which in turn increases their psychological impact
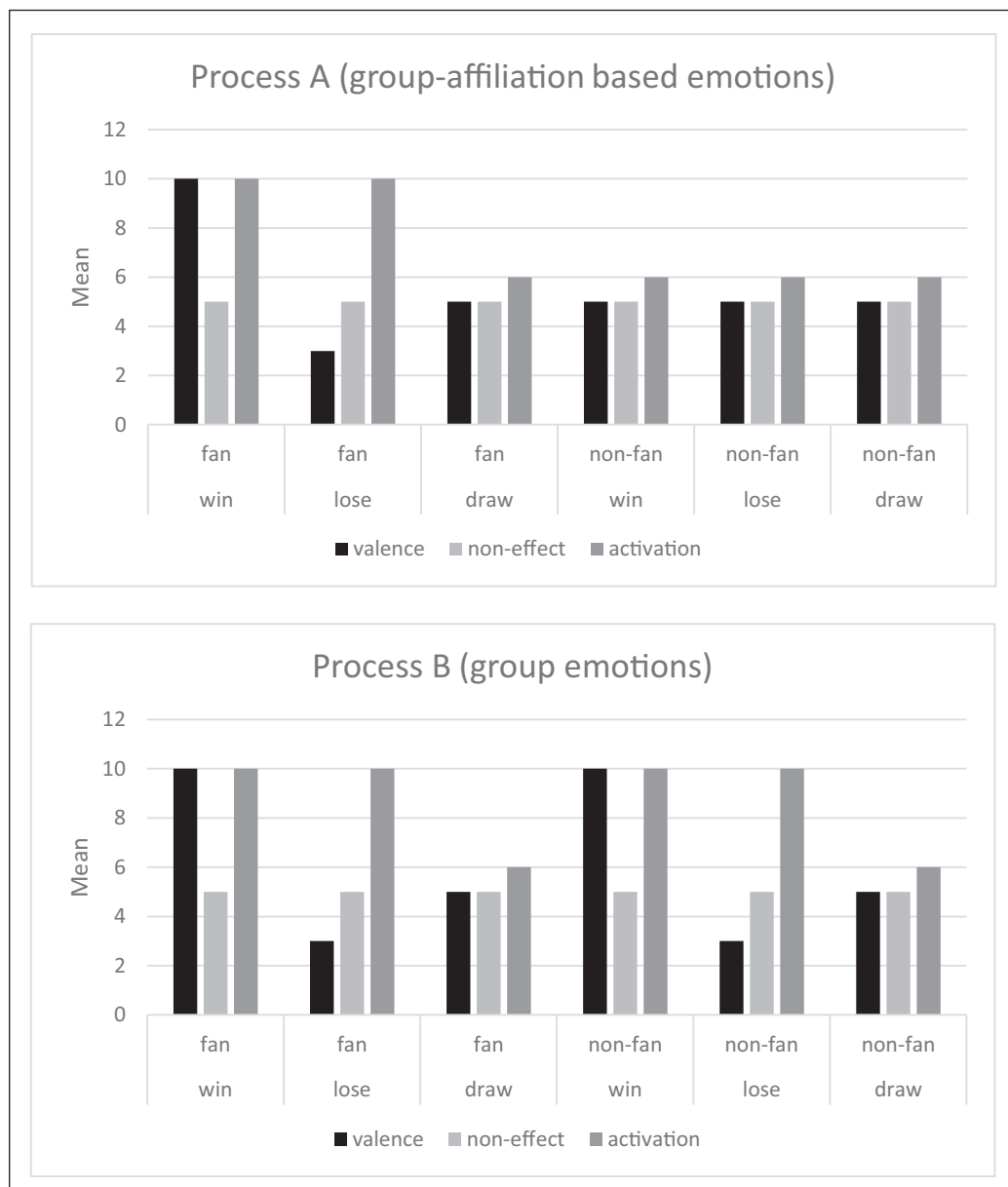

Figure 1: Hypotheses regarding valence and activation based on group-affiliation based emotions and group emotions (non-effect = baseline measures from reference matches).

on the self (Shteynberg, Bramlett, Fles, & Cameron, 2016). As such, shared attention leads to various cognitive, behavioural, and affective outcomes, the most relevant in the present context being emotional amplification (Lin, Keegan, Margolin, & Lazer, 2014; Shteynberg, 2018) and mood convergence (Shteynberg, Hirsh, Galinsky, & Knight, 2014). Importantly, unlike joint attention accounts, shared attention is rooted in the abstract knowledge of collective attention (Shteynberg et al., 2016) and does not presuppose the physical presence of others (Shteynberg, 2015, 2018). Indeed, while shared attention has never been studied in the context of large-scale sports events they have repeatedly been cited as ideal occasions to evoke shared attention (Lin et al., 2014; Shteynberg, 2015) due to spectators' awareness that millions of other are watching the same event at the same time. This appears to be especially salient in the case of FIFA World Cup live broadcasts, which consistently attract some of the largest audiences worldwide (Knoll et al., 2014) and routinely exceed 25 million viewers in Germany alone (Maennig & Porsche, 2008; Statista, 2018a, b).

Supporting these theories on widespread group emotions, recent studies in Germany and the Netherlands suggest that mega-sports events, such as the FIFA World Cup, may have broader ramifications for the emotional state of entire nations, including citizens that do not support the respective national team (Elling, van Hilvoorde, & van den Dool, 2014; Maennig & Porsche, 2008).

Research Goals and Hypotheses

Against this backdrop, the present study draws from both theoretical perspectives to advance a better understanding of the trajectories and determinants of spectators' affective responses to soccer matches during the FIFA World Cup. As such, our research pursues two goals. First, we aim to provide a fine-grained and rich description of spectators' affective responses, i.e., changes in arousal and pleasure, during soccer matches. This also serves as an in-built replication of prior research showing that wins of one's team are associated with heightened pleasure (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Stieger et al., 2015) and losses of one's team with decreased pleasure (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Leach & Spears, 2009), while arousal rises as the score moves away from 0–0, reflecting heightened suspense and excitement (Lehne & Koelsch, 2015).

Second, as the primary contribution of our study, we aim to zoom in on these affective responses and relate them to individuals' identification with the German national team to see which of the two afore-mentioned processes appears more likely to shape spectators' affective experiences.

Here, we hypothesise:

H1: If process A (group-affiliation based emotions) is more likely, the within-person changes in pleasure and arousal described above should only be observed among participants that identify as fans of the German national team. No within-person differences in pleasure or arousal should be observed among non-fans.

H2: If process B (group emotions) is more likely, the within-person changes in pleasure and arousal described above should be observed among all spectators regardless of their identification with the German national team. The corresponding hypotheses are schematically displayed in **Figure 1** and were pre-registered on the Open Science Framework (https://osf.io/r7vxp/register/565fb3678c5 e4a66b5582f67). Please note, that the sole purpose of **Figure 1** is to illustrate the expected direction of the effects, without aiming to make any concrete predictions about the magnitude of any effects.

Methods

Recruitment

In a previous ESM-study conducted in Germany during the 2014 FIFA World Cup (Stieger et al., 2015) we consistently found substantial effects of wins of the German national soccer team on spectators' well-being (Cohen's d = 0.49 and 0.64; small: 0.2, medium: 0.5, large: 0.8; Cohen, 1988). Hence, we assumed medium effects on valence and activation in the present study (d = 0.5). As the incumbent world champion, Germany was expected to go far in the competition (Zeileis, Leitner, & Hornik, 2018) so we expected the team to advance at least to the semi-finals, and hence based our power analysis on a best-case scenario of n = 7 games. Applying a conservative power calculation for multi-level models (Twisk, 2006; p.123) suggested a minimum sample of 84 participants (α = .05, power = 95%, n = 7 retests, assumed ICC = 0.3, effect size d = 0.5).

A three-pronged recruitment effort was carried out, deliberately targeting the general public rather than soccer fans only. First, the third author recruited participants at his home institution, the University of Mannheim, Germany. Second, we advertised the study on various social media platforms (e.g., Facebook, reddit) and the alumni network of the German National Academic Foundation. Third, we partnered with DIE ZEIT, one of Germany's most trusted and renowned media outlets (Reuters Institute, 2018) and most widely read weekly newspapers (Allensbach Institute for Public Opinion Polling, 2018). Mirroring prior research that yielded a large and representative sample through collaborating with a New Zealand national newspaper (Terry & Braun, 2013), the study was featured in an online article which included a direct link to a project webpage, where visitors could sign up to participate. Irrespective of the recruitment method, to be eligible for the study, participants had to be at least 18 years old. As the study app was only available in the Google Play store, participants had to use an Android smartphone. Lastly, while it was made clear that participants did not need to support the German national soccer team, they had to confirm that they were planning to watch at least some and ideally all German matches at the 2018 FIFA World Cup.

Participants

The recruitment strategy resulted in a sample of members of the general public who installed the freely-available app, described below, on their Android smartphones.

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In sum, 238 participants filled in the demographic data and 251 provided at least two data points during the longitudinal phase. Of these, 43% were female, 53% were male, and 4% chose not to disclose their sex. Participants were predominantly of German nationality (96.9%) and on average 29 years old ($SD = 10$; $Median = 26$). Regarding highest completed level of education, 3.4% had finished apprenticeships, 37.8% had obtained a high school certificate, 4.2% a university of applied sciences degree, 44.1% a university degree, and 9.7% a PhD (0.8% either had secondary school or not completed any formal education).

Procedure

The research project was carried out across a timeframe of 30 days (15th of June 2018 until 15th of July 2018) during the 2018 FIFA World Cup in Russia. Data collection started two days before the first match of the German national soccer team against Mexico (0–1; 17th of June 2018) to give participants time to get used to the study procedure and ended on the day of the World Cup final (France – Croatia, 4–2; 15th of July 2018).

After having read the informed consent sheet, which outlined the research project's aims and procedures, participants downloaded and installed the science-app described below. Upon the study launch, participants completed a short survey. They were asked to consent to the terms and conditions of the study and answer a brief questionnaire that assessed sociodemographic variables as well as support and national identification during the 2018 FIFA World Cup. Two days later, the German team's first appearance in the tournament marked the beginning of the longitudinal ESM-based data collection.

We assessed the two components of core affect, i.e. valence and activation, also referred to as pleasure and arousal, each on bipolar visual analogue scales (range: 0 to 100), thus recreating the affect grid (Russel et al., 1989; Russel, 2003). Participants were also asked to report whether they were alone or in company (in 58.9% of measurement occasions participants stated being in company) and whether they were watching the respective soccer match (Germany – Mexico: $n = 143$; Germany – Sweden: $n = 176$; Germany – South Korea, $n = 173$; average number of viewers for reference games: $n = 50$). ESM-assessments took place 15 minutes before kick-off, during the half-time break and after the game. These intervals had been chosen for the following two reasons: (1) to capture the dynamic development of affect throughout the respective matches rather than relying on single assessments after the game as had been done in prior research (Jones et al., 2012; Stieger et al., 2015); (2) to capitalise on naturally occurring breaks that would not disrupt the sports consumption and hence result in higher response rates (David et al., 2008).

Overall, we followed common recommendations regarding the length and frequency of ESM-assessments, to keep participant burden at a tolerable level (Shiffman, Stone, & Hufford, 2008; Wrzus & Meehl, 2015). In addition to the German matches which were the primary focus of the present research ($n = 3$), we mirrored prior research (Yu & Wang, 2015) and also measured affect during 22 reference games without German participation. Upon completion of the longitudinal ESM data collection after the World Cup final, another questionnaire was administered. Participants were once again asked to report demographics (sex, age, nationality, highest educational level) and the questions tapping support for the German soccer team. The questionnaire also measured additional constructs that are not part of the present investigation, e.g. the Big Five.

The study was conducted in accordance with the Declaration of Helsinki and ethical guidelines of the Department of Psychology, University of Mannheim where the study was approved to be registered for course credit after a streamlined ethical screening procedure. Participation was completely voluntary and participants were made aware that they could revoke their consent and withdraw from the study at any time without any personal disadvantages arising from it. While participation was generally unpaid, eligible participants could request course credit from the University of Mannheim. All participants also received a broad summary of descriptive results upon conclusion of the study and were invited to take part in a lottery with the chance to win €200. The entire study was run in German.

Materials

Core Affect

At every ESM-assessment, core affect was measured. Herein we followed the definition of core affect as a neurophysiological state that captures non-reflective, consciously accessible elementary feelings of subjective valence and activation (Feldman Barrett & Russell, 1999; Russell, 2003). While valence describes a dimension of hedonic tone, activation reflects energy and mobilization (Feldman Barrett & Russell, 1999). Moreover, both dimensions are conceived as bipolar ranging from unpleasant to pleasant and sleepy to activated, respectively, which has received strong empirical support (Feldman Barrett & Russell, 1999; Russell, 1980, 2017). In keeping with this definition and prior research that underscored the suitability of the affect grid for ESM-studies (Kuppens, van Mechelen, Nezlek, Dossche, & Timmermans, 2007; Lathia, Sandstrom, Mascolo, & Rentfrow, 2017) the two experiential dimensions of core affect were measured via bipolar visual analogue scales (unpleasant–pleasant; sleepy–activated; range 0 to 100). Of note, valence is also often referred to as pleasure, whereas activation is also known as arousal. Hence the terms are used interchangeably in the present article.

Sociodemographic Information

Participants were asked to report their nationality, sex, age as well as highest completed education status (ranging from "did not complete primary school" to "PhD").

Support for the German team

Three questions were employed to gauge support for the German national soccer team and were administered during the pre- and post-ESM-questionnaires. First, to allow for the support of other teams, participants were asked which team, if any, they would root for at

the 2018 FIFA World Cup ("Which soccer team do/did you support at the 2018 FIFA World Cup?"). Second, participants were asked to indicate the extent to which they identified with the country that they supported. ("The country I support/supported during the 2018 FIFA World Cup is part of my identity." [Visual Analogue Scale (0–100): do not agree at all; totally agree]). Third, in keeping with previous research (Stieger et al., 2015), participants reported the intensity of their support for their respective team ("How strongly do/did you support your chosen soccer team during the 2018 FIFA World Cup?" [Visual Analogue Scale (0–100): not at all; very much]).

Science-App

When the app was first opened, a one-time screen appeared with a detailed outline of the study's terms and conditions (all questionnaires and app screens can be found under https://osf.io/gm2w9/). In keeping with prior research (Götz, Stieger, & Reips, 2019), providing informed consent by explicitly agreeing to these terms was made a prerequisite to proceed to the study. Upon providing informed consent, the app sent an automatic prompt to answer a short battery of questions on sociodemographic information as well as support and identification during the FIFA 2018 World Cup. After that, the app automatically displayed the ESM-items (i.e., bi-dimensional affect grid, indication of whether the current game was watched and whether participants were in company) as long as the tournament lasted. Moreover, in-app reminders were employed to prompt participants to complete the ESM assessments. After the World Cup final, which also marked the end of the study, a post-ESM questionnaire was administered via the app, assessing the Big Five, as well as support and identification during the FIFA 2018 World Cup. To safeguard participants' anonymity and personal rights, the entire communication between the app and the back-end server employed a secure protocol (i.e., https).

Analysis Strategy

To address our research questions, we adopted a two-pronged analysis strategy. In step 1, we charted the development of pleasure and arousal for each of the games with German involvement, as well as the average of reference games, which served as a benchmark for comparison purposes.

In step 2, we applied multilevel modelling, nesting measurement time points (level 1) in participants (level 2; Nezlek, 2008). This complemented step 1, providing a second, more rigorous replication of previous research on the effects of soccer outcomes on spectator affect (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Leach & Spears, 2009; Lehne & Koelsch, 2015; Stieger et al., 2015). More importantly, it further allowed us to gain a better understanding of which emotional process was more likely to drive spectators' affective reactions, by examining H1 (*if process A is more dominant, within-person changes in pleasure and arousal following the performance of the German team should only be observed among fans of the German national team, whereas no within-person changes*

should be observed among non-fans) and H2 (*if process B is more dominant, within-person changes in pleasure and arousal following the performance of the German team should be observed among all spectators, regardless of their identification with the German team*). Herein, substantial significant effects of fan identity on pleasure and arousal would be interpreted as support for process A and hence H1, whereas non-significant or comparatively small effects would be interpreted as support for process B and hence H2.

Of note, fan identity was determined by examining the relationship between the variables measuring support for the German national team. Intensity of support ($M = 58.2$, $SD = 23.7$) and identification ($M = 61.2$, $SD = 27.9$) were correlated ($r = .492$. $p < .001$) and a Principal Components Analysis (PCA) revealed a clear one-factor solution (explained variance 74.6%). Therefore, we calculated a mean score representing the degree to which a person is a fan of the respective team (fan identity; $M = 59.5$, $SD = 22.5$). Participants who stated that they supported another team ($n = 18$) were retained in the sample, but their value on the newly extracted fan identity variable was set to 0. For descriptive purposes, we calculated a median-split (fan vs. non-fan) to better visualize the effects in step 1. However, for the principal MLM analyses in step 2 we used the mean score. During step 2, for power reasons, we did not analyse the data separately for each game with German involvement (see *Deviations from Pre-registration* section for further details). Instead, we calculated a new variable representing the goal difference for each game and each time point (*half-time*: Germany vs. Mexico and Germany vs. Sweden: goal difference = –1; Germany vs. South Korea: goal difference = 0; *after the game*: Germany vs. Mexico: goal difference = –1; Germany vs. Sweden: goal difference = 1; Germany vs. South Korea: goal difference = –2).[1] For *reference games*, participants that had not seen the respective German game, and for the measurements taken *before the match* we set the goal difference to 0. For valence, combining these data points appears justified, as no significant differences in valence ratings were found between these three categories ($\eta^2_p = .008$, n.s.). For arousal, there were differences in ratings before the match compared to reference games/those who did not watch the game ($\eta^2_p = .055$, sign.), therefore, we separated both groups into *before the match* (goal difference = 0) and *reference games* (goal difference = 10). As goal difference was treated as a factor in the analysis of arousal, using 10 for reference games was not a problem.

Deviations from Pre-Registration

Before collecting any data, we pre-registered the current research project on the Open Science Framework (https://osf.io/r7vxp/register/565fb3678c5e4a66b5582f67). While we have generally adhered to the pre-registration, there are a few minor, yet noteworthy deviations that should be mentioned.

Our pre-registration originally stated that we would test two emotional mechanisms against each other, namely emotional contagion and affective disposition. As the

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project progressed, through talking to other researchers and thanks to the helpful feedback of an anonymous reviewer, it became clear to us, that these labels might be too narrow, as other conceptually similar, yet distinct processes could also be at work (e.g. shared attention). In recognition of that, we decided to use broader labels, that would be inclusive while maintaining the crucial difference (i.e. whether or not fan identity determines the magnitude of affective responses during soccer matches) between the processes that was highlighted in the pre-registration. As such, we settled for the established terms group-affiliation based emotions, which we labelled process A and group emotions, which we labelled process B (Niedenthal & Brauer, 2012).

Moreover, as the study advanced, we realised that while clearly distinguishable, process A and B are not per se mutually exclusive. Reflecting this, our approach shifted from identifying one of the two processes as the single determinant of spectators' emotional reactions to examining which of the two processes appeared to be the more dominant process. While we still followed the two-pronged analytical approach, laid out in our pre-registration (step 1: charting affective trajectories; step 2: multilevel modelling), we no longer used correlation coefficients to inform a binary decision as to which process would drive spectators' emotional reactions. Furthermore, it should be noted that although our pre-registration raised the same research questions and specified the same methods to address them, it did not feature the formalised, individual hypotheses used in the final manuscript. Likewise, whereas the methodological approach of step 2 was explicitly stated in the pre-registration, step 1 was only conceptually planned. We also complemented the multilevel models with various charts (**Figures 3** to **5**) to facilitate their interpretation, which had not been pre-registered.

Lastly, in the pre-registration we hypothesised that the stage of the competition (e.g. group stage versus round of the best 16, quarter final etc.) might serve as moderator and aimed to include this in our analyses. However, as the German national team was eliminated in the group stage they did not progress to the knock-out stage and this specific question could thus not be investigated. As another consequence of the unexpectedly early elimination of the German national team from the tournament, we could only collect data on three matches with German involvement, rather than the seven matches, that were anticipated in our a priori power calculations (see *Recruitment* section). Therefore, as stated above, to boost the statistical power of our design and maximize utilized information from our

data, we chose to investigate the effect of goal difference, rather than final result, when specifying our multilevel models. This also had the advantage of incorporating the information from reference-games and half-time score assessments, rather than focusing merely on before/after match comparisons across the three German matches. This being said, throughout the results and discussion section, we sought to contextualise all results and make clear how the goal difference values correspond to the respective results of the German team.

Results
Step 1: Core Affect Trajectories
Table 1 summarises the mean scores and standard deviations of core affect at baseline and during the three German matches, averaged across all spectators and time points (before kick-off, half-time, after the match).

Figure 2 shows the core affect trajectories for the three German World Cup matches and baseline measures separated by fan vs. non-fan identity (**Figure 2a**: valence; **Figure 2b**: activation). The baseline reflects core affect while watching reference games or no soccer matches at all.

Examining Affect Trajectories: Valence
As can be seen in **Figure 2a**, all spectators tended to exhibit at least some pleasant affect before kick-off. At half-time, when Germany was either one goal down (GER-MEX 0–1, GER-SWE 0–1) or tied (GER-KOR, 0–0), valence dropped substantially, especially among fans. While valence plummeted drastically after the lost matches (GER-MEX 0–1, GER-KOR 0–2), consistent with prior research (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Leach & Spears, 2009), fans were more negatively affected than non-fans. This was especially true after the defeat against Korea which eliminated Germany from the World Cup. Consistent with previous research (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Stieger et al., 2015), after Germany's last-minute victory against Sweden (2–1) which kept the team in the competition, a strong upswing in valence occurred in all spectators, although it was slightly more pronounced in fans.

Examining Affect Trajectories: Activation
Figure 2b shows moderate levels of activation for all spectators before the first match (GER-MEX) followed by somewhat heightened arousal before the subsequent matches (GER-SWE, GER-KOR). At half-time, activation had already visibly risen, particularly during the Sweden match (0–1) where Germany was one goal down and hence on the verge of early elimination. While little

Table 1: Descriptive statistics of experience sampling variables.

	No game/reference games	Germany vs. Mexico	Germany vs. Sweden	Germany vs. South Korea
	n, k, M (SD)	*n, k, M (SD)*	*n, k, M (SD)*	*n, k, M (SD)*
Valence	247, 9750, 58.3 (18.0)	158, 329, 50.1 (22.9)	193, 435, 64.0 (27.5)	184, 432, 48.5 (25.9)
Arousal	247, 9796, 47.7 (18.3)	158, 330, 58.8 (20.5)	193, 437, 73.0 (21.6)	184, 433, 66.2 (20.8)

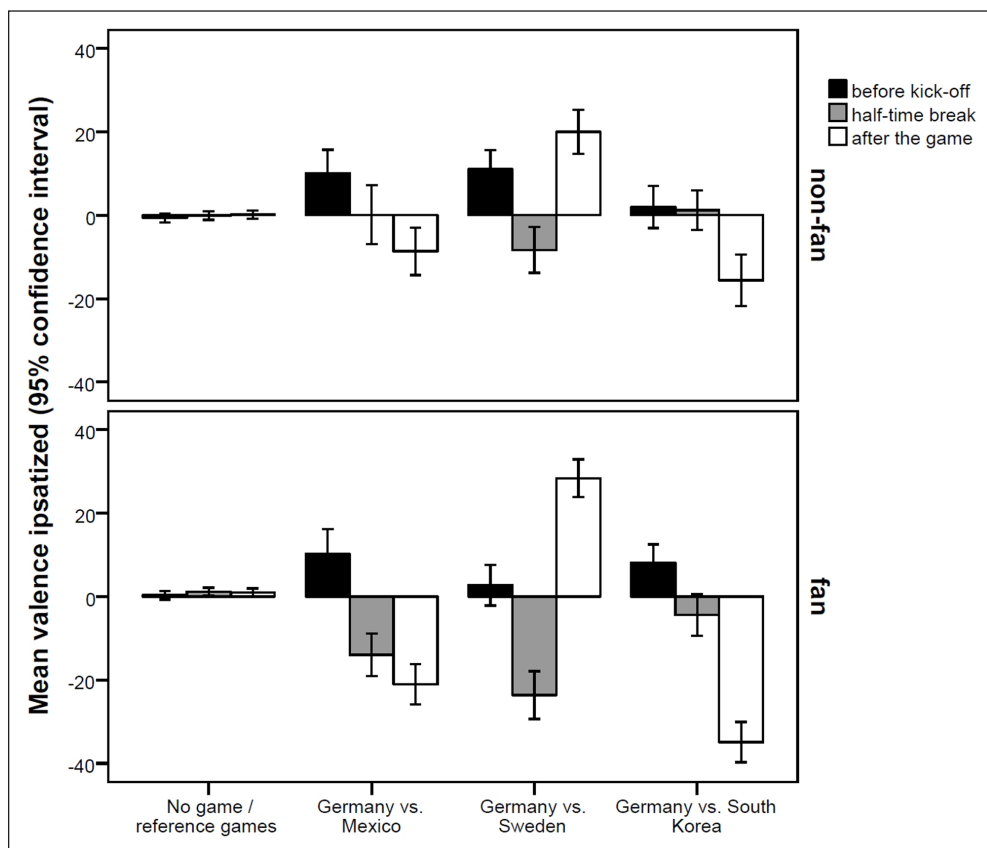*Note*: n = number of participants, k = number of assessments.

Figure 2a: Development of affective valence of fans and non-fans during the three German matches and references games; half-time and end scores are shown in parentheses.
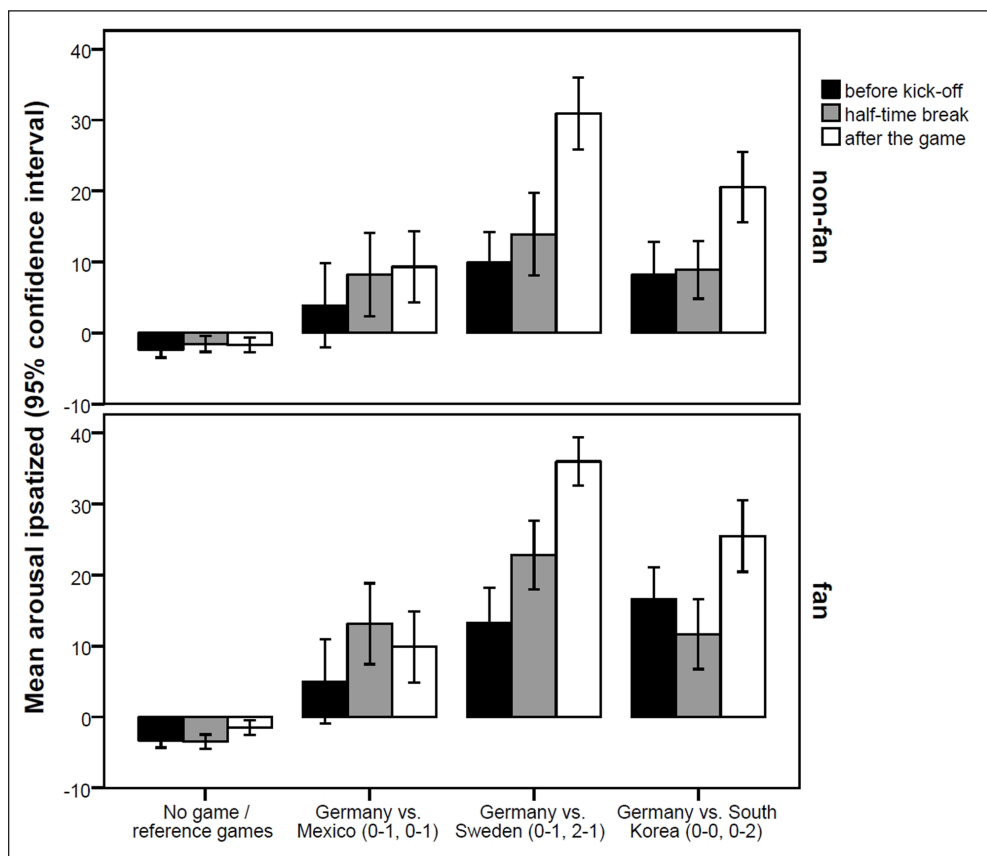
Figure 2b: Development of affective activation of fans and non-fans during the three German matches and references games; half-time and end scores are shown in parentheses.

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change occurred after the Mexico game, compared to half-time, another strong surge in activation was observed after the last-minute win over Sweden (2–1) and the subsequent elimination against Korea (0–2), in line with prior research and theorising (Bryant & Comisky, 1982; Knobloch-Westerwick, David, Eastin, Tamborini, & Greenwood, 2009; Lehne & Koelsch, 2015). Generally, fans and non-fans showed almost identical activation patterns, with slightly higher arousal among fans.

Overall, **Figure 2** illustrates that both fans and non-fans exhibited strong fluctuations in response to the performances of the German national team, as would be expected by process B. Moreover, the general patterns are converging among the two groups, which is also consistent with process B. At the same time, the magnitude of the observed affective responses occasionally differs slightly between the two groups, which may hint at a moderating effect of fandom, in line with process A. Taken together, based on visual inspection and descriptive statistics, process B would appear to be the dominant mechanism driving the affective dynamics of spectators, while process A may also play a role, albeit a less influential one. However, no definite conclusions can be drawn from these purely descriptive figures and rigorous testing is needed to address our research questions. Therefore, we ran multi-level models (MLMs) which are reported below.

Step 2: Multilevel Modelling (MLM)

Next, MLM was conducted to elucidate the dynamics of the affective fluctuations in response to the performances of the German national soccer team. In the current case, the multilevel structure is expressed in temporal hierarchies (Nezlek, 2008), with ESM-assessments constituting Level 1 (longitudinal level) nested in individual respondents at Level 2 (participant level).

By using the goal difference, it was possible to include not only the respective games with German involvement, but also those participants who did not watch the respective Germany match as well as all those reference games without German involvement (which have been labelled as "baseline" above, see **Figure 2b**; first column). For the MLM, we calculated a linear mixed-effects model (R-package lme4, version: 1.1–21; Bates, Maechler, Bolker, & Walker, 2015). The two dimensions of core affect, i.e., valence and activation were defined as dependent

variables. Goal difference and being alone vs. in company while watching the match served as Level 1 predictor. Meanwhile, fan identity served as Level 2 predictor and was grand-mean centred prior to analysis, consistent with established guidelines (Enders & Tofighi, 2007).

To utilize all information from fan identity we included it as a continuous variable rather than performing a median split as was done in **Figures 1, 2, 3** and **5** for the benefit of more easily interpretable visualisation. In addition, as being in company vs. alone might moderate potential emotional contagion or shared attention effects (i.e., company arguably facilitates contagion and the awareness of co-attention and hence boosts the effects of process B) we added an interaction term between goal difference and being in company vs. alone. Likewise, as **Figure 2** suggested that in cases where Germany had a negative goal difference (i.e., lost or was lagging behind) effects where significantly smaller for non-fans compared to fans, it appears conceivable that the processes of affective experience may function differently depending on the dynamics of the match (i.e., winning vs. losing). To address this possibility, we furthermore added a second interaction term between goal difference and fan identity.

Accordingly, for the final analysis, we used the following model including the cross-level interaction terms specified above:

Level 1: Pleasure$_{ti}$ = π_{0i} + π_{1i} * goal difference$_{ti}$ + π_{2i} * in company$_{ti}$ + e_{ti}

Level 2: π_{0i} = β_{00} + β_{01} * fan identity.cgm + r_{0i}

Level 2: π_{1i} = β_{10} + β_{11} * fan identity.cgm + r_{1i}

Level 2: π_{2i} = β_{20} + β_{21} * fan identity.cgm + r_{2i}

Examining Hypothesis 1/Hypothesis 2

The results are summarised in **Table 2** (valence) and **Table 3** (activation), respectively. As can be seen in **Table 2**, goal difference yielded the greatest effect, with every increase of one goal in favor of Germany leading to a mean increase of 15.22 points in positive affect, mirroring prior research (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Stieger et al., 2015). Likewise, irrespective of the outcome of the match, being in company (vs. alone) was related to an average increase of 5.09 points on the valence scale. Of note, however, these two effects did not interact, i.e., the effect of goal difference on affective

Table 2: Results from MLM with Affective Valence as Criterion.

Predictor		Fixed				Random	
	Coef.	Est. [95% CI]	SE	t	Coef.	SD	
Intercept	β_{00}	55.36 [54.01, 56.70]	0.69	80.4***	r_{0i}	8.75	
Goal difference	β_{10}	15.22 [11.75, 18.70]	1.78	8.6***	r_{1i}	10.04	
In company	β_{20}	5.09 [3.98, 6.20]	0.56	9.0***	r_{2i}	5.54	
Fan.cgm	β_{01}	0.05 [<0.01, 0.09]	0.02	2.0*			
Goal difference * In company	β_{11}	0.45 [–3.08, 3.97]	1.80	0.2			
Goal difference * Fan.cgm	β_{21}	0.27 [0.20, 0.34]	0.03	7.8***			

Note: cgm = centering on grand mean. * $p < .05$, *** $p < .001$.

Table 3: Results from MLM with Affective Activation as Criterion.

Predictor		Fixed			Random	
	Coef.	Est. [95% CI]	SE	t	Coef.	SD
Intercept	β_{00}	44.10 [42.88, 45.34]	0.62	71.23***	r_{0i}	7.43
Goal difference (−2)	β_{10}	29.02 [20.08, 38.30]	4.21	6.89***	r_{1i}	14.53
Goal difference (−1)	β_{20}	12.77 [7.18, 18.79]	2.92	4.38***	r_{2i}	14.09
Goal difference (0)	β_{30}	13.91 [9.67, 17.87]	2.08	6.69***	r_{3i}	9.60
Goal difference (1)	β_{40}	29.90 [2.24, 38.47]	4.30	6.96***	r_{4i}	11.50
In company	β_{50}	5.30 [4.16, 6.41]	0.58	9.20***	r_{5i}	5.42
Fan.cgm	β_{01}	0.04 [>−0.01, 0.08]	0.02	1.83+		
Goal difference (−2) * In company	β_{11}	−5.03 [−14.52, 4.41]	4.60	−1.09		
Goal difference (−1) * In company	β_{12}	1.94 [−4.44, 7.92]	3.02	0.64		
Goal difference (0) * In company	β_{13}	−4.11 [−8.11, 0.34]	2.21	−1.86+		
Goal difference (1) * In company	β_{14}	4.98 [−4.48, 13.67]	4.53	1.10		
Goal difference (−2) * Fan.cgm	β_{21}	0.10 [−0.03, 0.23]	0.07	1.45		
Goal difference (−1) * Fan.cgm	β_{22}	0.16 [0.05, 0.27]	0.06	2.89**		
Goal difference (0) * Fan.cgm	β_{23}	0.17 [0 08, 0.26]	0.04	3.81***		
Goal difference (1) * Fan.cgm	β_{24}	0.22 [0.10, 0.34]	0.06	3.64***		

Note: Reference for goal difference was 10 (did not watch game at all), cgm = centering on grand mean. + $p < .10$, * $p < .05$, ** $p < .01$,
*** $p < .001$.

valence was independent of whether someone was watching the respective match alone or in company.

Meanwhile, fan identity emerged as a statistically significant predictor of heightened valence. However, an increase of ten points on the fan identity measure (scaled from 0 to 100) was accompanied by a rise of only 0.5 points on the valence scale, making this effect tiny, especially in comparison to the large effect of goal difference. Notably, fan identity was found to moderate the effect of goal difference on affective valence. The more pronounced spectators' fan identity was, the larger was the impact of goal difference on valence.

Taken together, this pattern suggests, that both, process A and process B bear on spectators' valence while watching the German national soccer team. More specifically, a general group emotion effect (process B) appears to be present at any time i.e., the effects of all positive and negative goal differences on valence for non-fans are significantly different from 0 and occur in the same direction as those for fans. However, fans still appear to be more strongly affected by the performance of their team, especially if their team fares badly. This becomes evident in **Figure 3** exhibiting the effect of goal difference on valence separated by fan identity (median split for better visualisation), which shows that the confidence intervals for negative goal differences do not overlap between the two groups. As an additional visual aid to comprehend these findings, **Figure 4** demonstrates that the slopes of the effect of goal difference on valence are getting substantially steeper as fan identity rises. It is however important to note, that even in the absence of fan identity, the slope is still substantially different from 0 (simple slopes

test: +1 *SD*: $t = 16.73$, $p < .001$; −1 *SD*: $t = 16.26$, $p < .001$). Summed up, our MLMs indicate that the affective valence of all spectators was strongly affected by the performance of the German national team ($b = 15.22$). While the affective impact was slightly stronger on fans, particularly in the event of negative goal differences, this interaction was very small in comparison to the afore-mentioned indiscriminate effects on all spectators ($b = 0.27$).

Next, we ran a second MLM with slightly altered specifications to examine the effects on affective *activation*. A different approach to the goal difference variable was used, as it could be argued that wins and losses alike should lead to heightened arousal (Comisky & Bryant, 1982; Knobloch-Westerwick et al., 2009; i.e., non-linearity is prevalent). Displaying the effects of goal difference on arousal separated by fan identity, **Figure 5** lends support to this assumption. Moreover, it also highlights, that goal difference direction matters, with greater effects occurring if Germany was one goal ahead, rather than behind. Hence, to account for the non-linear relationship between goal difference and arousal, we dummy-coded goal difference before entering it into our MLM, which is shown in **Table 3**. Furthermore, to account for the fact that fans already showed greater arousal before the German matches as mentioned above, we separated the baseline (goal difference = 0) into two groups, i.e. measurements taken from neutral reference games (= reference) and measurements taken from German matches before kick-off (*before the game*: goal difference = 0).

As shown in **Table 3**, after the last match against South Korea (the only data collection where goal difference was −2) spectators' arousal was on average 29.02 points (out
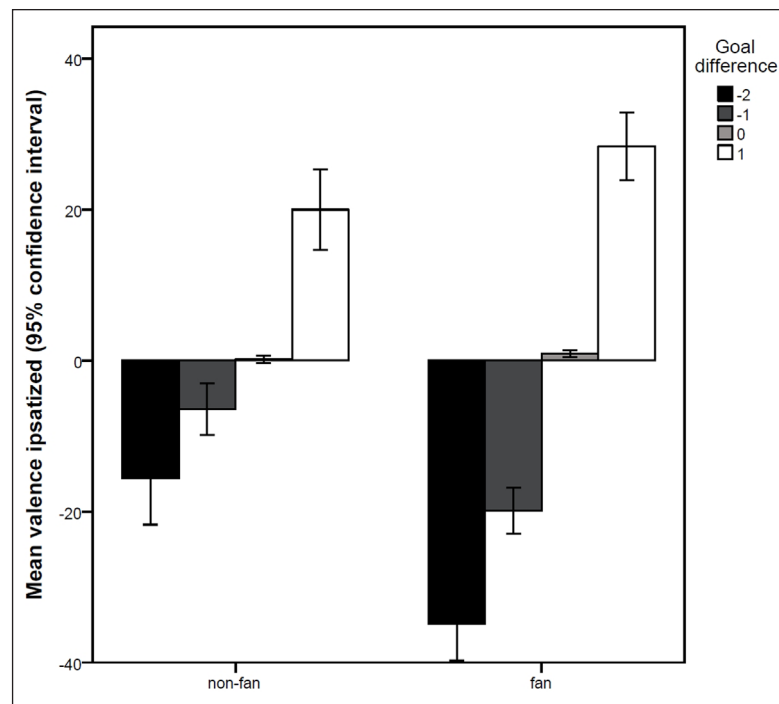
Figure 3: Effect of goal difference on affective valence for non-fans and fans.
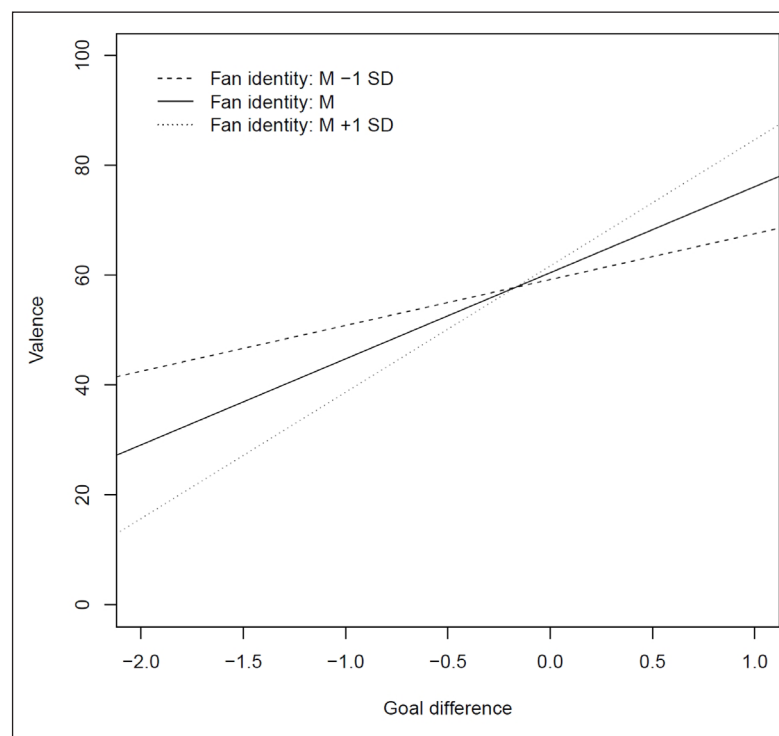

Figure 4: Moderating effect of fan identity on the relationship between goal difference and affective valence.

of 100) higher than at reference. The magnitude of this effect is in fact more than double of the effect of a goal difference of −1. Interestingly, goal difference +1 shows a similarly strong effect as goal difference −2 ($b = 29.90$). In both cases this might be also attributed to circumstances and consequences rather than the sheer goal difference alone. In fact, the loss against Korea meant the premature elimination of the team from the tournament. Likewise, the goal difference of +1 only occurred once, when

Germany secured the last-minute victory against Sweden and maintained their chances to survive the group stage. Interestingly, activation before the German matches (goal difference = 0) was already significantly different from the reference, i.e., compared to non-spectators, participants before the match already scored 13.91 points higher on activation.

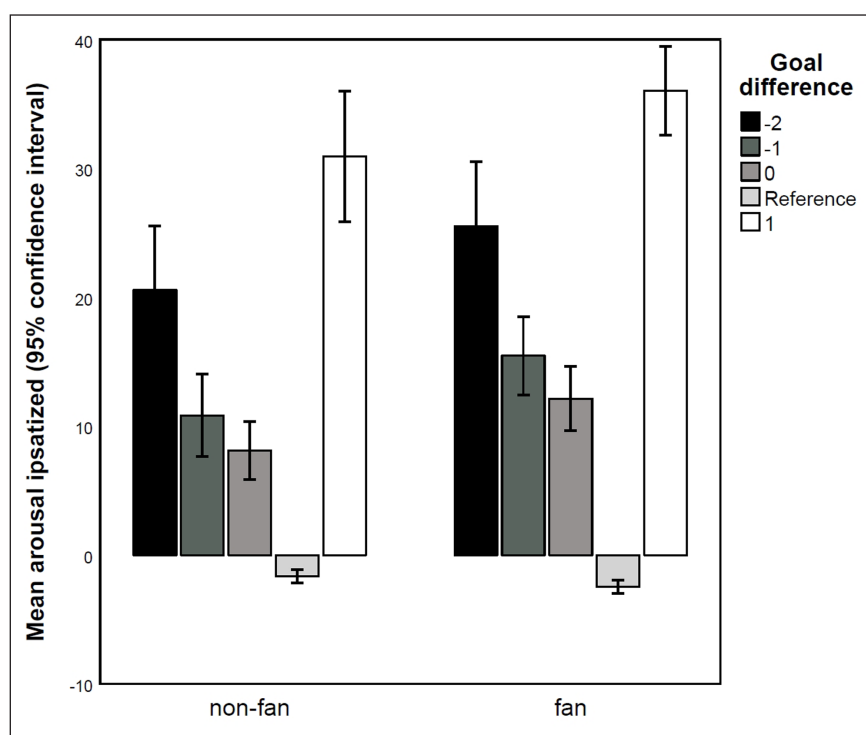Similar to the findings for valence, being in company led to an increase of 5.30 points on average. Meanwhile

Figure 5: Effect of goal difference on affective activation for non-fans and fans.

fan identity had a very weak positive effect on arousal that failed to reach nominal significance ($p < .10$). Concretely, scoring 10 points higher on the fan identity variable (on a 0–100 VAS) was associated an increase of 0.4 points in activation. Again, mirroring the results for valence, no significant interaction between goal difference and being in company was found. Regarding the interaction between goal difference and fan identity, arousal of fans and non-fans was differentially affected by the performance of the German team, (except goal difference –2) leading to a somewhat greater arousal among fans. However, mirroring the findings for valence, the effect sizes of these interactions were very small ($b = 0.16$ to 0.22).

Taken together, a largely consistent picture emerges from our MLM analyses on the two dimensions of core affect. As such, the findings point to both process A and process B at the origin of spectators' affective experience with the latter emerging as the predominant and more powerful process.

Discussion

The powerful consequences of emotions are especially salient among soccer spectators, who experience strong affective reactions in response to game outcomes with potentially severe downstream behavioural consequences. As such, soccer-induced emotions may lead to dramatic losses at stock markets (Ashton et al., 2003; Edmans et al., 2007), fuel riots (Lever, 1969), and in the most extreme cases trigger heart attacks (Kirkup & Merrick, 2003; Witte et al., 2000; Wilbert-Lampen et al., 2008). While these are extreme examples, they illustrate the power of soccer to impact on spectators, which begs a simple yet crucial question: how exactly do the dynamic trajectories of

spectators' emotional experiences unfold during soccer matches and what determines their intensity?

To answer this question, the present study used an app-based ESM-procedure, monitoring the development of core affect in German sports spectators throughout the matches of the German national soccer team at the 2018 FIFA World Cup. In addition to providing an informative overall sketch of how soccer spectators' emotions changed during matches, we assessed fan identity before the tournament and compared the affective trajectories of fans and non-fans to determine whose core affect would be altered during the performances of the German team. Applying MLMs based on more than 9,000 data points revealed (1) that wins of the German team generally led to heightened pleasure among spectators, (2) losses of the German team generally led to displeasure among spectators and (3) spectator arousal rose as a function of goal difference, thus replicating prior research (Jones et al., 2012; Kerr et al., 2005; Knoll et al., 2014; Leach & Spears, 2009; Lehne & Koelsch, 2015; Stieger et al., 2015).

Furthermore, group emotions emerged as the psychological process, most likely to drive changes in both dimensions of core affect, i.e. valence and activation. Notwithstanding the fact that significant interactions were found, indicating that fans tended to display somewhat more negative affect after losses ($b = 0.27$) and slightly greater arousal after the last-minute victory against Sweden ($b = 0.22$), those effect sizes were small, especially when compared to the general effects that applied to all spectators regardless of fan identity (e.g., main effect of activation after victory against Sweden: $b = 29.90$). Taken together, these converging patterns of activation and valence suggest that while psychological affiliation with

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the team slightly intensifies the affective experience of German spectators during the FIFA World Cup (process A), they do not need to identify strongly to be strongly emotionally affected by its performance (process B).

In light of these findings, given how many people are affected by the FIFA World Cup, even small effects would be highly relevant (Knoll et al., 2014). However, the strength of our effects are substantial in magnitude. In fact, across our sample of 208 participants, a single goal in favour of Germany's goal difference was followed by a mean increase in positive affect of 15 points on a 100-point scale. Similarly, the effects of the last-minute win against Sweden ($b = 29.90$) and the loss to South Korea that effectively eliminated the team from the competition ($b = 29.02$), both approach an average change in arousal of almost 30 points on a 100-point scale.

In a nutshell, these findings demonstrate that the performance of the German national soccer team at the World Cup was followed by pronounced changes in core affect, that occurred among all spectators, irrespective of whether or not they identified as fans. While the general pattern of our empirical results is hence very consistent and interpretable, two aspects of our findings deserve a more nuanced discussion.

First, as can be seen in **Figures 3** and **4**, the effects of emotional convergence in valence do not appear to be symmetrical. Rather, emotional convergence is observable after wins (goal difference 1), whereas fans seem to suffer the affective consequences of negative goal differences more strongly than non-fans, echoing prior research (Ferrarra & Yang, 2015; Totterdell, 2000). This aligns with the established finding that many sports spectators engage in affective cherry-picking, by strengthening their emotional ties after wins, basking in reflected glory of their team (BIRGing; Cialdini, Borden, Thorne, Walker, Freeman, & Sloan, 1976) and distancing themselves after losses, hence cutting off reflected failure (CORFing; Snyder, Lassegard, & Ford, 1986). Thus, on an individual level it would be most adaptive to BIRG as a means of ego enhancement to maximise positive affect (Tamir, 2009; Wann & Branscombe, 1990) and CORF as a means of ego protection to minimise negative affect (Hirt et al., 1992). However, unlike utilitarian fair-weather fans who may prioritise their own well-being, true fans are usually genuinely emotionally attached to their team and would neither want nor be able to dissociate and CORF in case of failure (Hirt et al., 1992; Jones et al., 2012; Kirkup & Merrick, 2000; Wann & Branscombe, 1990).

Second, despite the evidence for group emotions, the interaction terms between goal difference and watching the game in company vs. alone were not significant (valence: $b = 0.45$, $p > .05$; activation: all $p > .05$). Hence, all spectators were notably affected by the performances of the German team – even in the absence of other people, which at first glance seems to contradict the prominent group emotion theories that informed our research, i.e. emotional contagion and shared attention. Indeed, when emotional contagion was proposed, Hatfield and colleagues (1993) primarily focused on primitive emotional contagion which occurs through facial and postural mimicry and requires the physical presence of other people. However, even back then, Hatfield and colleagues (1993) themselves suggested that more complex forms of large-scale emotional contagion might also be transmitted through mass media, such as TVs. As direct human interaction is not a precondition for emotional contagion (Neumann & Strack, 2000) such processes appear rather plausible. Such an emotional contagion through televised media (von Scheve et al., 2014) might be further facilitated in the present context, due to the ever-increasing emotionalisation of sport broadcasts (Ismer, 2011). A similar argument can also be made in support of shared attention: While, spatial and emotional closeness with others makes the perception of shared attention more likely (Shteynberg, 2015, 2018; Boothby, Smith, Clark, & Bargh, 2016), they are not a necessary precondition. Rather, shared attention is predicated on the perception of synchronous co-attention of others (Shteynberg et al., 2016). Thus, if anything, broadcast mass media that reaches large numbers of individuals aware of being part of a massive audience may actually give rise to a unique form of shared attention that yields cognitive, affective, and behavioural ramifications on a scale, that could not be accomplished through physical co-presence (Shteynberg, 2010, 2015).

Likewise, an alternative pathway of emotional contagion and the emergence of shared attention may have opened up through the advent of social media, which are quickly diminishing the importance of face-to-face interactions for emotional experiences (Parkinson & Manstead, 2015). Indeed, the Internet may represent an excellent platform for emotional spill-overs (Gosling & Mason, 2015), with recent research demonstrating massive emotional contagion via Facebook (Coviello et al., 2014; Kramer, Guillory, & Hancock, 2014) and Twitter (Ferrara & Yang, 2015; Stieger & Swami, 2014) in the complete absence of any physical personal interaction. Consequently, it appears reasonable to assume that spectators watching the match on their own may have been exposed to emotionally contagious content on social media during the match. At the same time, social media content related to the soccer matches could also be a salient way to raise spectators' awareness for the multitude of others attending to the same event and hence foster perceptions of shared attention and in turn more profound cognitive processing and emotional experiences (Lin et al., 2014; Shteynberg, 2015).

This dovetails well with research showing that second-screen social media usage may enable mediated co-viewing experiences that are emotionally similar to physical co-viewing (Cohen, 2017; Cohen, Bowman, & Lancaster, 2016). In the current context, these phenomena may be even more likely to occur given 63% (Wang, 2015) to 79% (Cunningham & Eastin, 2017) of sports spectators access social media during sports consumption, with many soccer spectators deliberately using social media during the matches as an emotional outlet and way to experience social camaraderie (Phonthanukitithaworn & Sellitto, 2017; Yu & Wang, 2015).

A third route of emotional contagion and shared attention induced effects might relate to the outstanding societal role of the soccer World Cup, especially in Germany (von Scheve et al., 2014). In fact, many scholars have highlighted a general transcending change in atmosphere and a ubiquitous feel-good effect during major soccer tournaments in countries that have a high affinity for the sport (Ashton et al., 2003) and Germany in particular (Hallmann, Breuer, & Kühnreich, 2013; Maennig & Porsche, 2008). This may ultimately affect the entire society (Edmans et al., 2007) and make it almost impossible to escape the World Cup, even for soccer haters (Elling et al., 2014). Thus, spectators may not need to be in the company of others while watching the match itself, to catch the omnipresent World Cup vibe.

Limitations and Future Research

As we adopted a naturally occurring quasi-experimental design, we could not manipulate the performance of the German team at the soccer World Cup. Unexpectedly, our data captured a historical and unprecedented failure of the German team, which yielded very strong and emotionally powerful effects. At the same time, due to the failure of the team to advance to the knock-out stage, our study was restricted to the group stage. Therefore, we could not examine any unique effects of the changed competition mode in the knock-out stage or the affective dynamics of potential extra time and penalty shootouts. Moreover, despite converging evidence from other countries and sports (Cialdini et al., 1976; Fan, Billings, Zhu, & Yu, 2019; Hirt et al., 1992; Jones et al., 2012; Kerr et al., 2005; Leach & Spears, 2009; Snyder et al., 1986; Wann et al., 1994) as the study was confined to a German cultural context it is unclear to which extent the findings may generalise to other countries that (1) have a weaker soccer culture and (2) are not expected to do well. In order to address this question, future research should aim for a cross-cultural replication e.g., through a multi-national ESM-study during the 2020 UEFA European Championship. Likewise, future research should also consider other sports events that may not be as deeply entrenched in the national culture to determine whether affective disposition may be more relevant in such cases.

Beyond investigating cultural differences, another promising avenue for future research would be to delve into individual differences, that might either predict fan identity or affective reactions to sport events independent of fan identity. These could be personality traits, such as the Big Five (John & Srivastava, 1999), moral foundations (Haidt, 2007) or basic values (Schwartz, 1992, 2012). Similarly, it would be informative to assess the viewing motivations of non-fans and investigate if they might moderate their affective experience. For instance, spectators who watch the matches for the benefit – and in the company – of friends, family or partners might be more prone to experiencing intense group emotions than spectators who are not watching by choice and are passively exposed to it, e.g. bartenders.

On a methodological level, it should be noted that while the sheer magnitude and immediacy of the changes in affect make it probable that they were directly caused by the performance of the German team, strictly speaking it is theoretically possible that the changes were caused by a third unknown or unmeasured factor. We therefore caution readers against an interpretation of the present findings as conclusive causal evidence.

Furthermore, as our study app was only available on Android smartphones, it is possible that this may have induced selection biases in our sample. However, recent research has demonstrated that there are no meaningful differences in key psychological characteristics between users of the major smartphones operating systems (Götz, Stieger, & Reips, 2017). Nonetheless, future app-based ESM-research should be open to participants independent of their smartphone operating systems.

Lastly, in acknowledgement of the power of group emotions, future research should also aim to gain a more in-depth understanding of the phenomenon and its underpinnings. For instance, a more granular assessment of consumption circumstances of individual sports spectators that includes real-time information on shared attention, emotions of potential physically present co-viewers and social screen usage might be useful. Likewise, a more nuanced, non-binary measure of company, that reflects differences in group size and settings would be useful to foster a better understanding of the emergence and spread of group emotions both within the context of sports spectatorship and beyond e.g., in electoral campaigns (Shteynberg et al., 2016).

Concluding Remarks

Emotions in groups are a hot topic in psychological research (Niedenthal & Brauer, 2012), and the FIFA World Cup offers a great opportunity to study them in a natural setting. Applying a fine-grained app-based ESM-design, the present study tracked the affective experiences of spectators who followed the German national soccer team throughout the tournament. Across both dimensions of core affect as well as three German matches with very different dynamics and outcomes, we found consistent evidence that fans and non-fans were both strongly emotionally affected by the performances of the German team. While some responses were slightly more pronounced among highly identified fans, overall the findings clearly point to group emotions rather than group-affiliation based emotions with emotional contagion and shared attention as plausible drivers of this phenomenon.

Data Accessibility Statement

All participant data and analysis scripts can be found on our project page on the Open Science Framework: https://osf.io/mq4n2/.

Note

[1] We also checked whether this pattern holds true for half-time scores and final results in isolation. It might be reasonable to assume that final results will elicit higher effects than half-time scores. Contrary to that assumption, we found no significant differences. Therefore, we subsequently treated half-time and final

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scores as equally important. Detailed results are omitted for brevity.

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Competing Interests

The authors have no competing interests to declare.

Author Contributions

- Contributed to conception and design: FMG, SS, TE, DL
- Contributed to acquisition of data: FMG, SS, TE, DL
- Contributed to analysis and interpretation of data: FMG, SS
- Drafted and/or reviewed the article: FMG, SS, TE, PJR, DL
- Approved the submitted version for publication: FMG, SS, TE, PJR, DL
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